**Congratulations! You passed!**

**TO PASS** 80% or higher

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**GRADE**
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# Pairs Trading Strategy concepts

**LATEST SUBMISSION GRADE**
100%

1. What is the advantage of trading a long-short pair of stocks versus a single stock? **1 / 1 point**

- [x] You exposure to market risk is lower

**Correct**
Yes, by being long one stock and short another, you hedge at least part of your market risk or beta. This is why we size our long and short positions based on share price and each stocks beta. If you beta hedge your pair then you eliminate your expected market risk.

- [ ] You double your expected return
- [x] You can lower your exposure to industry and sector risk

**Correct**
Yes, if you choose a pair of stocks from the same industry and same sub-sector you can reduce or eliminate your exposure to industry and sector risk. The more similar your long and short are, the more you reduce your risk and get closer to a return that is pure alpha.

2. A long-short pairs trade will have a positive return if: **1 / 1 point**

- [x] The long side has a larger positive return than the short side.

**Correct**
Yes, if the long side outperforms the short side, a long-short pair will have a positive return.

- [ ] The long side has a larger negative return than the short side.
- [ ] The long side has a smaller positive return than the short side
- [x] The long side has a smaller negative return than the short side.

**Correct**
Yes, if the short side has a larger negative return than the long side the pair will have a positive return.

3. Your fundamental and statistical research indicate that Oracle (ORCL) will outperform Salesforce (CRM) over the next quarter. Oracle is currently trading at $50 and has a beta of 1.15. Salesforce is trading at $165 and has a beta of 1.22. You have total trading capital of $10,000,000 and your risk management team say you can can only allocate 5% to each strategy. If you fully allocate to a long ORCL, short CRM pair, how many shares of CRM should you short if you want the strategy to be beta hedged? **1 / 1 point**

- (•) 2,856 shares of Salesforce (CRM)
- ( ) 3,030 shares of Salesforce (CRM)
- ( ) 2,484 shares of Salesforce (CRM)

**Correct**

Yes, this would be the number of shares you would short if you wanted to beta-hedge your long position in Oracle .

2,856 = ($500,000*1.15/1.22)/$165.

4. When we ran a principal components analysis of the 68 stocks in the XLK Technology ETF, our first component, PC1 explained a little over 50% of the variation in returns for the XLK stocks. All of the stocks had positive loadings in PC1. Why did we chose a pair of stocks that had equal loadings in this dimension? **1 / 1 point**

- ○ We wanted to create a long-short pair of to stocks with the same price/earnings ratio which is one way to measure the Value factor.
- ◉ We wanted to create a long-short pair of stocks that were hedged in their main exposure to variations in the overall returns of the XLK portfolio of stocks.
- ○ We wanted to create a long-short pair of to stocks in the same industry sub-sector and equal loadings in PC1 indicate that the stocks are in the same sub-sector.

✓ **Correct**

Yes, having a pair that is hedged in PC1 is as close as we can get to hedging out the risk exposure of our pair to volatility in the technology sector overall. PC1 loadings seem to measure the covariance of the each XLK stock's return with the overall return of the XLK ETF.

5. You have backtested 10 trading strategies using two distinct data sets representing different market regimes (down-trending with high volatility and up-trending with low volatility). From the 10 strategies you have identified the ones with the highest Sharpe ratio and highest return under each regime. **1 / 1 point**

| Strategy | Return | PnL Vol | Sharpe Ratio | Regime |
|---|---|---|---|---|
| 3 | .08 | .04 | 2.00 | Down/High |
| 6 | .05 | .02 | 2.50 | Up/Low |
| 7 | .10 | .06 | 1.67 | Down/High |
| 10 | .06 | .03 | 2.00 | Up/Low |

The strategies have about 70% pair-wise correlations with each other. Your analysis predicts a 75% chance that the market will be up-trending and low volatility and 25% chance that it will be down-trending and high volatility. Which strategy or combination of strategies would you choose for implementation or further backtesting and why would you choose it or them?

- ☐ Implement Strategy 6 because it has the highest Sharpe ratio and it is the most likely market regime.
- ☐ Implement a combination of Strategy 7 and 10 as this will give you the highest expected return regardless of the market regime.
- ☐ Implement a combination of Strategy 3 and 6 as this will give you the highest expected Sharpe ratio regardless of the market regime.
- ☑ Rather than looking at the performance of individual strategies, consider backtesting combinations of different strategies and determining the combination that gives you the highest Sharpe ratio.

✓ **Correct**

Yes, you should consider backtesting all possible combinations of the 10 strategies on all three of your data sets if this is feasible. This will help you identify the optimal combination of strategies that will maximize your risk-adjusted return.