



Rational Investing

Artificial Intelligence . Forward Beta . Valuation

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Forward (Looking) Beta

- **Risk Adjusted DCF Model** -> Corporate Finance without Noise and Bias
- Estimate Cash flow defensible through the business cycle, and the costs of generating that cash flow
- Generates a **forward looking measure of a stock's expected correlation to the market**, driving which is the expected sensitivity of the company's future health to that of the economy, a **true Beta**
- We use **artificial intelligence / decision trees** rather than CAPM / Statistical finance to integrate fundamental information
- We run a 'clean room': **No guidance, consensus or other outside estimates, biases, or opinions of any kind**
- An analyst team reviews initial results for data correction and footnote / event processing – **systems scale a labor intensive corporate finance process**
- Stringent quality monitoring – Industrial process, not just analytical result
- Finished product – standalone Sharpe 2+ historical record



Unique Methodology Implements Fundamental Decision Process

Short Term Anomaly or Multi-Decade Fundamentals

- Statistical Arbitrage – price autocorrelation or mean reversion
- Multi-Factor Models – cross sectional regression on a few factors
- Very short or very long timelines - Most ‘anomalies’ face limits of opportunity size and do not offer competition to traditional equity long / short
- We have automated traditional equity long / short portfolio construction

Rational Investing: Blend of approaches, scales medium time horizon

- Consistent, scalable approach to corporate finance + CAPM
- Stable portfolio returns realized in any horizon greater than a few weeks
- Flexible Equilibrium: Incorporate macro cycle impact
- Observation backed by intuition i.e. we are always able to answer ‘Why?’
- Blend of techniques from fixed income, equity statarb, merger analysis
- **Finished Product Tested under Market Neutral Constraints**

Corporate Finance Integrated into Quantitative Valuation



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- Rational Investing is a valuation system integrating hundreds of non-linear relationships
- It parses a massive, distributed decision tree to produce a DCF model with
 - **Free Cash Flow normalization** reviewed and supplemented by an analyst team
 - **Projection of financial statements line item by line item** using 2 years of data
 - A unique, **forward looking Risk Adjusted Expected Return / Discount Rate** for each stock, impacted by company and sector fundamentals
 - The impact of **Leverage, Taxes and Monetary Policy**
- **Event processing and error reduction** consume a majority of our day to day effort



Methodology Consistency, Accurate Information, and Economic Data Scrubbing

- **We have scrubbed corporate data history for 5000+ global firms**
- We adjust GAAP numbers to generate sustainable cash flow, e.g.
 - Revenue is normalized from quarterly, annual, quarter to quarter, cyclical and seasonal trends
 - Movements of costs between line items are normalized for projection
 - Outsized marketing expenses of growth firms are toned down over time
- A single valuation template leads to consistency across sectors
- **Our analyst team enhances the systematic results without offering opinions**
 - Review models as earnings are released, and correcting for a variety of one-off items – litigation settlements, merger costs etc.
 - Incorporate and project balance sheet changes and financial engineering from disclosures in footnotes e.g. hedges, mineral reserves, equity dilution
 - Build a history of M&A and divestitures to understand management behavior



Modern Portfolio Theory => Forward Looking Risk Estimation

- Risk Aversion leads to Diversification - (Maximize) Mean (Minimize) Variance
- Beta – Correlation to Market Portfolio is the driver of risk.
- Beta is elusive in calculation and implementation
- Evidence of ‘un-diversifiable’ fundamental factors in returns such as size, distress, R&D / intellectual property / brand strength / regulation
- We use some of these factors as components to calculate forward looking risks
- Rational Investing: Integrated valuation model incorporating
 - **Fundamental historical inputs** which reveal Industry / Firm cyclicalities, margins and capital structure
 - **The risk aversion of Public rather than Private Investors** - extrapolates changes in trendlines of company fundamentals without bias
 - **The impact of the Yield Curve and credit conditions as inputs into a CAPM**



Artificial Intelligence Applied to Data Normalization

- Sophisticated interpolation, data scrubbing and boundary estimation
- Economic linkages applying contingent probability based rules are used to project financial statements and eliminate noise
- Projections are uniform across industry sectors; allows a single general purpose valuation template incorporating fundamentals from the past 2 years
 - Eliminate accounting tradition variations and ‘guidance’; avoids ‘drift’ by formatting analyst input in risk factor and transaction / event settings
 - The reasonableness and consistency of the fit across companies and sectors allows for high confidence in relative value analysis
- Scalable and enterprise quality infrastructure refined over a decade
 - We have modeled a variety of US indexes at www.rationalinvesting.com
 - We can support Japan, Canada, UK, India on demand, other geographies on 90 days notice.

Corporate Finance without Bias, Quantitative Processing without Noise



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- **Flexible, markets driven general rules not firm specific opinions:** We observe how markets behave and construct rules to map expectations to fundamentals, rather than fitting historical data into theory and calling the rest 'error' or building projections based on 'judgment'.
- Our **data is unique**; other quantitative efforts do not have a corporate finance team normalizing the true cash flow of the company and **checking for errors** and transactions **in the context of the model**.
- **Forward Looking Estimates of Risk Actually Work.** The historical definition of beta has proved almost irrelevant in valuation, but the concept is correct and we have created the best measure of risk. Period.
- **Unbiased, Automated Valuation** Our system generates a full blown DCF spreadsheet on the fly, from company filings, interest rates, and beta.



Quantitative Approach to Corporate Finance = Exceptional Results

- Intuitive and malleable Microsoft Excel valuation for non-financial US stocks, most ADR's, Japan, UK, India, Canada and top 1000 MSCI World firms.
- Apples to apples comparison of relative value between companies in different sectors by using a single modeling template and risk factor 'switches'
- Models reflect a firm's competitive position and financial strength by projecting long term trends in capital expenditure, margins, and funding costs
- The modeling process often points out issues in data; correcting data offers insight into improving the model, creating a positive feedback loop.
- We have experience in gathering company data history from multiple sources and cross-checking it for emerging markets firms.
- Market neutral returns have a Sharpe Ratio of 2 to 3 depending on constraints.
- Index valuation results:

<http://www.rationalinvesting.com/ETFPortfolio.asp?etf=3&name=%20Diamond>

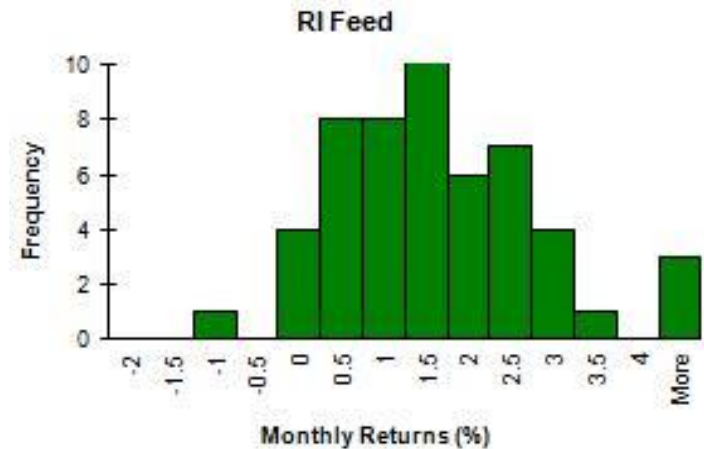
<http://www.rationalinvesting.com/ETFPortfolio.asp?etf=2&name=%20Spider>

<http://www.rationalinvesting.com/ETFPortfolio.asp?etf=4&name=%20Nasdaq+100>

Feed Track Record

Qtr Ending	Unlevered Return	Long / Short Positions	S&P500 Return
Mar-09	2.7%	965 / 126	-3.4%
Jun-09	17.1%	775 / 254	5.3%
Sep-09	6.3%	564 / 373	7.0%
Dec-09	3.7%	578 / 346	7.6%
Mar-10	4.5%	568 / 364	8.9%
Jun-10	3.3%	762 / 210	-13.1%
Sep-10	8.9%	759 / 246	3.6%
Dec-10	5.8%	554 / 344	-6.3%
Mar-11	3.4%	517 / 436	5.4%
Jun-11	1.0%	491 / 430	-0.4%
Sep-11	5.0%	660 / 298	-14.3%
Dec-11	2.5%	493 / 415	11.2%
Mar-12	4.7%	408 / 486	12.0%
Jun-12	2.0%	440 / 379	-3.3%
Sep-12	3.3%	447 / 445	5.8%
Dec-12	2.8%	407 / 509	-1.0%
Mar-13	3.7%	457 / 376	10.0%
Jun-13	2.2%	418 / 447	2.4%
Cumulative	122.8%		77.8%

Average Annual Return 19.5%
 SD Annualized 6.1%
 Sharpe Ratio 3.2



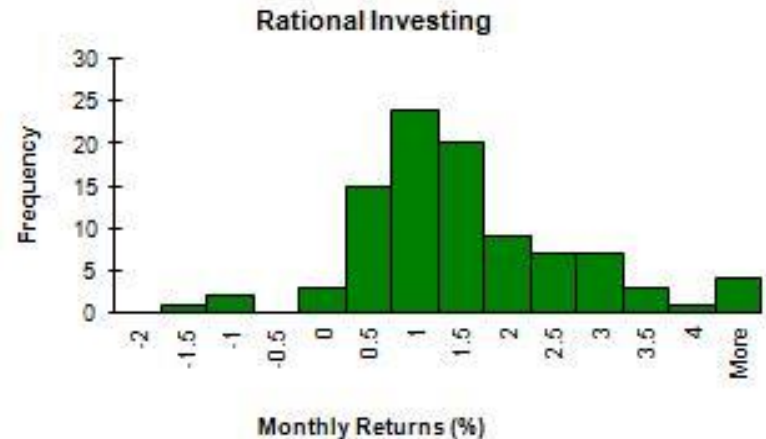
8 years

Year Ending	Unlevered Return	Long / Short Positions	S&P500 Return
Jun-06	16.0%	141 / 1051	6.6%
Jun-07	9.9%	71 / 930	18.4%
Jun-08	9.7%	538 / 392	-14.9%
Jun-09	37.5%	966 / 352	-28.2%
Jun-10	17.4%	1324 / 182	12.1%
Jun-11	19.4%	871 / 341	28.1%
Jun-12	20.4%	926 / 279	3.1%
Jun-13	15.4%	569 / 448	17.9%
Cumulative	274.2%		34.8%

Average Annual Return 17.9%

SD Annualized 5.8%

Sharpe Ratio 2.8



Excluding financials and utilities. Exposure is aggregate of individual buy/sell decisions by Rational Investing model, 5% per sector net limit, 5% monthly stop loss, 25% mis-pricing threshold for initial investment, 10% for exit .



Management

Manish Aurora Quantitative Methodology and Product Architecture, New York

- Co-founded Rational Investing LLC and built its first models starting in 1998. Independent analytics consultant since 1996.
- Designed and developed the FX trading platform of www.fxcm.com now supporting 40,000 retail and 400 institutional clients. FXCM is the world's largest non-bank online FX dealer
- Converted Merrill's European FX derivatives exposure at NYC, London, Singapore offices to the Euro
- Reprogrammed JP Morgan's global swaps pricing and counterparty credit risk calculation using Massively Parallel Supercomputing technology
- Designed the Value at Risk calculator for the merger of Chase and Chemical, then the biggest ever, under an extremely tight deadline from the Federal Reserve
- Constructed earliest CMBS and Corporate Bond credit risk models at BlackRock, allowing it to increase its book tenfold
- Sell-side analyst at Nomura Securities covering real estate equity and debt including CMBS
- Built the first commercial paper direct issuance and investment management and reporting system for GE Capital, ITT, Ford at Financial Sciences
- MBA from the University of Chicago, BS in Computer Science from the University of Scranton



Management

Pieter Hellquist Principal, Fundamental and Valuation Research

- Reviews major changes in Standard DCF valuations produced by the firm
- Deep understanding of how risk and valuation is impacted by changes in fundamentals
- An international financial markets professional with over 20 years experience
- Founding Partner of FLP, a Paris based consulting firm. General Manager EMEA and Head of International Operations for Velocity, a provider of electronic trading systems
- 10 years of Eurasian experience with Citibank, most recently as Global Product Manager for a cross border equities data and trading system
- Business Development Manager for the Citi's e-commerce in Europe before establishing a business development lab based in Australia. Played a key role in several initiatives, e.g. Citibank's next generation FX trading system and a multi-bank confirmation service
- Marketing Manager for Information Products for Reuters - Northern Europe, based in London, for 4 years; preceded by six years in Japan where as Marketing Director he guided the company's rapid business expansion to a US\$ 100+ million turnover
- MBA from INSEAD, a Master of Industrial Engineering from Lund University in Sweden and a degree from Ecole Centrale de Paris. Pieter has lived in seven countries and speaks five languages



Management

Harbhajan Aurora Technology and Research Management, Bombay

- Head of research support and software development effort. Trains the analyst and software engineering teams in corporate finance
- Co-founded Rational Investing LLC and, since 1999, oversees the analyst team. Instrumental in creating the valuation and data normalization processes
- Coordinated all financial technology consulting projects of Distributed Risk LLC and oversaw their engineering including a financial community and the FXCM trading platform
- This is his third career and second successful entrepreneurial venture
- Principal of a textile manufacturing and trading business for 20 years in Bombay and Surat
- Head of Chicago Pneumatic's North Indian marketing, sales and client service, managing 30 professionals selling machinery for large-scale infrastructure projects of national importance
- BSE from the University of Punjab. State record for mathematics proficiency in university entrance exams