**Minimum Variance Portfolio**

$$Wmin\left(S\right)=\frac{σ\_{b}^{2}-Cov(r\_{s},r\_{b})}{σ\_{s}^{2}+σ\_{b}^{2}-2Cov(r\_{s},r\_{b)}};Cov\left(r\_{s},r\_{b}\right)= ρ\*σ\_{s}\*σ\_{b};Wmin\left(B\right)=1-Wmin(S)$$

$E\left(R\_{min}\right)=\sum\_{}^{}W\*R$; $σ\_{p}=\left[w\_{s}^{2}σ\_{s}^{2}+w\_{b}^{2}σ\_{b}^{2}+2w\_{s}w\_{b}Cov(r\_{s,}r\_{b})\right]^{\frac{1}{2}}$

**Tangency Portfolio**

$$W\_{s}=\frac{\left[E\left(r\_{s}\right)-r\_{f}\right]\*σ\_{b}^{2}-\left[E\left(r\_{b}\right)-r\_{f}\right]\*Cov(r\_{s},r\_{b})}{\left[E\left(r\_{s}\right)-r\_{f}\right]\*σ\_{b}^{2}+\left[E\left(r\_{b}\right)-r\_{f}\right]\*σ\_{s}^{2}-\left[E\left(r\_{s}\right)-r\_{f}+E\left(r\_{b}\right)-r\_{f}\right]\*Cov(r\_{s},r\_{b})}$$

$W\_{b}=1-W\_{s}$; $σ\_{p}=\left[w\_{s}^{2}σ\_{s}^{2}+w\_{b}^{2}σ\_{b}^{2}+2w\_{s}w\_{b}Cov(r\_{s,}r\_{b})\right]^{\frac{1}{2}}$; $E\left(R\_{p}\right)=\sum\_{}^{}W\*R$

y’$=\frac{E\left(rp\right)-rf}{Aσ^{2}}$ ; $CAL= \frac{E(r\_{a})-rf}{σ\_{a}}σ\_{p+rf}$; => $E(r\_{p})= .422\*σ\_{p}+rf=CAL$

$$=> .1493=.4221\*σ\_{p}+.09= σ\_{p}=.1405$$

**Stock Risk Premium** 

13%=7%+Stock Risk Premium; $Price of Stock= \frac{Dividend}{k} ;k=E\left(r\right) from CAPM$

$β=\frac{Cov(R\_{i},R\_{m})}{σ\_{m}^{2}}$ ; $ρ\_{i,m}=\frac{Cov(R\_{i},R\_{m})}{σ\_{i}σ\_{m}}$; E($R\_{i})$=$R\_{f}+β\left(E(R\_{m}\right)-R\_{f})$

$.14=y\left(.2\right)+\left(1-y\right)\left(.12\right)=> .02= .08y=> .25\left(s\right)+ .75\left(b\right)= .14$

**When two stocks are perfectly negatively correlated**

$σ\_{p}=y\*σ\_{a}-\left(1-y\right)\*σ\_{b}$ => 0 = .05y – (1-Y).1 => .6667

$E\left(r\_{p}\right)= .6667\left(.1\right)+.3333\left(.15\right)=11.67\%$

$β= \frac{Δ in Individual Security \$}{Δ in Market \$ } ;Traynor Ratio= \frac{\left(E(\_{rp})-R\_{f}\right)}{β}$ ; $\left\{\begin{array}{c}if α<0, then overvalued\\if α>0, then undervalued\end{array}\right.$

**What is the stock’s alpha?** $α\_{a}=\left(AnalystExpectedReturn\right)-CAPM E(r))$

**Two Factor APT Model General Form** $E(r\_{p})=r\_{f}+β\_{p1}\left(E\left(r1\right)-r\_{f}\right)+β\_{p2}(E\left(r2\right)-r\_{f})$

$$E(R\_{i})= R\_{f}+\left(β\_{1}\right)\left(Market Risk Premium\_{1}\right)+\left(β\_{2}\right)\left(Market Risk Premium\_{2}\right)$$

**How to find σ from the CAL**

$E(\_{r})= R\_{f}+\frac{\left(Er\_{TangentPortfolio}-r\_{f}\right)}{σ\_{TangentPortfolio}}σ$ => .14 = .08+.4601σ => σ = .1304

**To calculate the variance of returns;** $σ^{2}=β^{2}σ\_{m}^{2}+σ^{2}(e)$; when there is only systematic risk: = $β^{2}σ\_{m}^{2}$



**On Portfolio Optimization: Forecasting Covariances and Choosing the Risk Model**

We evaluate the performance of different models for the covariance structure of stock returns, focusing on their use for optimal portfolio selection. Comparisons are based on forecasts of future covariances as well as the out-of-sample volatility of optimized portfolios from each model. A few factors capture the general covariance structure but adding more factors does not improve forecast power. Portfolio optimization helps for risk control, but the different covariance models yield similar results. Using a tracking error volatility criterion, larger differences appear, with particularly favorable results for a heuristic approach based on matching the benchmark's attributes.

**The Cross-Section of Expected Stock Returns Eugene F. Fama; Kenneth R. French**

Two easily measured variables, size, and book-to-market equity, combine to capture the cross-sectional variation in average stock returns associated with market /3, size, leverage, book-to-market equity, and earnings-price ratios. Moreover, when the tests allow for variation in /3 that is unrelated to size, the relation between market /3 and average return is flat, even when /3 is the only explanatory variable.

**Returns-Chasing Behavior, Mutual Funds, and Beta's Death**

I develop an agency model where returns-chasing behavior by mutual fund investors causes beta not to be priced to the degree predicted by the standard CAPM. Mutual fund investors chase returns through time, precipitating unusually large aggregate cash inflows into mutual funds just after dramatic market runups. Mutual fund investors also chase returns cross-sectionally across funds so that the highest-performing funds capture the largest fraction of the aggregate inflows into the mutual fund sector. The interaction of these two flow-performance relationships induces an asymmetry in payoffs to mutual funds where fund managers care most about outperforming peers during bull markets. Since high-beta stocks tend to outperform in up markets, active fund managers tilt their portfolios toward high-beta stocks, reducing the beta risk premium in equilibrium. To support the model's time-series flow-performance assumption, I show empirically that market returns have a large economic impact on subsequent aggregate mutual fund flows. In addition, data on mutual fund holdings suggest that the aggregate stock portfolio held by equity funds is overweighted in high-beta stocks relative to the overall market, though this does not include the cash held by mutual funds. Fama-MacBeth tests indicate that the equity premium falls only slightly as the relative size of mutual funds increases, and the relation is not statistically significant.

**A Rose.com by Any Other Name**

We document a striking positive stock price reaction to the announcement of corporate name changes to Internet-related dotcom names. This “dotcom” effect produces cumulative abnormal returns on the order of 74 percent for the 10 days surrounding the announcement day. The effect does not appear to be transitory; there is no evidence of a post announcement negative drift. The announcement day effect is also similar across all firms, regardless of the firm’s level of involvement with the Internet. A mere association with the Internet seems enough to provide a firm with a large and permanent value increase.

Individuals have limited time and attention and may rely on **heuristics** to help them make decisions. Investors limited analytic processing capacity may also cause them to overreact to attention grabbing news and underreact to less salient information.

**Overconfidence:** People tend to overestimate the precision of their beliefs or forecasts, and they tend to overestimate their abilities.

A **conservatism** bias means investors are too slow (too conservative) in updating their beliefs in response to new evidence.

**Representativeness** bias holds that people commonly act as if a small sample is just as informative about a population as a large one. They infer a pattern too quickly and extrapolate trends too far into the future.

**Framing** the choice of how to frame a risky venture as involving gains or losses can be arbitrary.

**Mental Accounting** is a specific form of framing in which people segregate certain decisions. i.e., a child’s education account is treated differently than another account.

**Disposition effect** is the reluctance to realize losses.

The **house money effect** refers to gamblers’ greater willingness to accept new bets if they are currently ahead.

**Prospect theory**: higher wealth provides higher satisfaction but at a diminishing rate.

**Confirmation Bias:** the selective perception that emphasizes ideas that confirm one’s beliefs, while deemphasizing or devaluing information that contradicts one’s beliefs.

**Hindsight Bias:** the tendency to convince oneself after an event that one would have been able to accurately predict it before it happened.