1 Results

For the following results we consider 3 types of parameterizations for the portfolio problem. The first is a simple case where the assets are identically distributed as seen in (Cai, Judd and Xu 2013), the second is a case where the parameters are chosen to match the parameters in (Schober, Valentin and Pflüger 2022) also seen in (Gaegauf, Scheidegger and Trojani 2023), and the last is a modification of the first case where the correlation between the assets is larger (correlation coefficient of 0.75).

Table 1: Parameters for Examples of Portfolio Problems

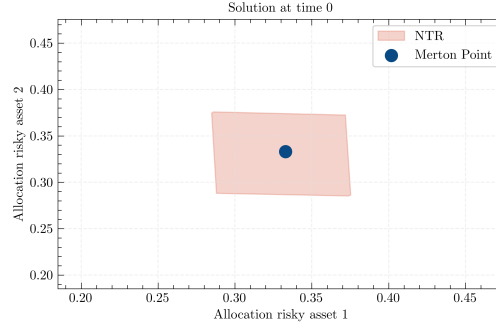|	**i.i.d Assets**	**Schober Parameters**	**High Correlation**
T	6	6	6
k	3	5	3
γ	3.0	3.5	3.0
τ	0.5%	0.5%	0.5%
β	0.97	0.97	0.97
r	3%	4%	3%
$\mu^\top$	$(0.07,\ 0.07)$	μ_{Shober}	$(0.07,\ 0.07)$
Σ	$\begin{bmatrix} 0.04 & 0.00 \\ 0.00 & 0.04 \end{bmatrix}$	Σ_{Schober}	$\begin{bmatrix} 0.04 & 0.03 \\ 0.03 & 0.04 \end{bmatrix}$

$$\mu_{\text{Schober}}^\top = \begin{bmatrix} 0.0572 & 0.0638 & 0.07 & 0.0764 & 0.0828 \end{bmatrix}$$

$$\Sigma_{\text{Schober}} = \begin{bmatrix} 0.0256 & 0.00576 & 0.00288 & 0.00176 & 0.00096 \\ 0.00576 & 0.0324 & 0.0090432 & 0.010692 & 0.01296 \\ 0.00288 & 0.0090432 & 0.04 & 0.0132 & 0.0168 \\ 0.00176 & 0.010692 & 0.0132 & 0.0484 & 0.02112 \\ 0.00096 & 0.01296 & 0.0168 & 0.02112 & 0.0576 \end{bmatrix}$$

1.1 Dynamic Portfolio Choice without consumption

I first consider the base model with proportional transaction costs and no consumption. In the absence of consumption, the optimal portfolio is the merton points, which we plot in every figure. I plot the No-trade region at time point 0 (initial time point) for each of the parameterizations in Figure 1.1. When using the Schober parameters we select the d first elements of the mean vector, and truncate the covariance matrix to a $d \times d$ matrix, depending on the number of assets d in the model.
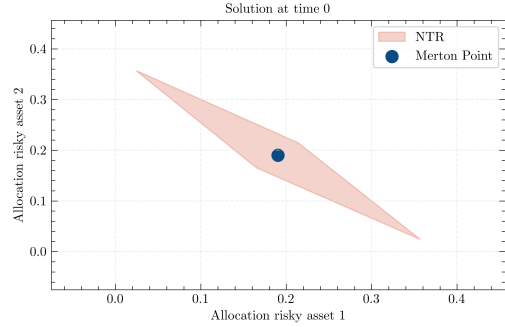
Figure 1.1: Comparison of No Trade Regions.

(a) No Trade Region for Independent Identically Distributed Assets.
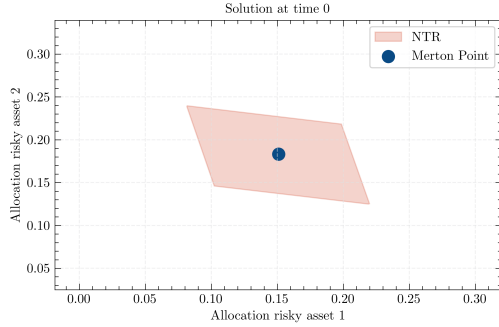
(b) No Trade Region for Schober Parameters.

(c) No Trade Region for High Correlation.

### 1.1.1 Investigating the No-Trade Region

We now look at the No-Trade region for the base model with proportional transaction costs and no consumption in more detail. Specifically we look at how the region behaves over the entire investment horizon $[0, T]$, and how the region changes with different transaction cost levels. We choose to look at the model with the Schober parameters, as this is a mixture of the other two parameterizations.

Note that for larger values of τ the NTR is larger, which is to be expected...

1.1.2 Increasing the dimensionality of the model

We now increase the dimensionality of the model to $d = 3$ and look at the No-Trade region for the Schober parameters.

Figure 1.2: No Trade Region for Schober Parameters over Time.
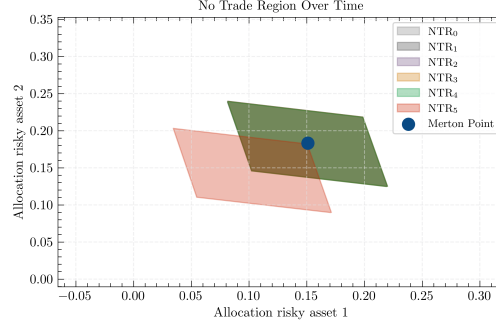
The No-Trade region is plotted for the Schober parameters over the entire investment horizon $[0, T]$ For time points $t \in [0, T-1]$ the no-trade-region (NTR)s overlap.

Figure 1.3: No Trade Region for the iid Parameters with different values of τ.
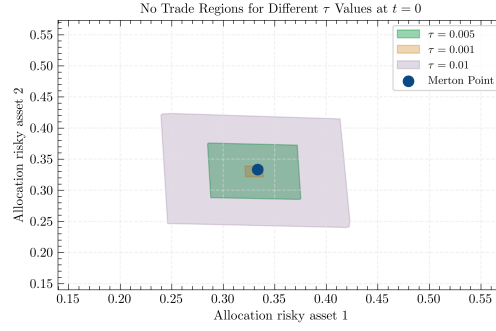

Figure 1.4: No Trade Region for the Schober Parameters with $d = 3$.