Empirical Asset Pricing for Tactical Asset Allocation

Stephen Rush

Department of Finance
The University of Connecticut School of Business

stephen.r.rush@gmail.com

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Background

Portfolio Managers

- Want to justify fees with some active management
- Low frequency: rebalance portfolio monthly
- Fundamental data does not change on a monthly basis

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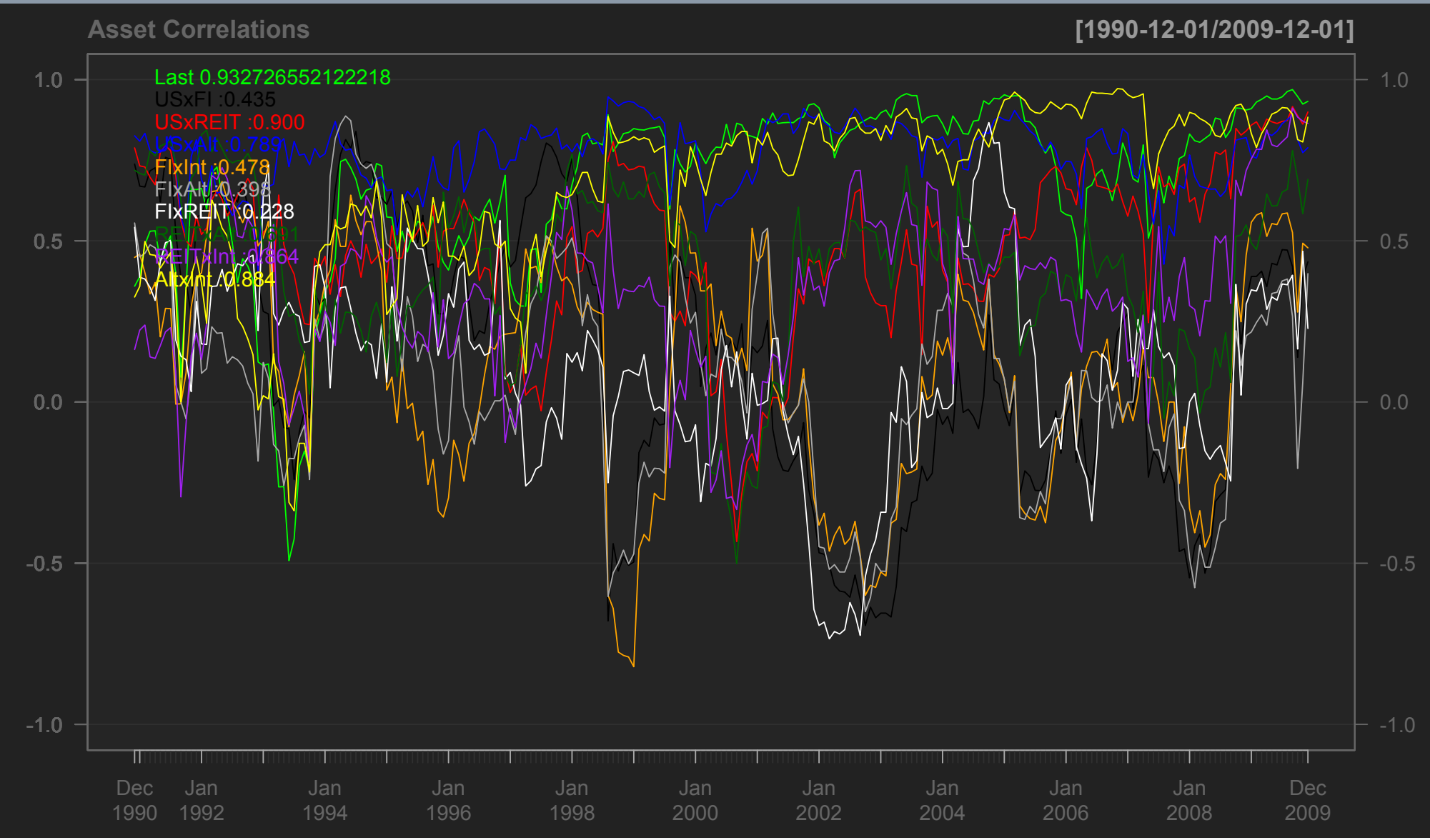
Restrictions

- Simple to understand and implement
- No expensive data sources
- US Equity, International Equity, Bonds, REITs, & Alternatives

Rolling 12 month Correlations



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Risk Factors

- Trailing joint distribution characteristics
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- Calculate each unique spread (20 spreads from 5 asset classes)
- Calculate spread statistics on trailing 24 month windows
- Calculate spread differential between high/low statistic
- Regress spreads on risk factors

Model

For each risk factor i and asset classes a, b, c, d, e

$$rf_{i,t} = \Sigma Ret\{rf_{max\{|a|:|e|\},t:t-12}\} - \Sigma Ret\{rf_{min\{|a|:|e|\},t:t-12}\} \quad (1)$$

For asset classes a and b

$$Ret_{a-b} = X'\beta \quad (2)$$

where X is the trailing sum of the return spread associated with the return, standard deviation, skewness, kurtosis, hedge ratio deviation, and interaction terms

Variables

Dependent Variable

- Spread on each asset class pair

Independent Variables

- Distribution risk factors
  (return, standard deviation, skewness, kurtosis, & interactions)
- CBOE Volatility Index (VIX)
- US treasury 1 year constant maturity rate
- Term spread (10 year treasury - 2 year treasury)
- Hedge Deviation (absolute deviation from a hedge ratio of 1)
- Cointegration
  (Augmented Dickey-Fuller test with nonstationary null)

Full GLS Model Results

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.00000	0.003369	0.000000	1.0000
VIX	0.00092	0.000550	1.670240	0.0950
1yr Treasury	21.64806	5.129599	4.220225	0.0000
10yr - 2yr	40.71688	9.390477	4.335976	0.0000
Return	-0.04989	0.020827	-2.395686	0.0167
Std Dev	-0.01131	0.023206	-0.487437	0.6260
Return & Std Dev	-0.03620	0.025436	-1.423198	0.1548
Skewness	0.02894	0.024912	1.161726	0.2455
Kurtosis	0.02122	0.021571	0.983561	0.3254
Correlation	0.01556	0.028694	0.542404	0.5876
Correlation & Return	-0.03933	0.021340	-1.843081	0.0654
Correlation & Std Dev	-0.00162	0.030030	-0.054110	0.9569
Correlation & Skewness	0.00673	0.024916	0.270063	0.7871
Correlation & Kurtosis	-0.01815	0.022812	-0.795564	0.4264
Skewness & Kurtosis	-0.00668	0.022161	-0.301550	0.7630
Std Dev & Kurtosis	-0.04997	0.020984	-2.381084	0.0173
Return & Skewness	-0.02241	0.020205	-1.109172	0.2675
Return & Kurtosis	0.02203	0.018866	1.167590	0.2431
Std Dev & Skewness	-0.00336	0.025806	-0.130373	0.8963
Hedge Deviation	-0.00266	0.018955	-0.140479	0.8883
Cointegration	-0.01008	0.017530	-0.574736	0.5655

Restricted GLS Model Results

Drop variables based on:

- Changes to log likelihood
- Impact on and correlation with other variables

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.00000	0.003364	0.000000	1.0000
VIX	0.00111	0.000504	2.201104	0.0278
1yr Treasury	22.36054	4.407615	5.073160	0.0000
10yr - 2yr	42.43004	8.258652	5.137647	0.0000
Return	-0.03798	0.017457	-2.175522	0.0297
Return & Std Dev	-0.04376	0.019151	-2.285088	0.0224
Correlation & Return	-0.04572	0.019484	-2.346605	0.0190
Std Dev & Kurtosis	-0.03655	0.012719	-2.874040	0.0041

Model Comparison

	Full Model	Restricted Model
Log Likelihood	881.9172	917.5741
Residual Standard Error	0.161205	0.160958

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Performance

Probability Monthly Return > Neutral	99.85%
Probability of Positive Annual Return	80.22%
Probability of Positive 2 Year Return	90.00%
Expected Monthly Return	0.97%
Expected Annual Return	11.63%
Median Annual Return	10.02%
TAA Band Size at 1% Threshold	8.60
Monthly Information Ratio	.2142

Questions?

Contact Email: stephen.r.rush@gmail.com Twitter: ProbablePattern

Working Paper http://ssrn.com/author=1688368