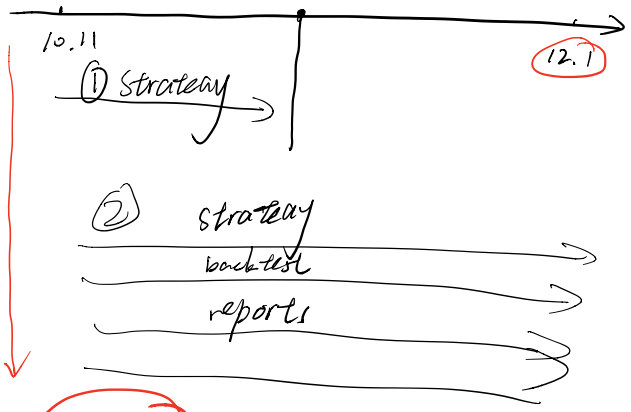
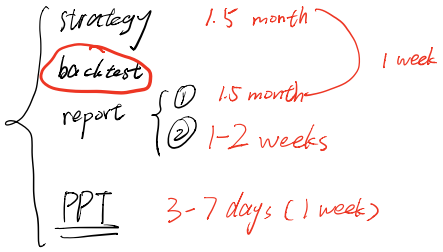
Programming Project

队名：two sigma

对象：stock

时间分工：





第一周 strategy & report

10.11 → 10.18

人员分工：

code (strategy + backtest) 周、钱、关、帆、袁

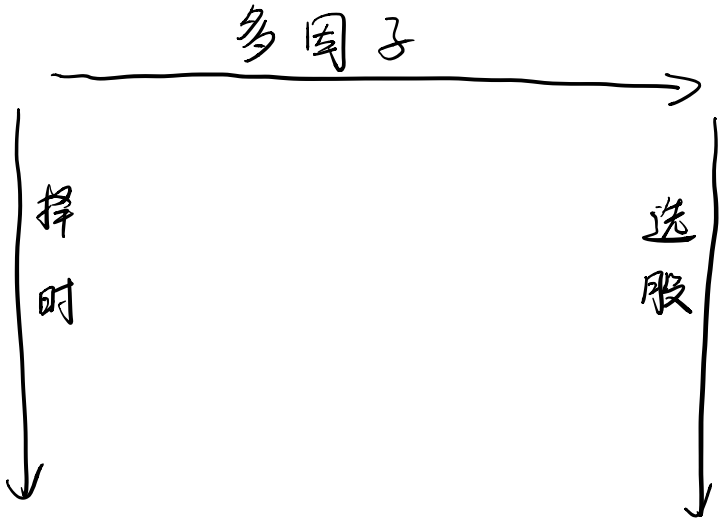
report (strategy) 张、罗 ...

(行不行) 谁都行 ...

PPT 谁都行 ...

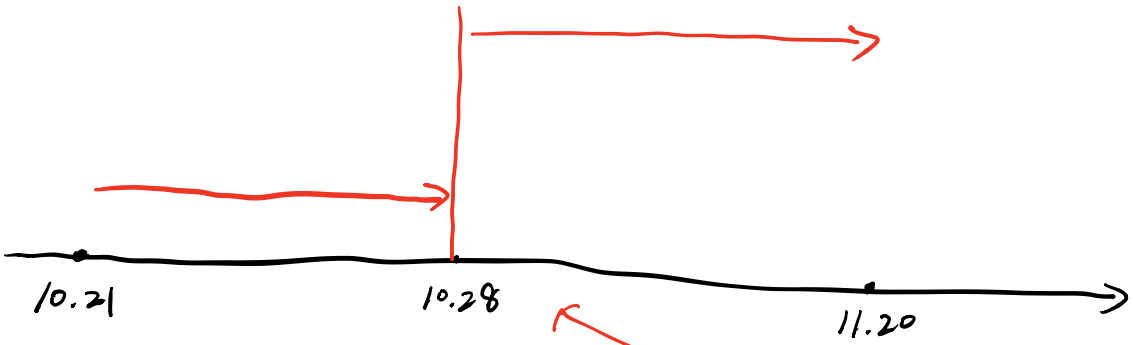
pres 谁都行 (袁)

2nd Group Discussion



1. 讨论大家的策略
2. 选取可行方向
   能否初步确定策略？
3. 下一周分工以及tips

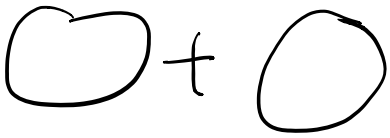
行研report尽快安排一周做完



1. 华泰多因子系列
2. 择时 or 选股 (复合?)
3. 多因子选择，理论依据，公式，模型
4. 行研Report，永辉超市...
   - 公司概况 罗
   - 行业分析 王
   - 主营业务/产品(业务分析) 月
   - 产业链 关、梅
   - 财务分析 袁

多因子策略

一、选什么因子（频率、策略）



- 准备工作（采集、标准化、有效）
- 收益模型（共线性分析、异方差分析、回归、预测收益）
- 风险模型
- 优化模型（目标、约束）

二、因子 → 交易策略

- 择时（因子选择）：特定投资组合，日度数据？
- 选股：日度调仓？ Long top short bottom

三、风险控制模型

四、交易成本模型（佣金费用、滑点、市场冲击）

五、其他？（其他因子）

3rd Group Discussion

一、多因子策略思路

因子收益率 (-1, 1)

二、找什么因子

每个人选一套多因子
- 分类（大类）
- 含义
- 计算方式
- 数据来源：wind csv. api.
- 逻辑联系
- 实证数据说明（研报）

三、多因子模型、策略理论、现有研究 张

4th group discussion

一、多因子策略

选股

多因子：月频……+（量）

股票池：大板块

交易频率：月度、季度
半年、

★

换手率（☆）

To be decided：

定仓（?）

二、下一阶段任务（假定按上面的框架）

① 确定因子、大板块、交易频率（初定月频）

② 数据获取　2005.01.01 – 2015.12.31 交易日

获取因子值对应原始数据，给出加工计算公式

③ 因子识别及有效性检验

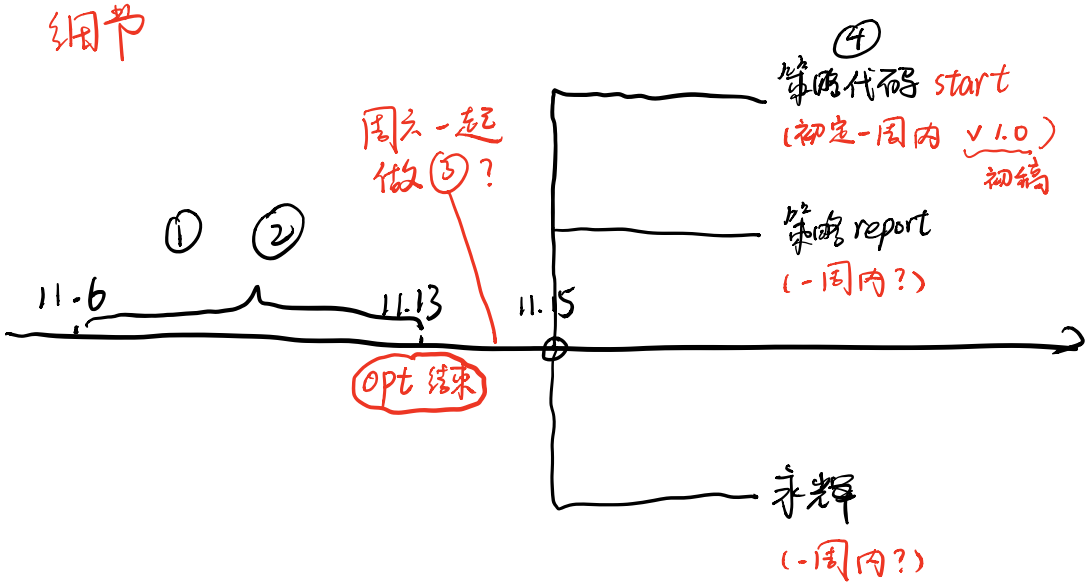
对所有因子、细分因子作检验（已确定股票池）

筛选出最终使用的多因子，检验结果反馈在 report 里

④ 具体策略代码实现

code (strategy + backtest)　周、钱、关、帆、表

code 组应预留时间学习具体调用的库以及 python 策略细节



tips: 人员分工可以回看第一点

多因子模型

$$\begin{bmatrix} \tilde{r}_1 \\ \tilde{r}_2 \\ \cdots \\ \tilde{r}_N \end{bmatrix} = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1K} \\ x_{21} & \cdots & & \cdots \\ & & & \\ x_{N1} & \cdots & & x_{NK} \end{bmatrix} \begin{bmatrix} \tilde{f}_1 \\ \tilde{f}_2 \\ \cdots \\ \tilde{f}_K \end{bmatrix} + \begin{bmatrix} \tilde{u}_1 \\ \tilde{u}_2 \\ \cdots \\ \tilde{u}_N \end{bmatrix} \qquad N = 747$$

股票池 N只股票收益率

N只股 每只股K个因子值

因子收益率 (回归系数)

残差收益率

多因子模型(选因子)

交易策略实现

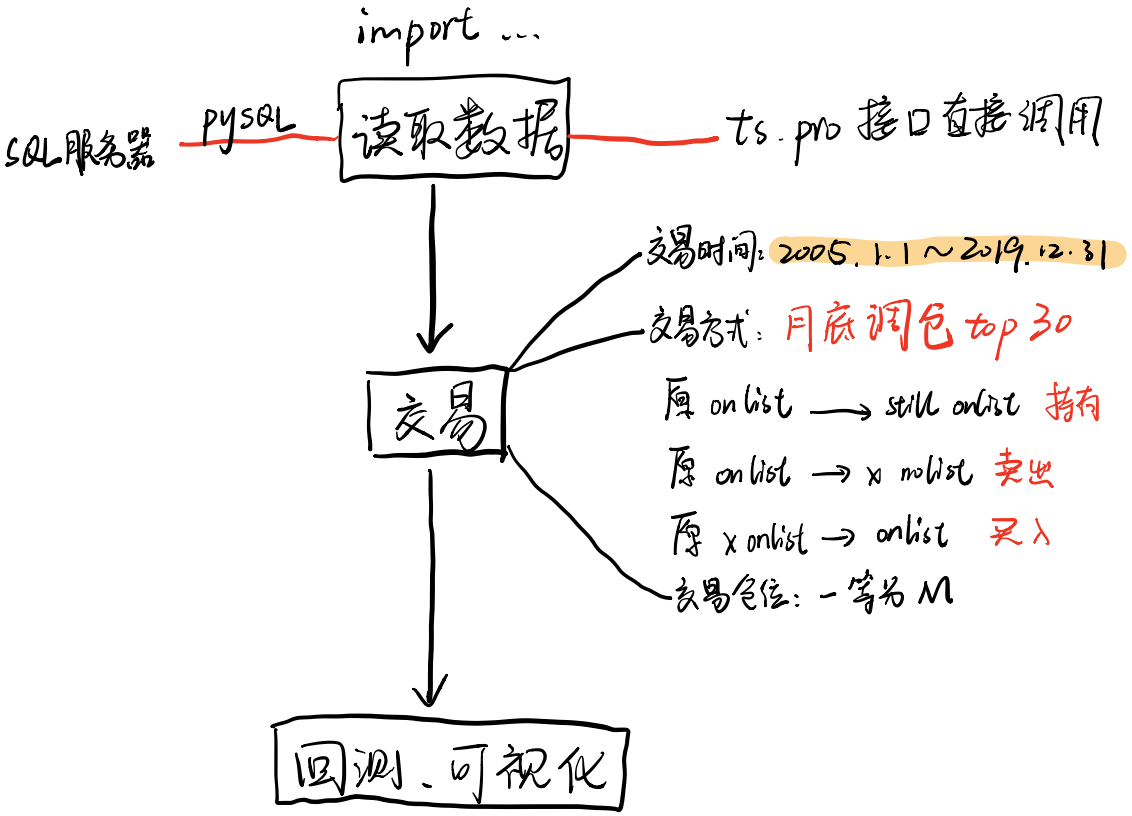
2005.1.1 ~ 2015.12.31

月底调仓

日期	$\tilde{f}_1$ (x_1)	x_2	x_K
00001	r_{11}	r_{12}	$\hat{r}_1 = w_i r_{1K}$
...			
00745			

rank

多因子交易策略框架

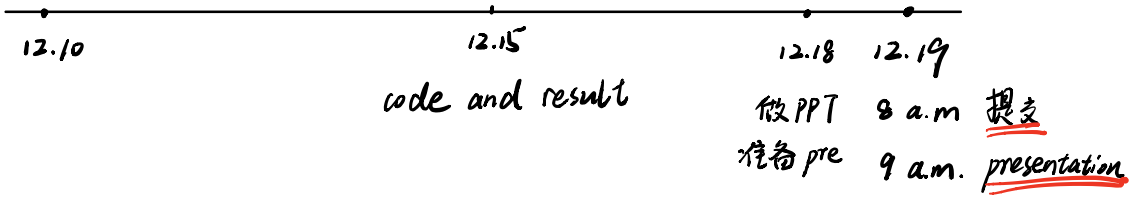


report:

选因子 $\tilde{f}_k$ (因子收益率)

W: (权重)

12-10 小组任务与进度



今日任务：

① 永辉超市收尾，剩下一周全力投入 strategy report

② strategy report (existing) —— 12.13 前初稿？

1/2

③ our model and strategy

原理、模型、框架以及任何不需要数据的内容 —— 12.13 前初稿？

补充数据、可视化图表、完稿 —— 12.18 前

④ coding

策略运行 12.14

回测 12.15

① 永辉　　今天完成

- 改图、逻辑、内容

② strategy report —— existing　　12.3

- 各种策略简介、特点
- 偏重多因子？（篇幅不作要求 < 1/2）

③ our strategy and model（多因子选股策略）

- 因子选取、因子含义、大类因子分类
- 因子检验（data）
- 模型
  - 公式 $\hat{r}_i = x_i \hat{f}_i + \varepsilon$（单因子预期收益率）
    $\hat{r}_i = \Sigma w_i x_i \hat{f}_i + \varepsilon$（多因子模型）
  - X_i（ARIMA）
  - 确定权重（等权）
- 策略
  1. 月末调仓 + 调因子
  2. 牛熊调仓位，看指数
- 回测框架、回测结果（data）

12.15 战果

① demo for backtesting

- 框架已完成，测试和优化大部分完成
- 需要交易订单数据测试
- 读取速度可能是潜在问题？

② PPT for presentation 12.18

pre 逻辑、框架以及重点已经写好

③ report for strategy

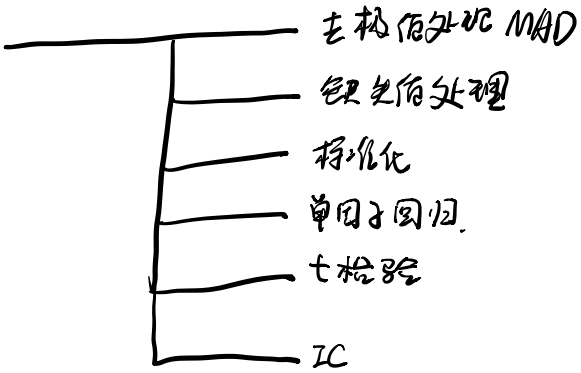
- existing strategy (✓)
- 因子 (✓) + 因子检验 (差数据)
- 模型
- 策略 (✓)
- 回测 (差数据)

④ code

1. 因子挖掘 ✓
2. 读取、存储 ✓
3. 预测新因子 ✓

MW ARIMA ARCH LSTM

4. 因子检验



5. 拼合
6. 选股 20只
7. 策略：

牛熊判断

↓

调仓：cash position

The Project of MFE 5250 CUHK SZ

- **Description**

  Welcome to participate the project of MFE5250, CUHK SZ. The target of this project is to let you know how to investigate, propose, and implement a trading strategy. Hope this project can help you learn useful things.

  Assume your team plans to setup a start-up hedge fund called XXX Capital. At this moment, since your company is looking for investment (maybe angel fund), you need to propose your trading strategy and give an attractive presentation for investors. You are required to finish the tasks below.

- **Task and requirement**
  - Propose a trading strategy.
    - Not limited to quantitative strategy. Any reasonable strategies are acceptable.
    - You do not have to propose your own strategy, and you can apply existing strategies. However, you can definitely get higher marks if you propose your own novel and profitable strategy.
  - Back test your trading strategy
    - Any markets in any exchanges (e.g. stock, futures and options, fx, fix income, mutual funds) are acceptable.
    - No limit on back testing trading period. However, you can get higher marks if you can test your strategy on tens years including one bull market and one bear market, e.g. financial crisis on year 2008.
    - Typical evaluation metrics are sharp ratio, information ratio, maximum drawdown, etc.
    - You can use any programming languages. Recommend C++, Python and MATLAB learned from this course.
  - Research report on trading strategies
    - Investigate the existing trading strategies
    - You are required to compare the trading strategy you have chosen with other trading strategies
  - Research report on general financial topics.
    - You are required to select one of the topics below
      - US CHINA Tension and its Impact on Financial Markets
      - Covid-19 Impact on Financial Markets
      - Semiconductor industry

typical tech company

- New Economy Companies, e.g. tiktok, meituan
- 光伏 PV(photovoltaic) Industry
- Pharmaceutical industry
  制药
  - in this report, you should quantitatively or qualitatively analyze the topics, and give a clear conclusion. If you apply some existing or public available content, please kindly cite them in your reference.
  - This report can be written in Chinese or English with the pages >= 10 (tables and pictures are excluded)
- Design the presentation materials
  - I suggest your team should have an attractive team name.
  - Try your best to show off your team's outcomes!

- **Team**
  - Each team has 7 or 8 students
  - Suggested responsibility for each team member:
    - 2 quantitative researcher for trading strategies research
    - 1 or 2 quantitative developer for back testing the trading strategy performance
    - 1 sales for presentation materials
    - 2 researchers for writing the research reports
    - another student can be support for other team members
- **Outcomes**
  - 1 demo for your back testing
  - 1 ppt (strategy?)
  - 1 research report on trading strategy Investigate. compare
  - 1 research report on general financial topics
- **Submission**
  - **Deadline: TBD** 原来的 12.1?
    - Each team just needs to have one submission
    - Indicate the responsibility of each team member
    - **submit all the outcomes of your team (1 demo code, related data if the data size is not large; 1 ppt; 2 research reports)**
  - Presentation date: TBD
  - Send your program code, PPT slides, two research reports to email xyqzki@gmail.com.
    - Write a Readme file for graders to run your program.
    - Write a file to let graders know your team members

- **Evaluation**
  - Each team member has the same mark
  - 15 mins presentation 25’
  - research report on trading strategies 25’
  - research report on general financial topics 20’
  - back testing your trading strategy 30’
- **Note**
  - The tasks for this project actually are not that easy. You are not required to have a really profitable strategy or a really professional and complete research report. Just have a try, and try your best! I believe you guys will learn a lot from this project.
- **Related materials**
  - Finding alpha – world quant
    - See the attached pdf book
  - Active Portfolio Management
    - See the attached pdf book
  - algo trading tutorial

    http://numericalmethod.com/courses/introduction-to-algorithmic-trading-strategies-2011-2013/

some Chinese learning materials

  - 建☒先看《打开量化投☒的黑箱》，然后看看《量化投☒ 以 matlab ☒工具》以及知乎的帖子。部分内容来源于后面。链接: 链接：https://pan.baidu.com/s/1PTKVlF7BcZ6v_PuZ0bDZmg 提取码：mt9m
  - 知乎

    https://www.zhihu.com/question/28099015
    https://www.zhihu.com/question/27980657
  - 【☒料分享】Python、研究☒告、☒量☒☒学、投☒☒籍、R ☒言等！(Book+Video)

    https://www.joinquant.com/post/467
  - 量化投☒ ☒酷☒☒

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