# Motivational Performance Measurement

## Jarrod Wilcox

**Northfield Information Services**
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# *"What you measure is what you get."*
## Peter Drucker

- **Need to Refocus**

- **Five easy performance measures**

  – Motivate response to liability structure

  – Motivate optimizing optionality

  – Motivate value-added after-taxes

  – Motivate teamwork

  – Motivate long-term excellence

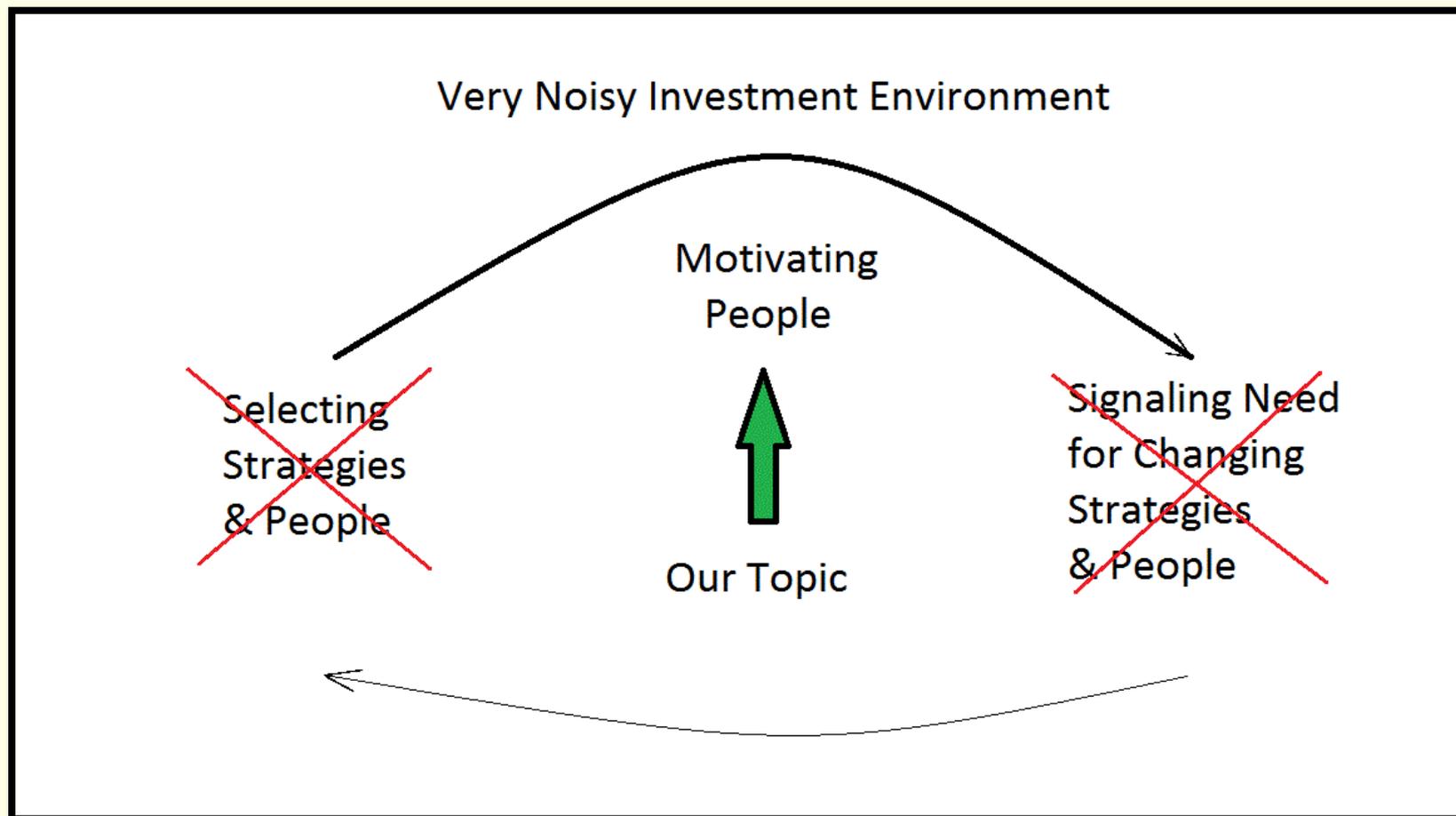- **Action suggestions**

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# Need to Refocus

- **Financial service industry paradigm shift**

  – Commoditization of many products and services

  – Unsustainable responses
    - Higher leverage & risk-taking
    - Miss-marketed financial engineering
    - Overpopulated hedge fund management

  – Increasing public disenchantment

- **But great potential for more value-added!**

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# Performance Measurement Cycle



Very Noisy Investment Environment

Motivating People

Selecting Strategies & People

Signaling Need for Changing Strategies & People

Our Topic

**Do our performance measures motivate available value-adding behavior?**

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# Motivation Failures

- **Madoff**
  - Need for objective measurement ignored.

- **Sub-prime lending, Lehman, et al**
  - Asymmetric agent rewards not managed.

- **VaR did not protect banks**
  - Lack of integration of risk and return,
  - Little attention to fat-tails and longer runs,
  - Misunderstanding of probability logic.

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# Performance Measurement Stress Test

- **Good Motivating Criteria**
  - Congruent with investor benefit
  - Comprehensive, hard to game
  - Objective, not subjective
  - Easy to construct and understand
  - Widely applicable

- **The Usual Suspects**
  - Residual return & tracking error
  - Alpha & factor-adjusted returns
  - Information & Sharpe ratios
  - Downside risk ratios
  - Taxable-equivalent returns
  - Single manager returns
  - Short or isolated history of returns

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# Motivating Response to Liabilities
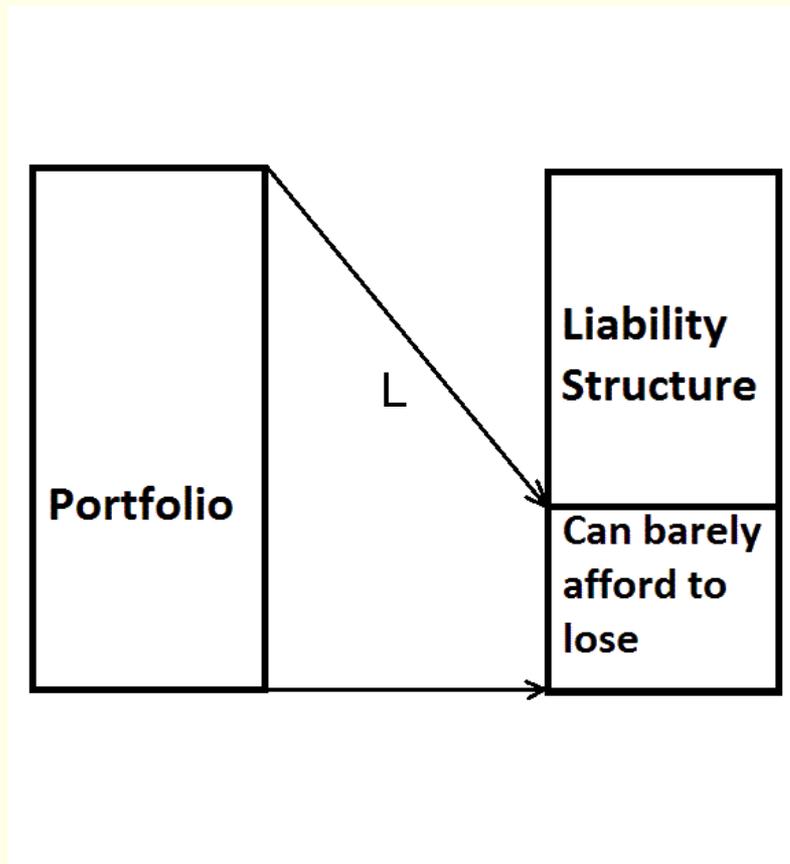


- We want to manage a margin of safety, or "discretionary wealth."

- The ratio of the value of the investment portfolio to what the investor (or investment manager) can barely afford to lose is implied leverage, L.

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# Appropriate Risk Aversion

**Efficient Frontier**

Return

Customized Tradeoff

Risk
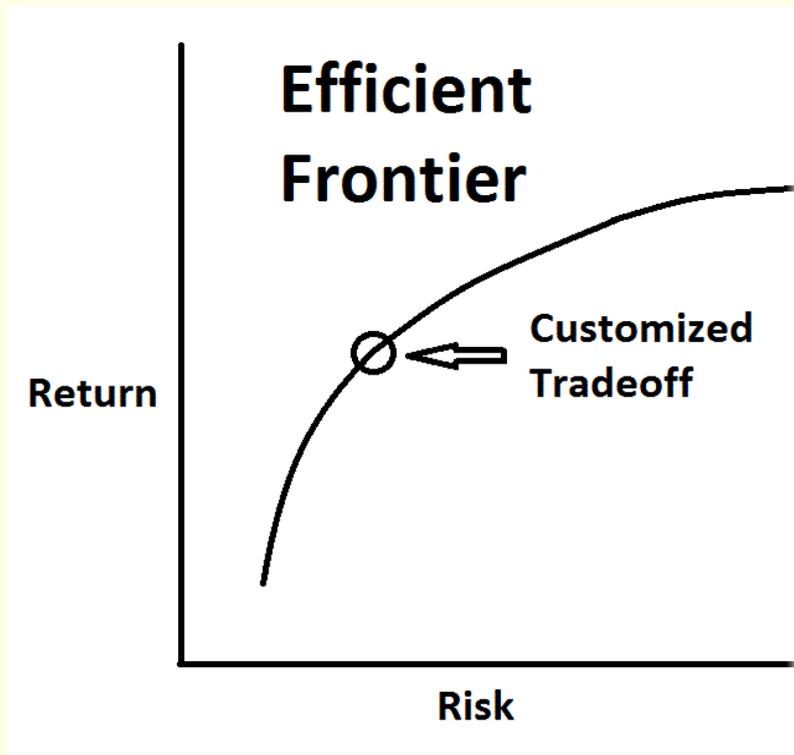
- Markowitz mean-variance optimization:                 max E – (L/2)V, subject to constraints
  - Where E is expected return, V is return variance.

- The discretionary wealth approach offers an anchor for negotiating L.

- What would motivate best performance?

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# Liability-Sensitive Performance Measure

- **Absolute Risk-Adjusted Return**
  - $E - LV/2$
  - Average period return less a risk adjustment based on multi-period return variance and a negotiated risk aversion, preferably based on the more objective discretionary wealth approach.

- **Relative Risk-Adjusted Return**
  - Difference in $E - (L/2)$difference in V
  - This avoids the dysfunctional effect of tracking error's bias against absolute risk aversion.

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# Motivate Optimizing Optionality

- Even plain-vanilla stocks and bonds exhibit non-normal return distributions.

- More broadly, options and price contingent trading strategies have strong impacts on portfolio return skewness and kurtosis.

- How can we motivate appropriate attention to these risk factors not captured by variance?

- Consider maximizing the expected log growth rate of discretionary wealth: **Expected ln(1+Lr)**
  - Where r is return.

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# Capturing the Effect of All Return Moments

## ln(1+Lr) as a Function of Lr



ln(1+Lr)

Lr
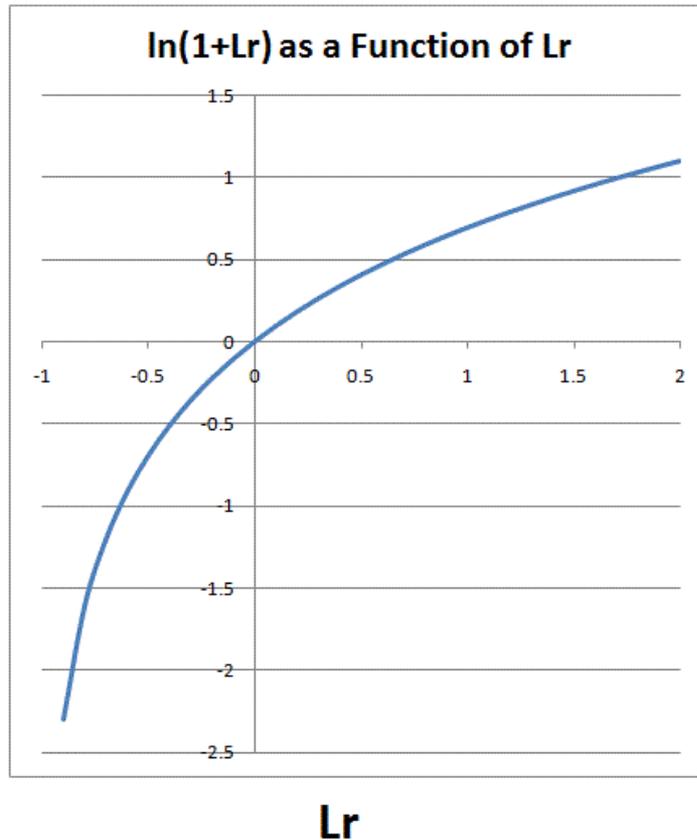
- Consider expected value of ln(1+Lr) as a function of a probability distribution of Lr.

- Variance reduces it.

- Negative skewness reduces it.

- Kurtosis reduces it.

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# Connecting Growth in Discretionary Wealth to Markowitz

- Expected $\ln(1+Lr) \sim$
  $$LE - (L\sigma)^2/2 + S(L\sigma)^3/3 - K(L\sigma)^4/4$$
  - Where $\sigma^2 = V$, S = skewness, K = kurtosis.

- If S and K are small, expected $(1/L)\ln(1+Lr) \sim E - LV/2$, so that the Markowitz goal approximates it.

- Otherwise, improving average $(1/L)\ln(1+Lr)$ is a better goal.

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# Performance Measurement for Motivating Optimum Higher Moments

- **Absolute Risk-Adjusted Return**
  - $(1/L)\ln(1+Lr)$, averaged or summed

  - Average period log leveraged return, scaled to the portfolio by dividing by L, the implicit leverage.

  - Note that, unlike risk-adjusting by variance, measurement can begin in the first period.

  - This measure eliminates the need for statistical formulae and auxiliary downside risk ratios.

- **Relative Risk-Adjusted Return**
  - $(1/L)\ln[(1+Lr)/(1+Lb)]$, averaged or summed, where b is the benchmark return.

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# Motivate Value-Added After Taxes

- Taxes introduce many complications, but we can easily improve with a first step.

- If tax losses can usually be offset against gains, then on average….

  - After-tax E is about E(1-T), where T is the tax rate
  - After-tax $\sigma$ is about $\sigma$(1-T)
  - After-tax V is about V(1-T)[2]

- The most fundamental effect of investment taxation is its differential effect on different return moments.

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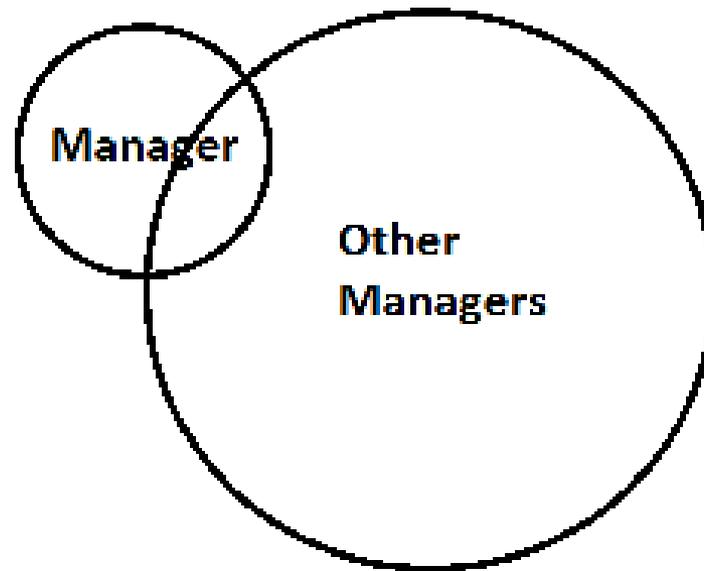# Performance Measurement for Taxable Investors

- **Absolute Risk-Adjusted Return**

  - $(1/L)\ln(1+Lr(1-T))$, averaged or summed.

  - If Markowitz optimization is adequate, then motivate performance by measuring
    $E - L(1-T)V/2$

- **Relative Risk-Adjusted Return**

  - $(1/L)\ln[(1+Lr(1-T))/(1+Lb(1-T))]$, averaged or summed.

  - If Markowitz optimization is adequate, then motivate performance by measuring
    difference in E less $[L(1-T)/2]$difference in V.

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# Motivate Teamwork

Investment manager performance measurement typically ignores diversification contribution to other managers.

Promote reduction of overlap by comparing the performance measure for the whole to the weighted sum of the performance of the two parts – manager and other. Attribute half the difference to the individual manager, scaled to that portfolio.

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# Example Teamwork Measure

- Absolute:

$\{\ln(1+Lr_t) - [(w)\ln(1+Lr_m) + (1-w)\ln(1+Lr_o)]\}/(2Lw)$

  - Where $r_t$ is the total multi-manager return, $r_m$ is the manager return, $r_o$ is the aggregate other manager return, and w is the weight of the manager's portfolio in the total.

- Note:  $r_o = (r_t - wr_m)/(1-w)$

- Relative:

  Absolute for the manager less absolute for the benchmark, in the latter case using b rather than $r_m$.

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# Motivate Long-term Excellence

- Limited performance series after startup offers a very poor indicator of value-added through skill as opposed to chance.

- Bayesian updating of prior probability distributions offers a solution, and would be even better with hierarchical modeling, but would not be well understood and motivating.

- A good first step:  Add negotiated hypothetical prior history to performance measures.

- Measured performance is dampened until more live history is accumulated.

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# Example

- Add three years of zero relative risk adjusted returns to the beginning of a $(1/L)\ln[(1+Lr)/(1+Lb)]$ performance record.

- This motivates reduced game playing based on excessive risk and asymmetric agent compensation.

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# Action Suggestions

- Currently, there is no commercial performance software for these suggested measures.

- But you can easily create and experiment privately with spreadsheet versions.

- Show colleagues examples as additional auxiliary measures, not as replacements.

- Cite to clients as examples of extra efforts you are making to better meet their needs.

- Let me know your setbacks and successes.

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# Useful Information

- Email– [jwilcox@wilcoxinvest.com](mailto:jwilcox@wilcoxinvest.com)

- Websites:[www.wilcoxinvest.com](http://www.wilcoxinvest.com)
[www.wealthmate.com](http://www.wealthmate.com)

- Background reading:  "Harry Markowitz and the Discretionary Wealth Hypothesis", *Journal of Portfolio Management*, Spring 2003.

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