因子模型工作计划

目标：五因子轮动的单因子模型算法

工程旨在8个工作周左右时间完成第一版上线，以 CAPM[1] 和 Fama 73[2] 模型为样本，在有限的时间内找到稳定的因子轮换库。额外8个工作周进行进一步的修改。

第一周：

1. 测试样本[1]内完成代表因子的2SLS和FGLS的估计，对比结果；
2. 列出代表指标。

第二周：

1. 清洗样本数据；
2. 基于主因子的产品分类在市面上产品中找到适合我们的产品结构。

> 下表是我早些时候总结的一个关于标普一些有代表性的产品，因子稳定且确定，虽然不适合现在的业务，但是也具有很多的参考价值。

Geography	Stock Selection	Filter	Weighting Scheme	Risk Control
United States	None	None	Div. Multi-Strategy	None
Emerging America	Multi-Beta Max Factor Int	Std-Factor-Intensity	Max Deconcentration	Country Neutral
Eurozone	Multi-Beta HFI Dyn Def	High-Factor-Intensity	Max Decorrelation	Sector Neutral
United Kingdom	Multi-Beta 6F EW	Narrow High-Factor-Intensity	Efficient Min Volatility	Mkt Beta Adjusted (Leverage)
Developed Europe ex-UK	Multi-Beta 4F EW	Low-Carbon	Efficient Max Sharpe	Mkt Beta Adjusted (CW Overlay)

Geography	Stock Selection	Filter	Weighting Scheme	Risk Control
Developed Europe	Multi-Beta 6F ERC		Div. Risk Weighted	Sector Neutral Mkt Beta Adjusted (Leverage)
Emerging EMEA	Multi-Beta 4F ERC			Sector Neutral Mkt Beta Adjusted (CW Overlay)
Japan	Low Volatility			
Developed Asia-Pacific ex Japan	Mid Cap			
Emerging Asia-Pacific	Value			
Developed ex-UK	High Momentum			
Developed ex-USA	High Profitability			
Developed	Low Investment			
Emerging	Mid Liquidity			
Global	High Dividend Yield			
Global ex-USA				
Extended Developed Europe				
Extended USA				

第三周：

1. 样本内继续测试；
2. 测试Robustness Estimator。

第四周：

1. 开始标的指数的清洗以及分类；
2. 尽量在因子在暴露后的风险衡量公式：

$$\sigma = Exposure \times Volatility \times Correlation$$

的框架下开始进行历史回测。

> 重要节点：
> 1. 完成样本内测试；
> 2. 开始全量样本，e.g.中证800指数的数据清洗。

第五周：

1. 根据不同方法首次确定因子类别；
2. 因子类别的首次正交性检验。

> 以下是我计划因子分类，但不可能在16个工作周内完成：

Factor	**Description**
Low Voaltility	
Low Voaltility	Seeks to measure the performance of the fixed number of least volatile stocks in Benchmark
Reduced Volatility	Seeks to measure the performance of the Benchmark, with an overweight of stocks with relatively low volatility and an underweight of stocks with relatively high volatility
Minimum Volatility	Seeks to measure low volatility stocks with in stocks of Benchmark using an optimizer and stock and sector constrains
Low Beta	Seeks to measure the 70% of stocks with the lowest beta with benchmark index for a given region/sector with a 5% to minimize turnover
High Beta	
High Beta	Seeks to measure the performance of the benchmark index that are most sensitive to changes in the market returns
High Beta Bullish	The same one, but the benchmark is designed for investoring initiation a bullish strategy or making a directional bet on current markets.
High Beta Bearish	The same one, but the benchmark is designed for investoring initiation a bearish strategy or making a directional bet on current markets.
High Beta Speicified	The same one, but the benchmark is sector/listed country specified.
Growth and Value	
Growth and Value	Seeks to measure stocks in the benchmark index using three factors: sales growth, the ratio of earning change to price and momentum.
Seeks to measure stocks in the benchmark index using three factors: the ratios of book value, earnings, and sales to price.	

Factor	Description
Value	
Intrinsic Value	Seeks to measure the performance of the respective markets, as weighted by intrinsic stock value rather than by traditional market capitalization
Enhanced Value	Seeks to measure the performance of the top quintile of stocks in the respective region based on their value scores, calculated using three fundamental measures: book value-to-price, earnings-to-price, and sales-to-price by different sector and listed countries
Low Valuation	Seeks to measure stocks from the benchmark index, overweighting stocks with relatively cheap valuations and underweighting stocks with relatively expensive valuations
Dividends	
Aristocrats	Seeks to measure the performance of the highest-dividend-yielding constituents of the benchmark index that have followed a policy of increasing or stable dividends for at a considerable number consecutive years.
Select	The same one, but the benchmark is sector/listed country specified.
High Yields	Seeks to measure the performance of a fixed number of highest-yielding constituents of the benchmark index that meet size, liquidity, and profitability criteria
Momentum	
Momentum	Seeks to measure the performance of top quintile of securities in the respective markets that exhibit persistence in their relative performance.
Quality	
Quality	Seeks to measure the top quintile of high-quality, large- and mid-cap stocks in the respective markets, as determined by their quality score. This score is calculated based
on return on equity, accruals ratio and financial leverage ratio.	
Capital Expenditures	
Capital Expenditures	Seeks to measure a fixed number constituents of the benchmark index that have exhibited the strongest capital discipline, in the form of efficient capital expenditures, over the near term.
Multi Factor	
Quality, Value & Momentum	Seek to measure the performance of selected stocks that are characterized as having the top combination of quality, value, and momentum as determined by a multifactor score.
GIVI	Seeks to measure the 70% of stocks with the lowest volatility from the volatility dashboard, as measured by regional market stock beta.

Factor	Description
Low Volatility High Yield	Seeks to measure the performance of the fixed number least-volatile, high-dividend-yielding stocks in the benchmark
Quality, Value & Growth	Seek to measure the performance of stocks in the benchmark index that have the highest combination of quality, value, and growth.
Factor Rotator	Seek to rotate its investment strategy across four distinct strategies based on the most recent economic data from the Economic Index, with a target volatility of fixed level (e.g. 6%).

第六周：

1. 按照不同切割市场[1]方法；

2. 测试切割对于统计量效果的测试。

第七周：

1. 测试已经选择的因子效果进行测试；
2. 因子半衰期计算。

第八周：

1. 确认因子回测结果；
2. 因子权重优化

> 重要节点：
> 1. 完成第一版因子轮动算法；
> 2. 优化回测的产生问题。

第九周：

算法阶段回顾

第十周以及第十一周：

GMM估计的使用方法

第十二周以及第十三周：

不同的加权方法对于估计量的有偏程度影响。

第十四周以及第十五周：

1. 因子的组合加权方法论；
2. 再次优化上线产品。

TODO：

1. 优化因子[1]；
2. 新的因子加权方法；
3. 新的因子实证分析，估计方法；
4. 新的因子开发。

> 写在最后：
>
> 本文为第一版本的预计工作计划，由于本人能力一般水平有限。在有限的时间内内并没有很大的信心能做出一个比较“结果体面”的算法。同时算法的分支开发以及整体优化是没有止境也没有捷径的。许多卓越的对冲基金用多因子类模型给市场以及社会带来了巨大的价值，实属我辈之楷模。希望这个项目能给各位同僚提供一个开始这项研究的工程，也同时能为公司创造更多的效益。
>
> 周渤洋

---

1. 基于APT无套利模型以及ICAPM模型为代表的的均衡模型。↩↩↩↩

2. Fama 1973，1992，2004，2014 的不同因子一类的模型。↩