Toturial_week1

call

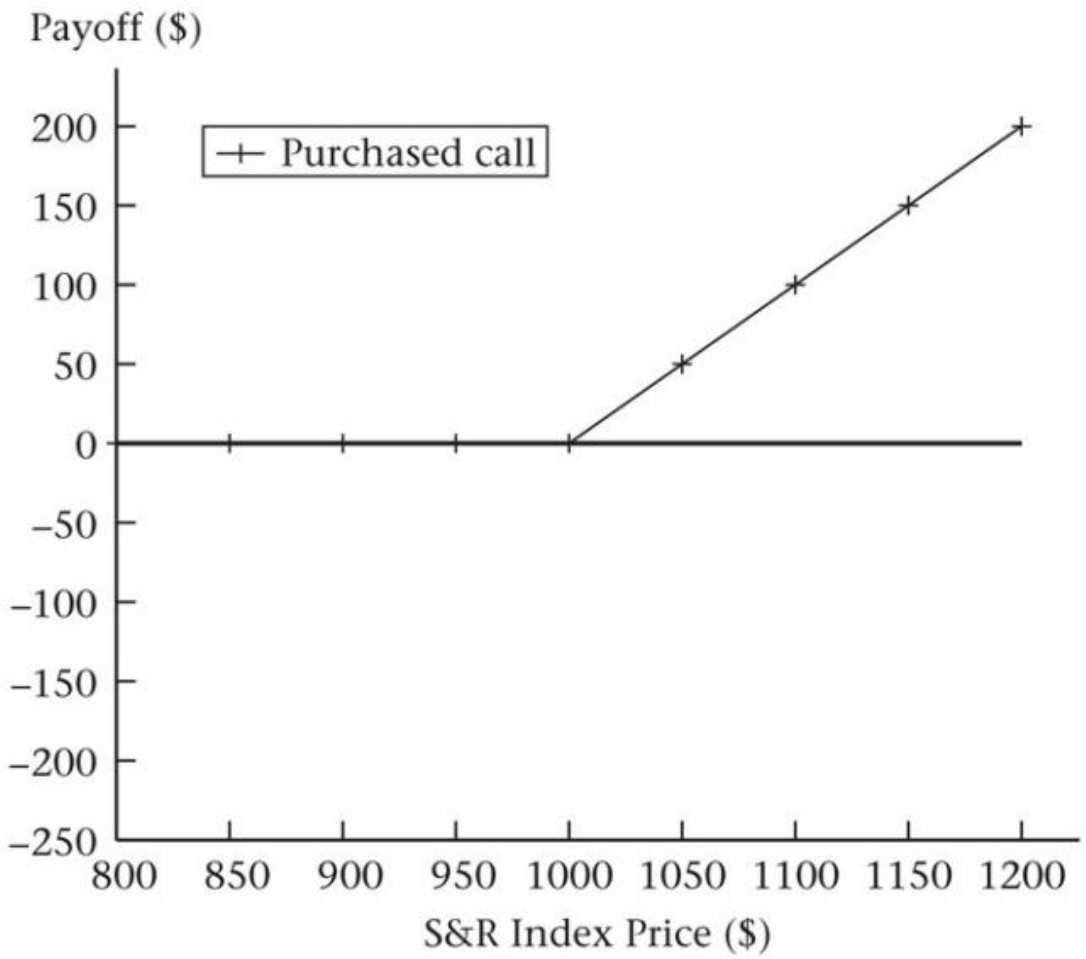
- A call option gives the owner the right but not the obligation to buy the underlying asset at a predetermined price during a predetermined time period.
- Strike (or exercise) price: the amount paid by the option buyer for the asset if he/she decides to exercise.
- Exercise: the act of paying the strike price to buy the asset.
- Expiration: the date by which the option must be exercised or become worthless.
- Exercise style: specifies when the option can be exercised:
  - European-style: can be exercised only at expiration date
  - American-style: can be exercised at any time before expiration
  - Bermudan-style: Can be exercised during specified periods

call

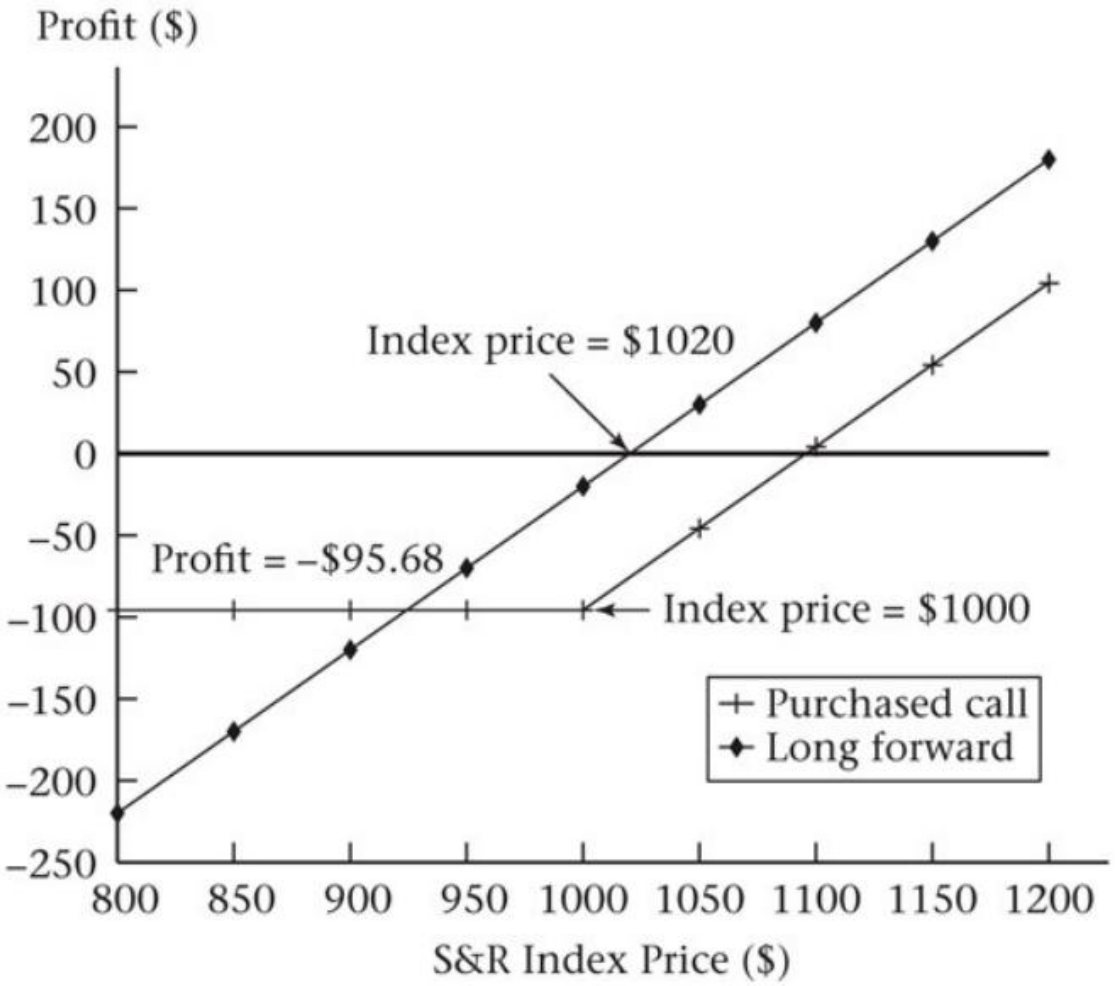
- Payoff = Max [0, spot price at expiration – strike price].
- Profit = Payoff – future value of option premium.
- Examples 2.5 & 2.6:
  - S&R Index 6-month Call Option
    - Strike price = $1,000, Premium = $93.81, 6-month risk-free rate = 2%.
  - If index value in six months = $1100
    - Payoff = max [0, $1,100 – $1,000] = $100
    - Profit = $100 – ($93.81 x 1.02) = $4.32
  - If index value in six months = $900
    - Payoff = max [0, $900 – $1,000] = $0
    - Profit = $0 – ($93.81 x 1.02) = – $95.68

call

- Payoff at expiration



- Profit at expiration



put

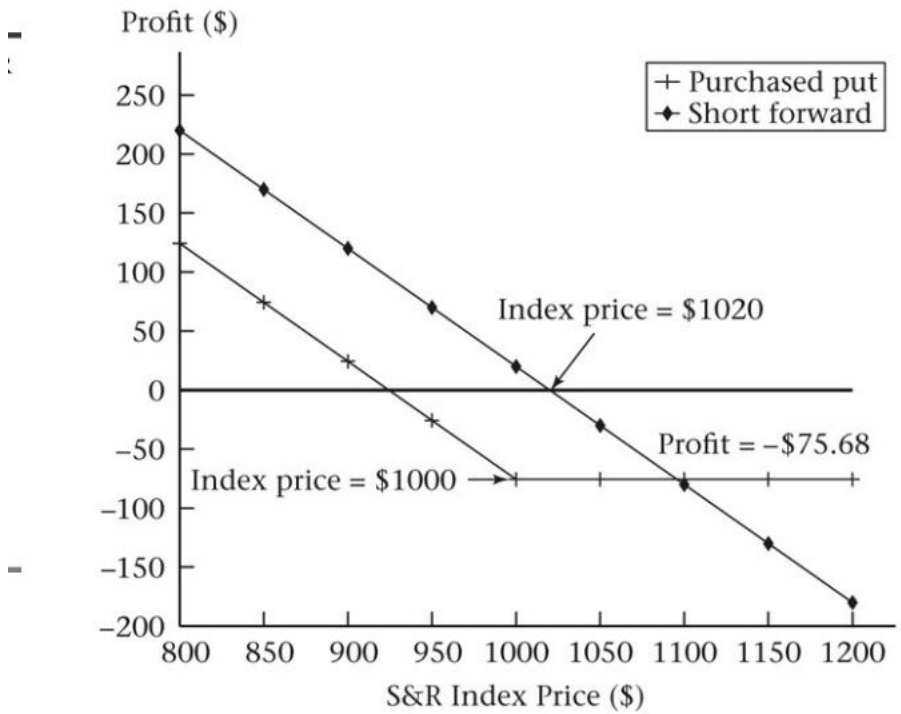
- A put option gives the owner the right but not the obligation to sell the underlying asset at a predetermined price during a predetermined time period.
- The seller of a put option is obligated to buy if asked.
- Payoff/profit of a purchased (i.e., long) put
  - Payoff = max [0, strike price – spot price at expiration]
  - Profit = Payoff – future value of option premium
- Payoff/profit of a written (i.e., short) put
  - Payoff = – max [0, strike price – spot price at expiration]
  - Profit = Payoff + future value of option premium

put

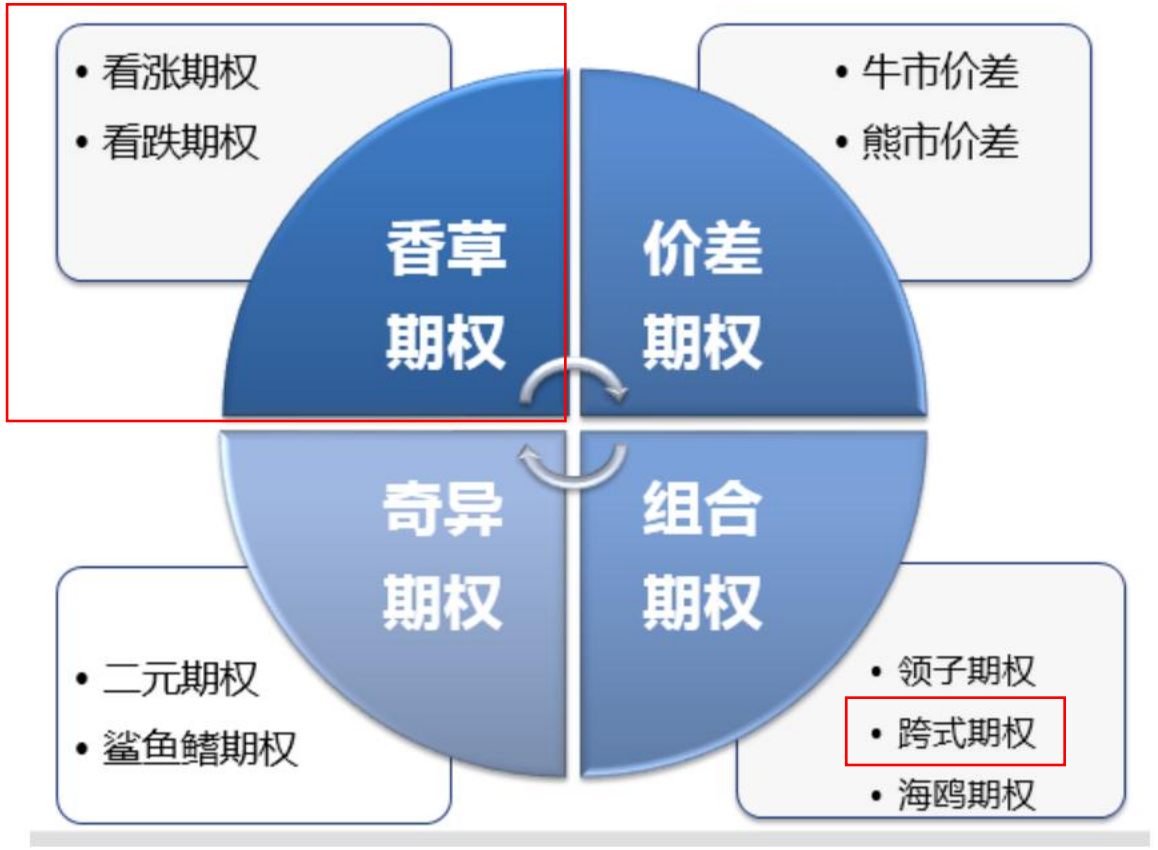
- Examples 2.9 & 2.10
  - S&R Index 6-month Put Option
    - Strike price = $1,000, Premium = $74.20, 6-month risk-free rate = 2%.
  - If index value in six months = $1100
    - Payoff = max [0, $1,000 – $1,100] = $0
    - Profit = $0 – ($74.20 x 1.02) = – $75.68
  - If index value in six months = $900
    - Payoff = max [0, $1,000 – $900] = $100
    - Profit = $100 – ($74.20 x 1.02) = $24.32

put

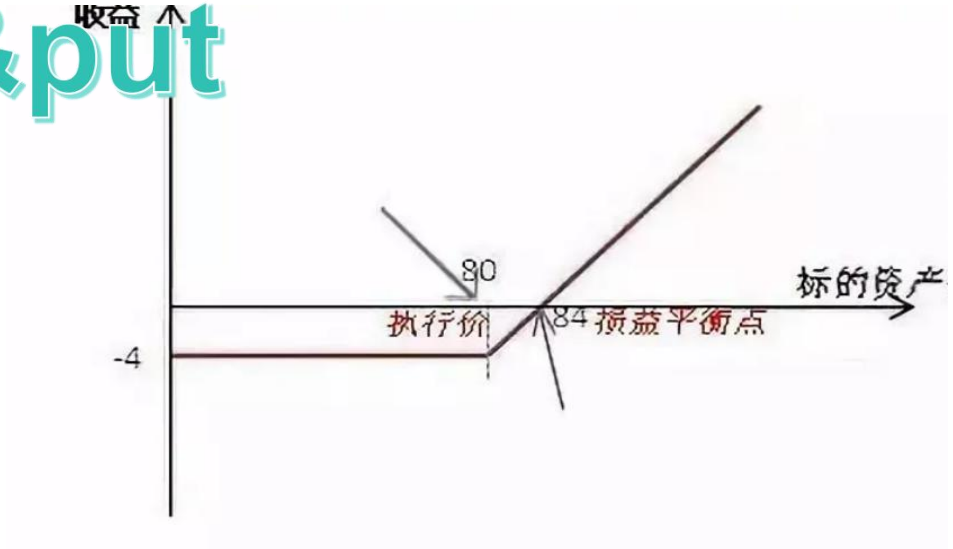
- Profit diagram



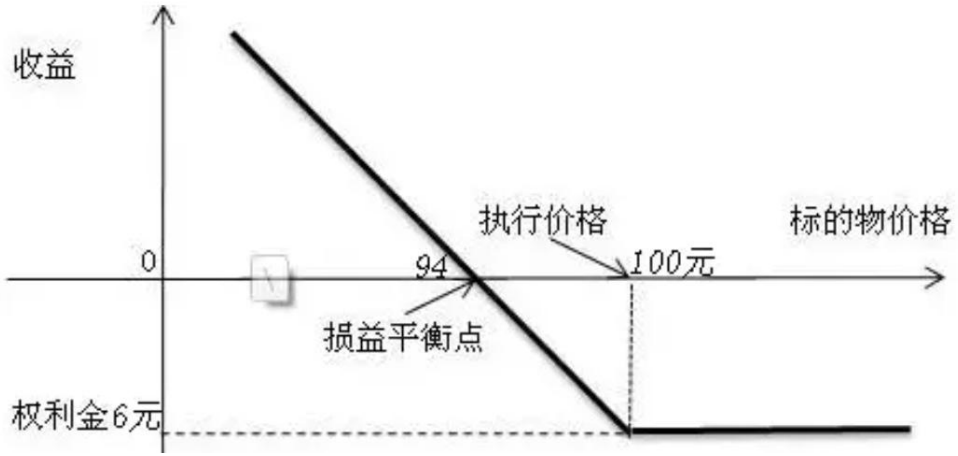
options


• 看涨期权
• 看跌期权
香草期权
• 牛市价差
• 熊市价差
价差期权
奇异期权
• 二元期权
• 鲨鱼鳍期权
组合期权
• 领子期权
• 跨式期权
• 海鸥期权

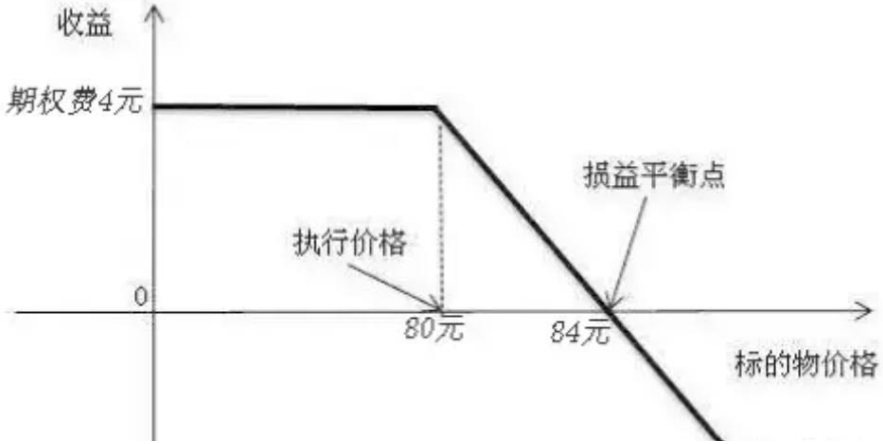
call&put



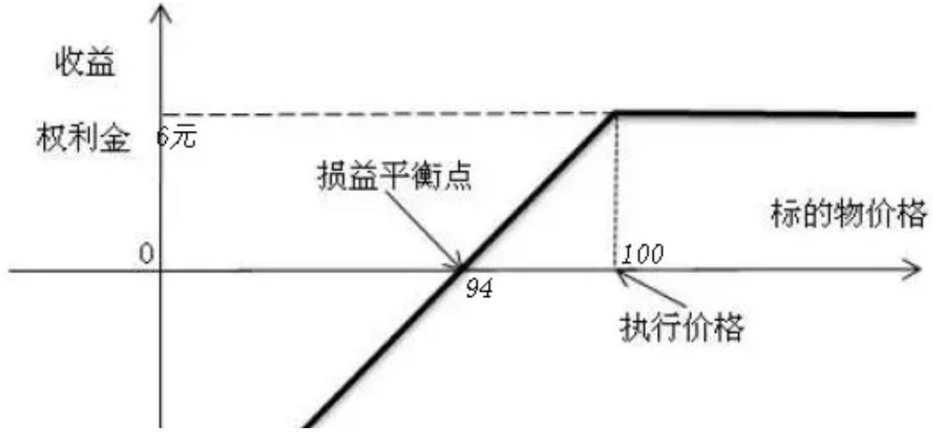
a. 买入看涨期权 long call



b. 买入看跌期权 long put

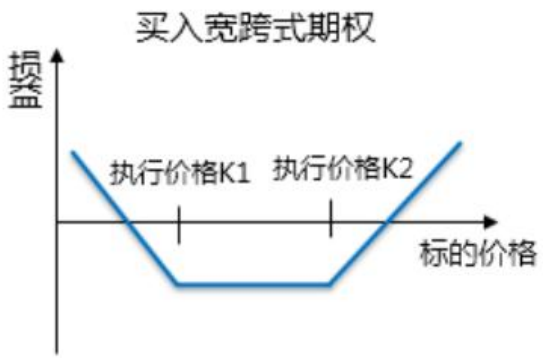


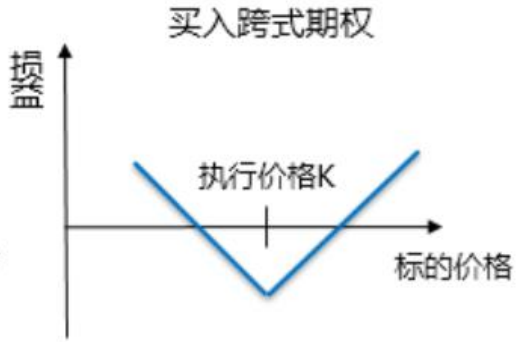
c. 卖出看涨期权 short call



d. 卖出看跌期权 short put

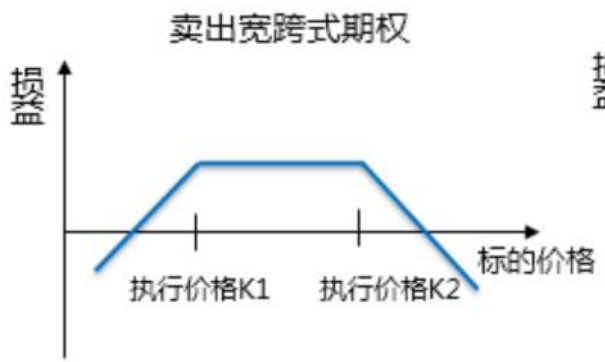
Straddle

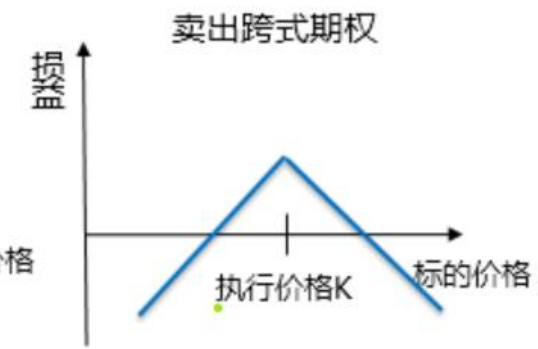




目标客户：

- 投机目的大于套保目的
- 拟使用杠杆获取价格大幅波动的收益





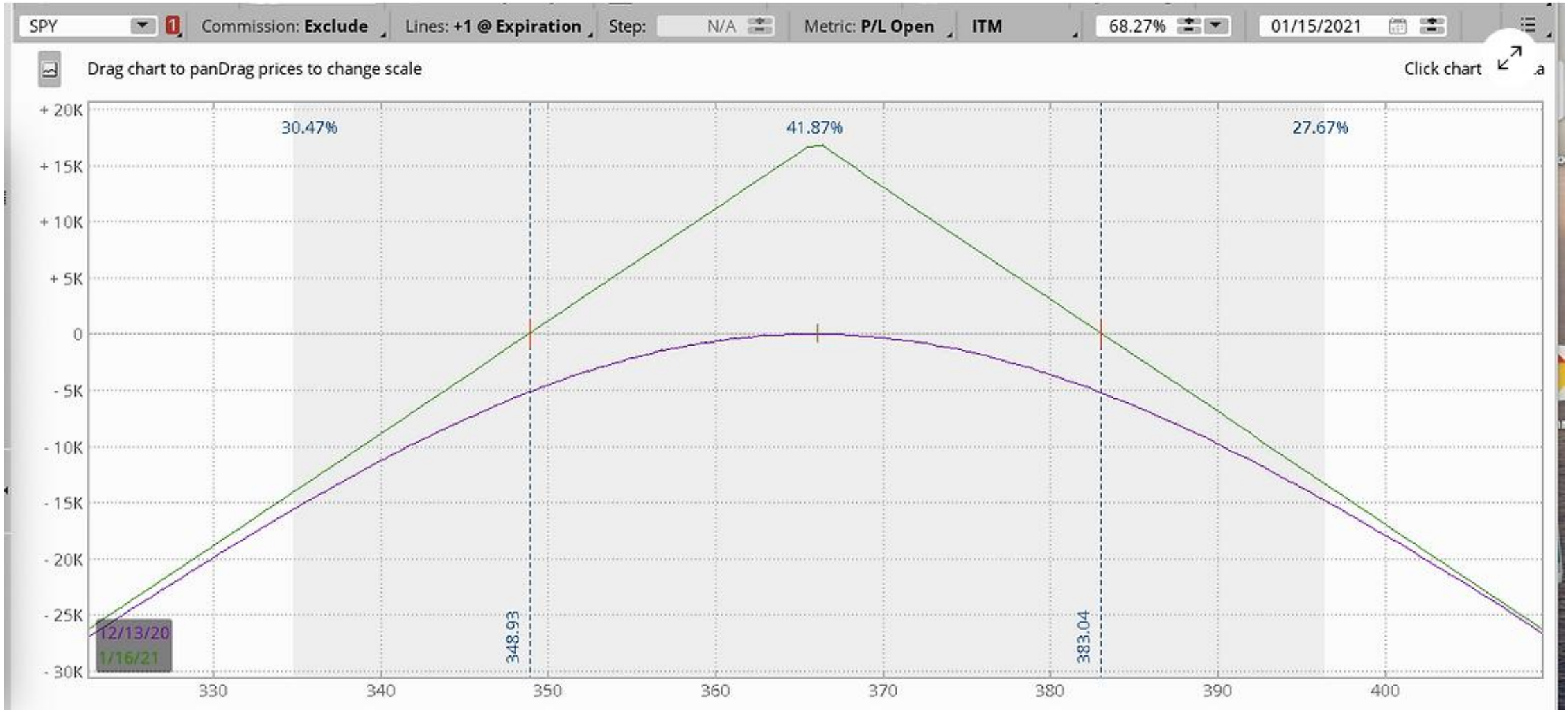
目标客户：

- 投资者为现货多头
- 拟使用期权获取预期区间内的收益


SPY
Commission: Exclude
Lines: +1 @ Expiration
Step: N/A
Metric: P/L Open
ITM
68.27%
01/15/2021
Drag chart to panDrag prices to change scale
Click chart for data
30.47%
41.87%
27.67%
348.93
383.04
12/13/20
1/16/21
+ 10K
+ 5K
0
- 5K
- 10K
- 15K
- 20K
- 25K
- 30K
- 35K
- 40K
330
340
350
360
370
380
390
400


SPY
Commission: Exclude
Lines: +1 @ Expiration
Step: N/A
Metric: P/L Open
ITM
68.27%
01/15/2021
Drag chart to panDrag prices to change scale
14.99%
37.31%
35.91%
11.79%
333.77
366.11
402.72
12/13/20
1/16/21
+ 10K
+ 5K
0
- 5K
- 10K
- 15K
- 20K
- 25K
- 30K
- 35K
- 40K
330
340
350
360
370
380
390
400

如果同时sell put和sell call，合并以后的盈亏曲线就是这样的：



Homework_week1

Q1: Read up about the initial public offering for Google. Which type of offering was it?

a) Best efforts

b) Firm commitment

c) None of these two

- Raising debt and equity for corporations or governments
  - bonds / shares / convertible bonds
  - public offerings: best efforts / firm commitment

1)坚定承诺（Firm Commitment)：对应国内的“包销”。承销商向发行公司保证将以事先约定的价格购买其全部发行的股票或债券，然后再将这些证券卖给公众投资者。如果承销商不能以高于或等于购买价格的价格将证券卖出，那么承销商将承担亏损。
2）最大努力（Best Efforts)：对应国内的“代销”。承销商同意尽最大努力销售发行公司的股票或债券，但并不保证会销售全部或任何特定数量的证券。如果承销商不能将所有证券售出，那么未售出的部分将退还给发行公司。

3) Google’s IPO：采用了“荷兰式拍卖”模式，这意味着所有的投资者—无论是大型机构还是个人投资者—都可以在同一个平台上出价购买股票。在这种拍卖中，所有股票的最终价格是根据收到的所有出价来确定的，以确保所有购买者都以相同的价格购买股票。例如：谷歌发行了100股，然后A报价90美元，要求买80股，B报价88美元，也要求买80股。那么最后A会优先买到80股，B就拿到剩下的20股，但是最后的结算价格都是88美元。

Q2: Trader Mr. X works for bank ABC. He manipulates the bank' s internal control systems and manages to circumvent the risk limit. He takes a huge bet on foreign exchange derivatives and loses $700 million in trading in these. Which type of risk describes best this event:

1. Operational risk
2. Market risk
3. Credit risk

Types of risk (not always clearly separated) in the context of finance and insurance:

- market risk: risk of a change in the value of a financial position due to the change in value of the underlyings (for instance the stock and bond prices, exchange rates, commodity prices,...)
- credit risk: risk of not receiving promised payments due to the default of the borrower
- operational risk: risk of losses resulting from inadequate or failed internal processes, systems and people or from external events.

1)操作风险（Operational Risk）指由于业务运营失败（如系统故障、员工失误、欺诈行为、管理不善、流程、政策和技术的缺陷）导致的损失风险。操作风险更多关注于公司内部的控制、组织结构和公司文化等方面。

2)市场风险（Market Risk）又称系统性风险，是指由于金融市场价格变动（如股票价格、利率、汇率和商品价格）导致的投资价值波动的风险。市场风险影响到几乎所有的金融资产类别，是不可避免的风险之一。

3)信用风险（Credit Risk）又称违约风险，是指借款人未能履行合约义务（如还本付息），导致贷款人或投资者损失的风险。这种风险主要出现在借贷关系中，例如银行贷款、购买公司债券或其他信用工具。

Q3: Which of the following is a key application of artificial intelligence in the finance industry?

a) Optimizing supply chain management

b) Personalizing customer service and financial advice

c) Monitoring environmental impact in manufacturing

AI in finance

1）优化供应链管理
2）个性化客户服务和金融建议
3）检测生产中环境的影响

- Portfolio management
- Customer services & Robo-Advising
- Credit scoring
- Fraud detection
- Anti-money laundering
- Risk management
- Trading

Q4: Cryptocurrencies are based on the following technology:

1. Deep learning
2. Blockchain
3. Large language model

Blockchain

- High-level principle:
  - Distributed ledger technology
  - Decentralized & "irreversible"
  - Consensus mechanism
  - Cryptographic security
- Key uses:
  - Cryptocurrencies
  - Decentralized Finance

Q5: Which regulatory framework aims to ensure the stability and integrity of the banking system by imposing capital requirements and conducting stress tests?

a) GDPR (General Data Protection Regulation)

b) SOX (Sarbanes-Oxley Act)

c) Basel III

d) MiFID II (Markets in Financial Instruments Directive II)

Goal: ensure that a bank or insurance has a sufficient amount of capital so that unforeseen losses do not lead to default. In banking:

- Basel Committe on Banking Supervision: no formal supervision/ not legally binding, but develops recommendations and guidelines (expecting that national authorities implement them adapted to their system).
- Basel III: current state (not fully implemented yet) at `https://www.bis.org/basel_framework`.

1）GDPR（通用数据保护条例）：聚焦于个人数据保护和隐私，在欧盟范围内实施。

2）SOX（萨班斯-奥克斯利法案）：主要关注会计和财务报告的透明度，通过要求更高的财务报告标准和企业治理规则，旨在防止会计欺诈、提高公司透明度，从而保护投资者利益。[2000年初会计丑闻:安然公司、世界通讯等都隐藏巨额债务和亏损，夸大了公司的收入和利润，误导了投资者和分析师对公司财务状况的判断。丑闻被揭露时，股价暴跌，公司纷纷破产。会计师事务所：安达信（Arthur Andersen）因安然事件倒闭。还剩四大会计师事务所：毕马威（KPMG），普华永道（PricewaterhouseCoopers，简称PwC），德勤（Deloitte Touche Tohmatsu，简称Deloitte），安永（Ernst & Young，简称EY）]

3）巴塞尔III是由巴塞尔银行监管委员会（BCBS）制定的一系列全球性银行监管标准，旨在增强银行业的资本质量，提高银行体系对经济周期波动和金融市场压力的抵御能力。巴塞尔III协议引入了更严格的资本充足率要求、新的杠杆比率和两项重要的流动性标准（流动性覆盖率LCR和净稳定资金比率NSFR），以及用于评估银行在极端经济情景下资本充足性的压力测试。

4）MiFID II（金融工具市场指令II）：旨在增加欧洲金融市场的透明度和效率，加强投资者保护。

巴林银行_尼克里森案

20世纪90年代，英国最古老的银行之一巴林银行因尼克里森（Nick Leeson）的未授权交易活动导致破产。

尼克里森在巴林银行的新加坡分支机构工作，担任衍生品交易员。他原本负责在日经225股指期货市场进行低风险套利交易。然而，李森开始进行未经授权的、高风险的投机交易，试图从股市波动中获利。开始时，他通过这些交易赚取了大量利润，但很快情况逆转。

1995年，尼克里森通过他控制的88888账户（一个最初用于隐藏错误交易的秘密账户）积累了巨额亏损，但他通过伪造交易记录和隐瞒真实情况来掩盖这一点。最终，他在尝试利用期货合约对冲风险并赌博日本股市会上涨时遭遇了巨大失败。然而，1995年初，神户地震震动了日本，导致股市大幅下跌，使得李森的头寸遭受了灾难性的损失。

到1995年2月，尼克里森的交易亏损累计达到了13亿美元，这一数字远超过巴林银行的资本。巴林银行无法承担这一巨额亏损，最终在1995年宣布破产。这一事件震惊了全球金融市场，巴林银行被荷兰国际集团（ING）以象征性的一英镑收购。

尼克里森逃往德国，后被逮捕并引渡回新加坡，那里他因欺诈和伪造文件而被判入狱6年。尼克出狱后完成的《我是如何搞垮巴林银行的》（Rogue Trader）一书。并被拍成电影《魔鬼交易员》。

Example: Operational risk (and market risk)

- Bankruptcy of Barings Bank caused by trader Nick Leeson:
  - Speculative trading with options on Nikkei Index
  - Final straw: in order to compensate for his losses he took a huge position in *Short Straddles*
    $\rightarrow$ enormous losses (700 Mio £) caused by price movements of the Nikkei Index due to the Kobe earthquake 1995.

Short straddle $\leftrightarrow$ selling both a put and a call option with same maturity and strike. Payoff / profit: