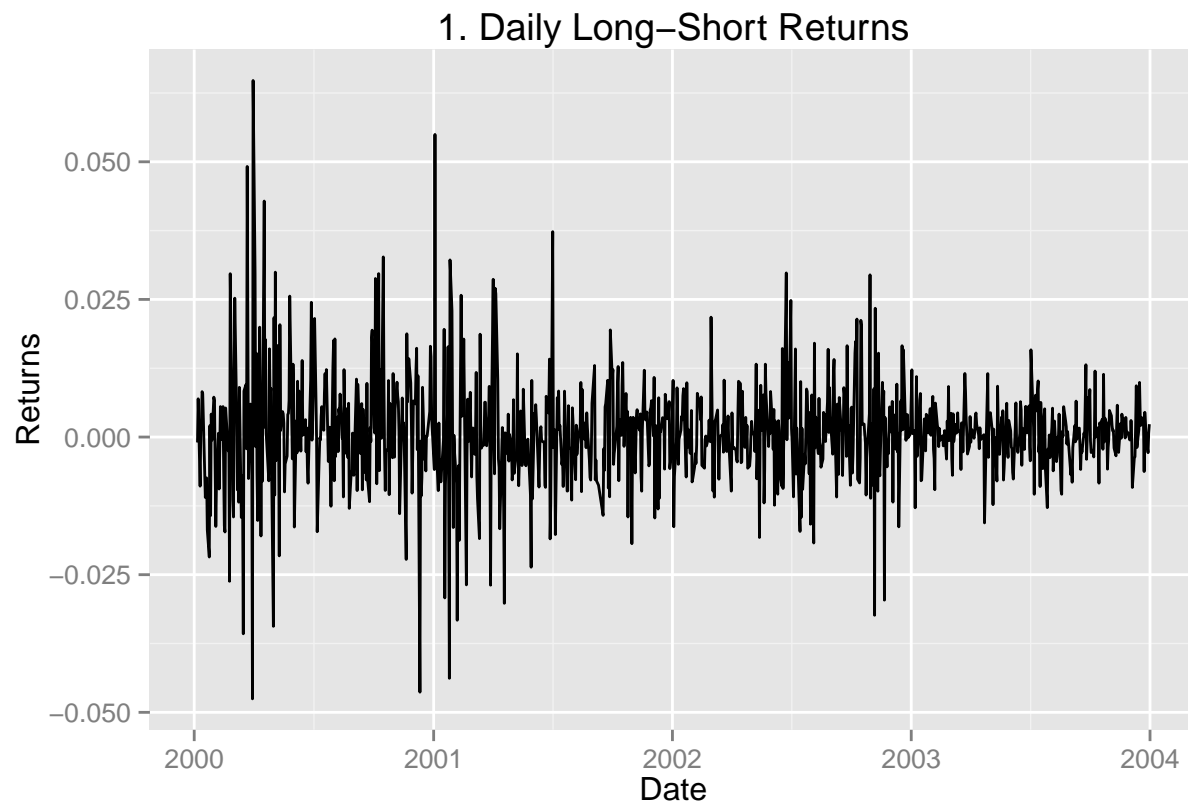


# Solution Description - Part (1)

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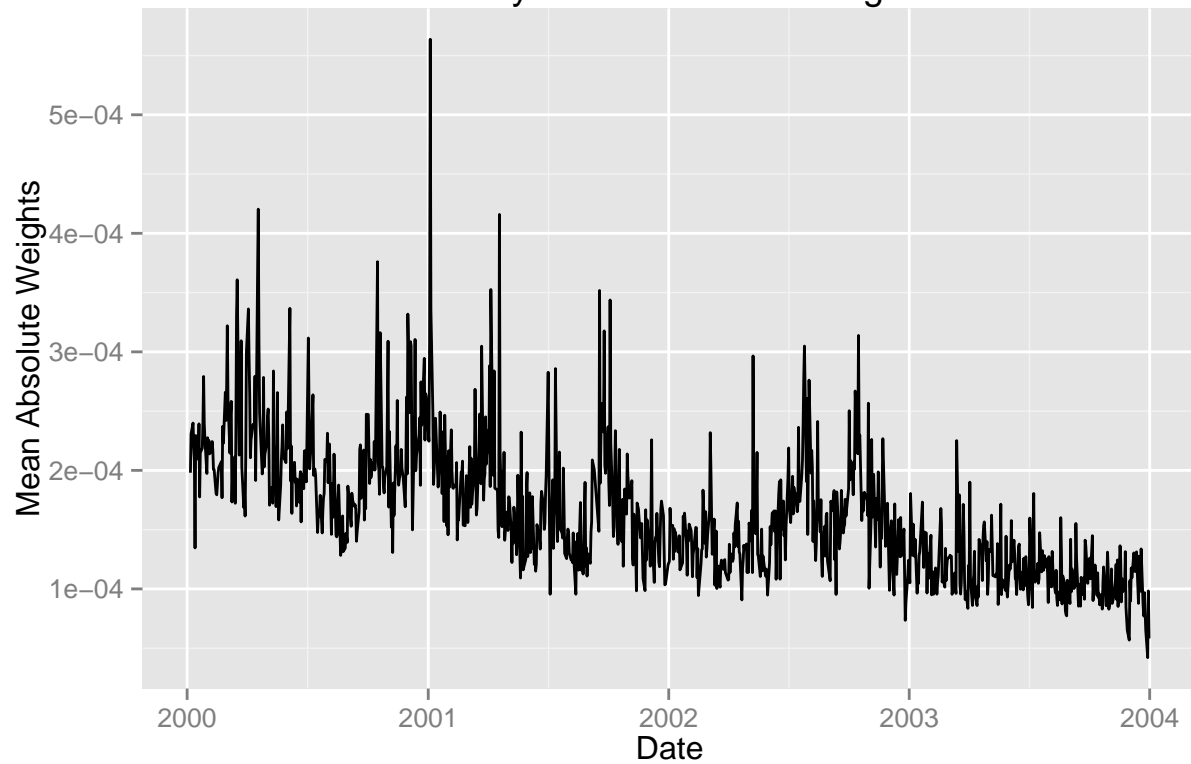
We first display the four time series plots.



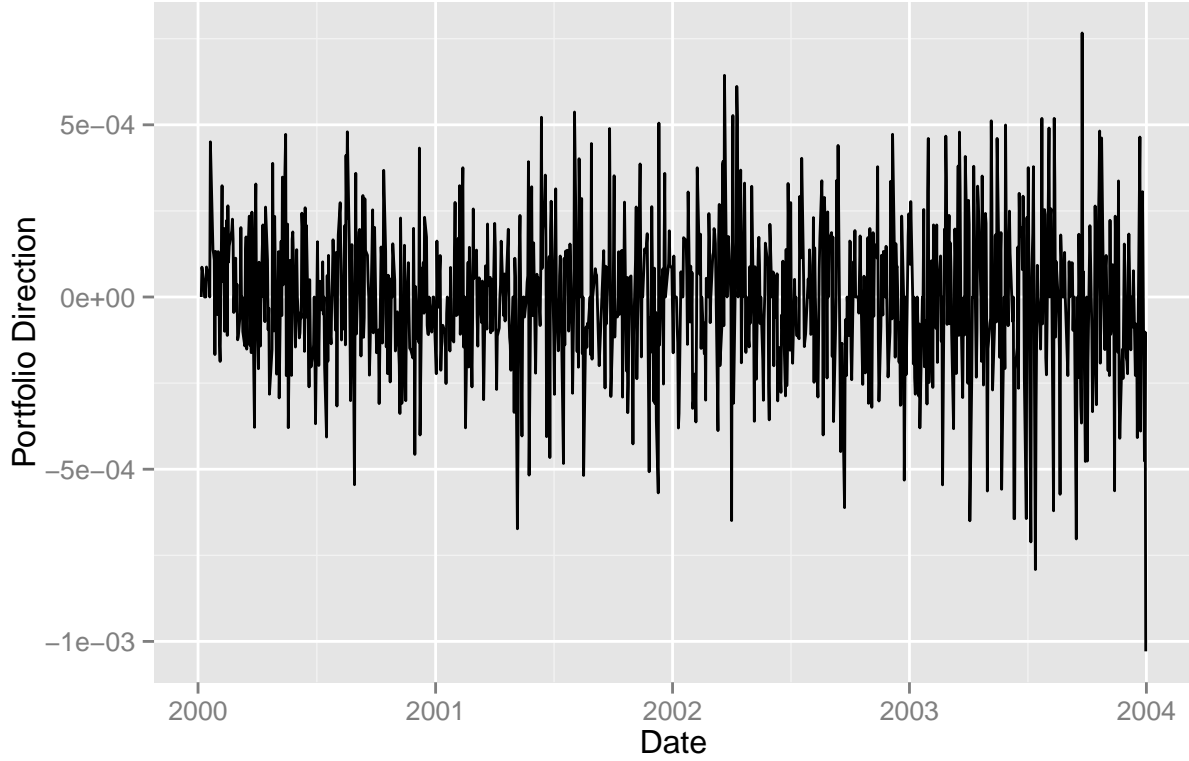
## 2. Cumulative Long-Short Returns – In Natural Logarithms



## 3. Daily Mean Absolute Weights



#### 4. Daily Portfolio Direction



We can also look at the relevant statistics below.

	Names	Values
1	Average Daily Log Returns	0.0006
2	Standard Deviation of Daily Log Returns	0.0097
3	Annualized Sharpe Ratio	1.0453
4	Skewness	0.3021
5	Kurtosis	5.7470
6	Maximum Drawdown - Number of Days	181.0000
7	Maximum Drawdown - Return	-0.2071
8	Correlation with Equal Weighted Returns	0.0840

The strategy worked well considering how naive it was. We first observe plot 2 of the cumulative returns, where both the long-short and the equal-weight portfolios delivered similar long term returns. In fact the Sharpe ratio for the equal-weight portfolio is 1.03, which means the strategy in this part is not outperforming the market.

For the equal-weighted portfolio, the skewness of returns is 0.188, and the excess kurtosis is 1.405, both are lower than the long-short portfolio. Especially for the kurtosis of 5.747, this value is comparable to that of a student-t distribution with 5 degrees of freedom (which has kurtosis 5), implying the returns are extremely heavy tailed.

To provide further intuition to the results, we observe the form of the strategy:

$$W_1(t, j) = -\frac{1}{N} R_{cc}(t-1, j) - R_{cc, avg}(t-1)$$

This weight is chosen based on whether the stock outperform its peers in the previous day or not. However, we observe that a higher weight is given to the bigger movers in the previous day. Suppose a stock remains

volatile for an extended period of time, we will have a greater risk exposure compared to the equal-weighted portfolio, possibly contributing to heavier tails of returns.