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Article

Modern Approaches to Dynamic Portfolio Optimization

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Online-Appendix zu

„Modern Approaches to Dynamic Portfolio Optimization“

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A Risk-Free Asset Correlogram

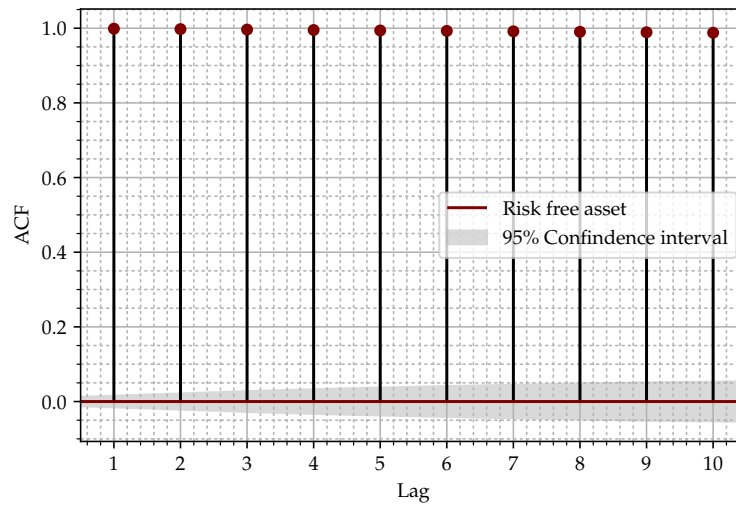


FIGURE A.1: Full sample correlogram for the risk-free asset

B Daily Volatility Figures

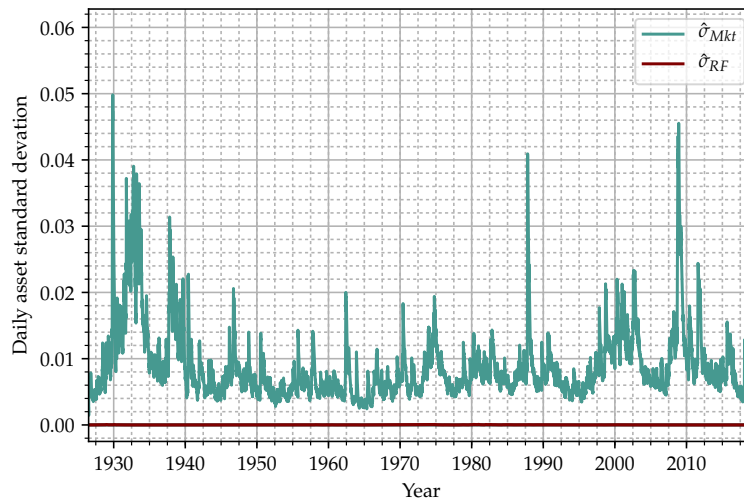


FIGURE B.1: Daily asset standard deviation over time

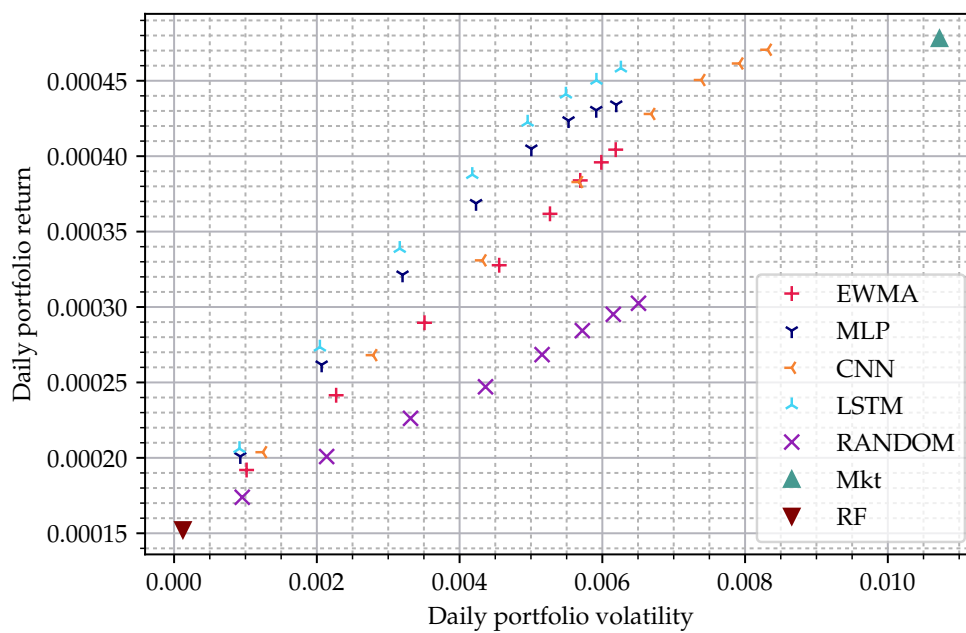


FIGURE B.2: Portfolio performances in μ - σ -space
(daily rebalancing, no TC)

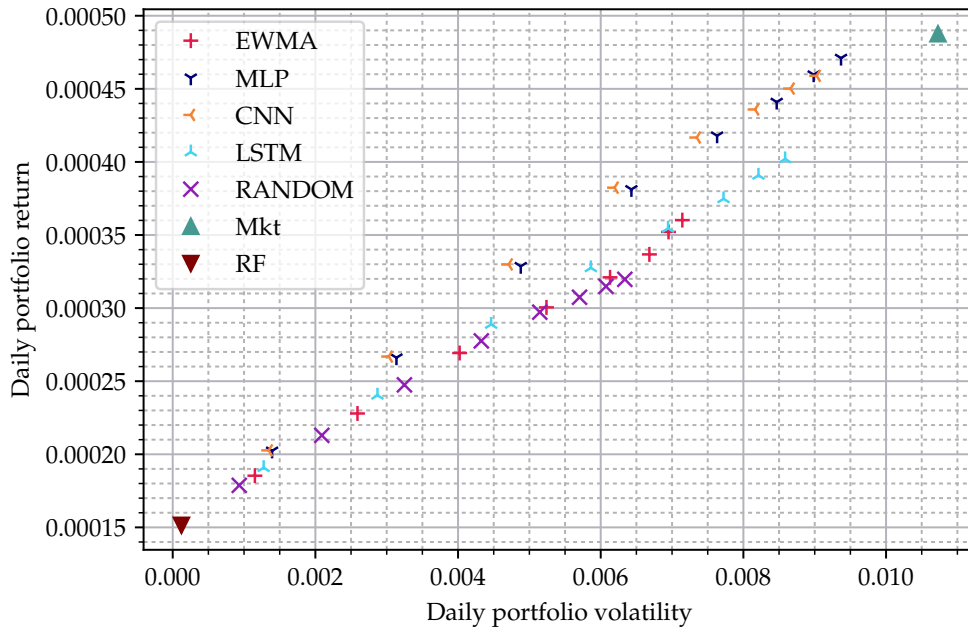


FIGURE B.3: Portfolio performances in μ - σ -space (monthly rebalancing, no TC)

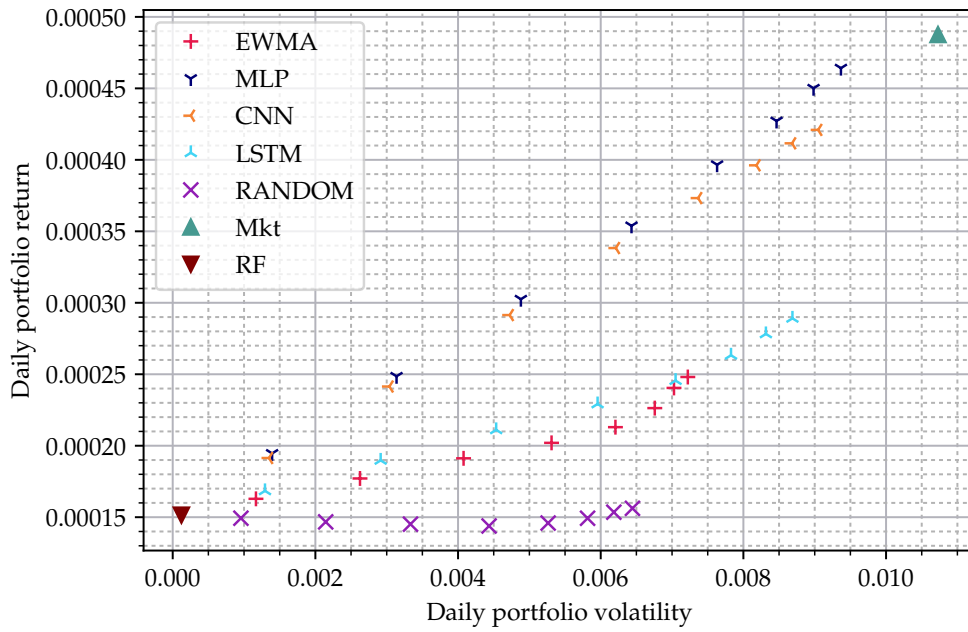


FIGURE B.4: Portfolio performances in μ - σ -space (monthly rebalancing, with TC)

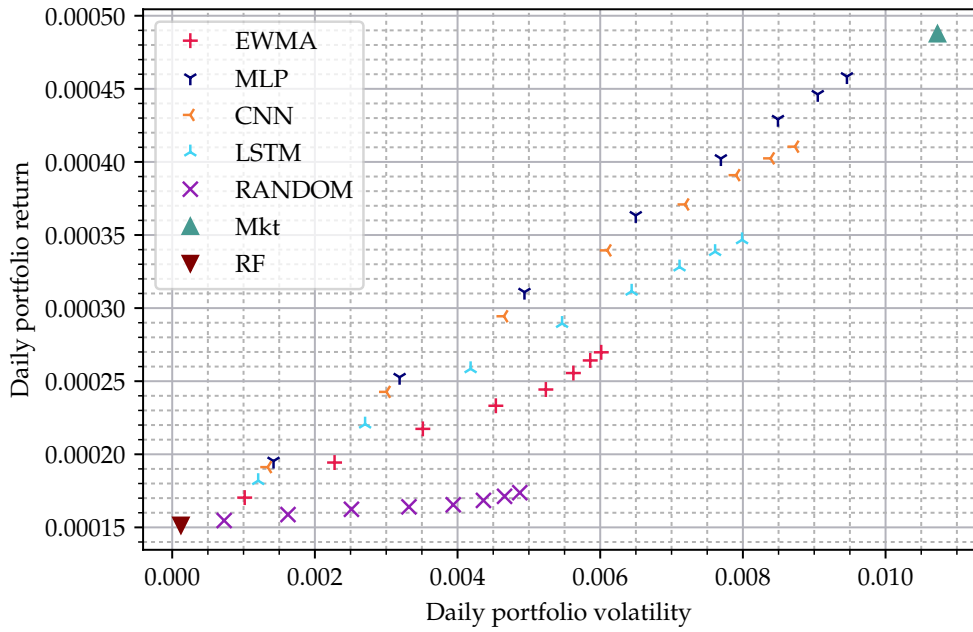


FIGURE B.5: Portfolio performances in μ - σ -space (smoothed daily rebalancing, with TC)

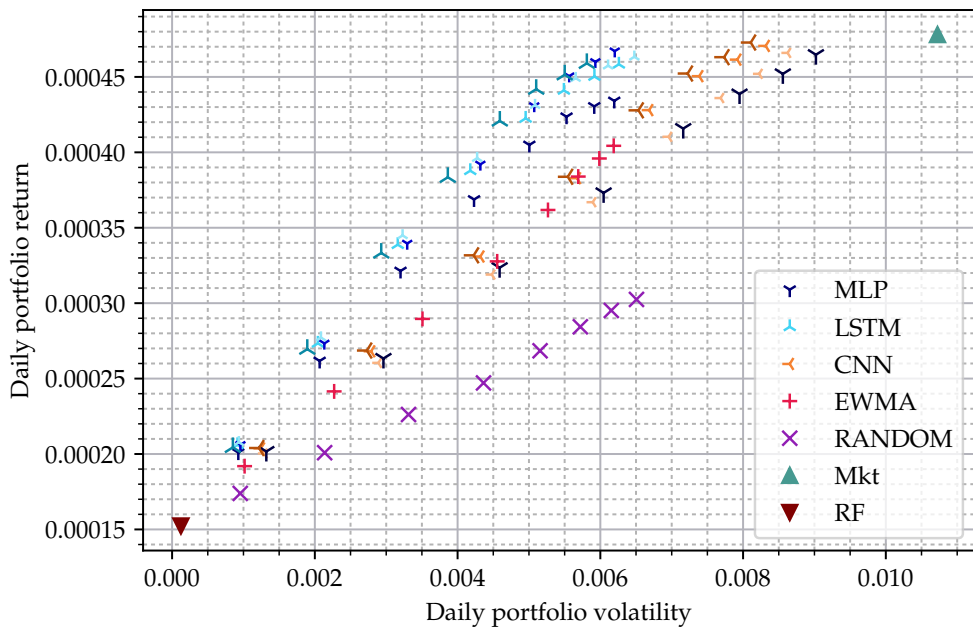


FIGURE B.6: Portfolio performances in μ - σ -space (small and large models, daily rebalancing, no TC)

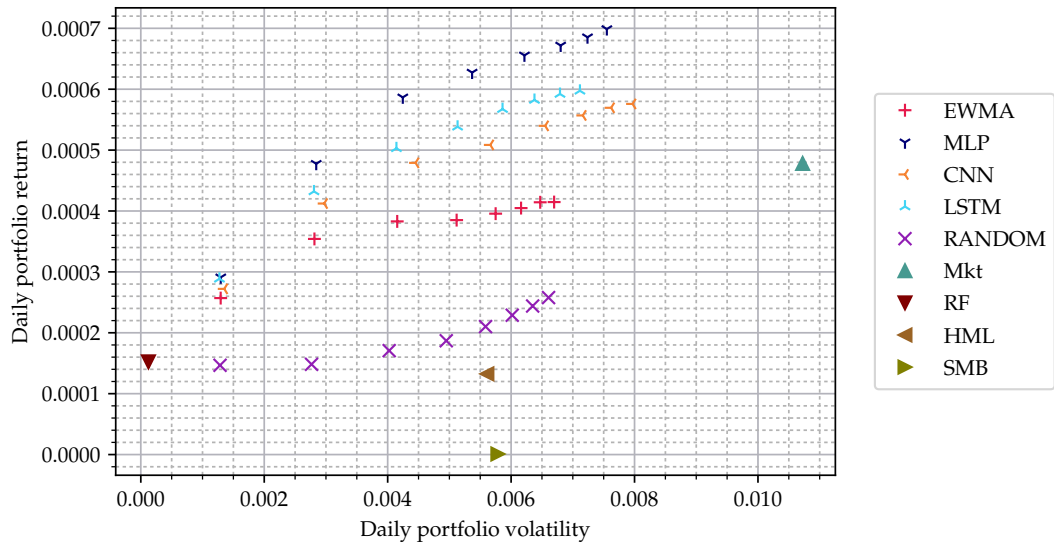


FIGURE B.7: Portfolio performances in μ - σ -space (all assets, daily rebalancing, no TC)

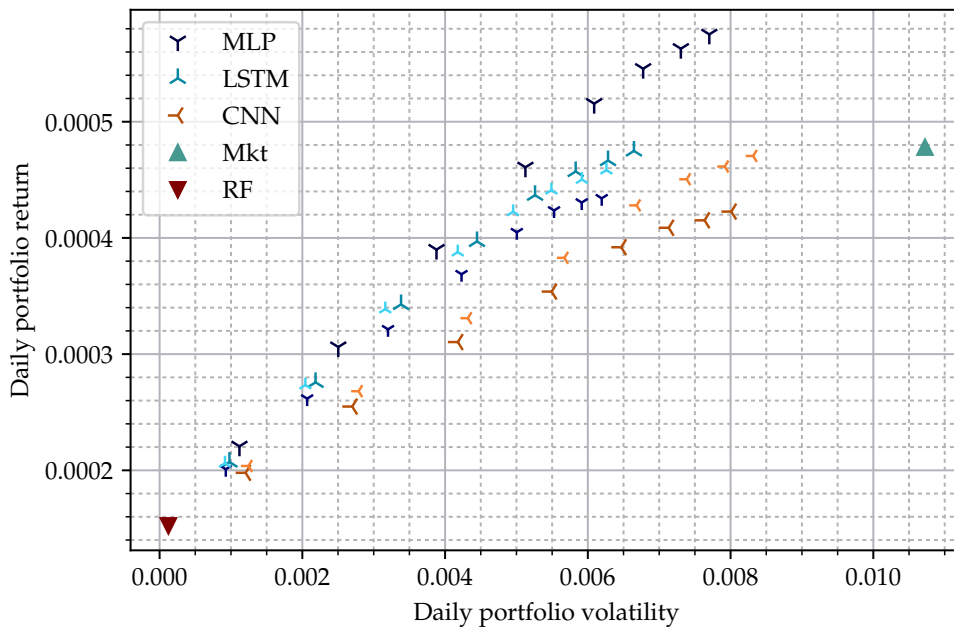


FIGURE B.8: Portfolio performances in μ - σ -space (recalibrated, daily rebalancing, no TC)

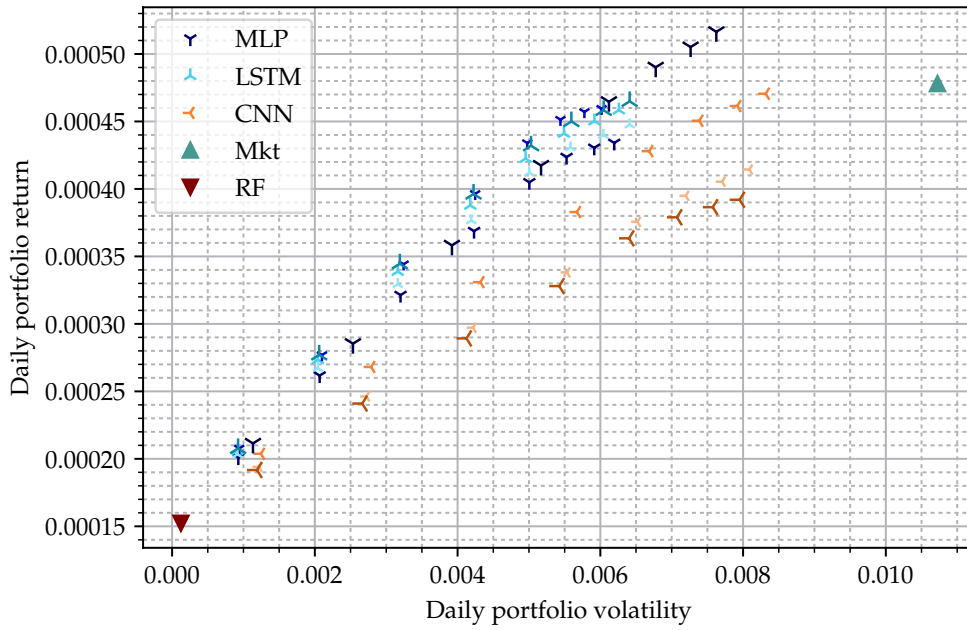


FIGURE B.9: Portfolio performances in μ - σ -space (rerun consistency, daily rebalancing, no TC)

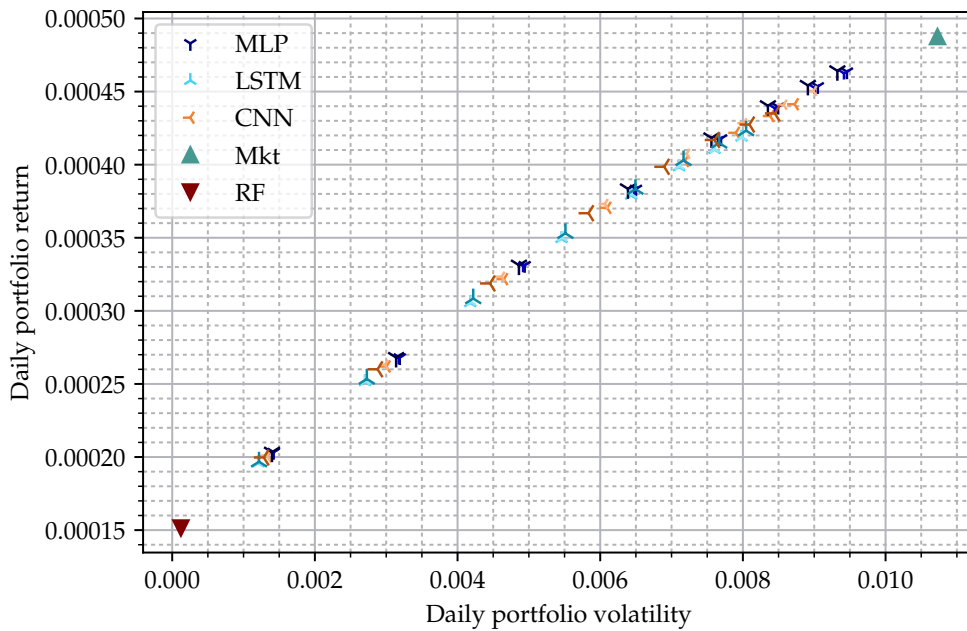


FIGURE B.10: Portfolio performances in μ - σ -space (rerun consistency, smoothed daily rebalancing, no TC)

C Daily Sharpe Ratio Tables

TABLE C.1: Portfolio Sharpe ratios (daily rebalancing, no TC)

Vola Target	EWMA	MLP	CNN	LSTM	RANDOM
0.1%	0.039	<i>0.053</i>	0.042	0.059	0.023
0.3%	0.039	<i>0.053</i>	0.042	0.059	0.023
0.4%	0.039	<i>0.053</i>	0.041	0.059	0.022
0.6%	0.039	<i>0.051</i>	0.041	0.056	0.022
0.8%	0.040	<i>0.051</i>	0.041	0.055	0.023
0.9%	0.041	<i>0.049</i>	0.040	0.053	0.023
1.1%	0.041	<i>0.047</i>	0.039	0.050	0.023
1.2%	0.041	<i>0.046</i>	0.038	0.049	0.023

Bold and italic table entries represent the highest and second highest Sharpe ratios per risk target, respectively.

TABLE C.2: Portfolio Sharpe ratios (monthly rebalancing, with TC)

Vola Target	EWMA	MLP	CNN	LSTM	RANDOM
0.1%	0.010	0.031	<i>0.030</i>	0.013	-0.002
0.3%	0.010	0.031	<i>0.030</i>	0.013	-0.002
0.4%	0.010	0.031	<i>0.030</i>	0.013	-0.002
0.6%	0.010	0.031	<i>0.030</i>	0.013	-0.002
0.8%	0.010	0.032	<i>0.030</i>	0.013	-0.001
0.9%	0.011	0.033	<i>0.030</i>	0.014	-0.000
1.1%	0.013	0.033	<i>0.030</i>	0.015	0.000
1.2%	0.013	0.033	<i>0.030</i>	0.016	0.001

Bold and italic table entries represent the highest and second highest Sharpe ratios per risk target, respectively.

TABLE C.3: Portfolio Sharpe ratios
(smoothed daily rebalancing, with TC)

Vola Target	EWMA	MLP	CNN	LSTM	RANDOM
0.1%	0.019	0.031	<i>0.030</i>	0.025	0.004
0.3%	0.019	0.032	<i>0.030</i>	0.026	0.004
0.4%	0.019	0.032	<i>0.031</i>	0.026	0.004
0.6%	0.018	0.033	<i>0.031</i>	0.025	0.004
0.8%	0.018	0.033	<i>0.031</i>	0.025	0.004
0.9%	0.019	0.033	<i>0.030</i>	0.025	0.004
1.1%	0.019	0.033	<i>0.030</i>	0.025	0.004
1.2%	0.020	0.032	<i>0.030</i>	0.024	0.005

Bold and italic table entries represent the highest and second highest Sharpe ratios per risk target, respectively.

D Lowest and Highest Risk Target Total Return Indices

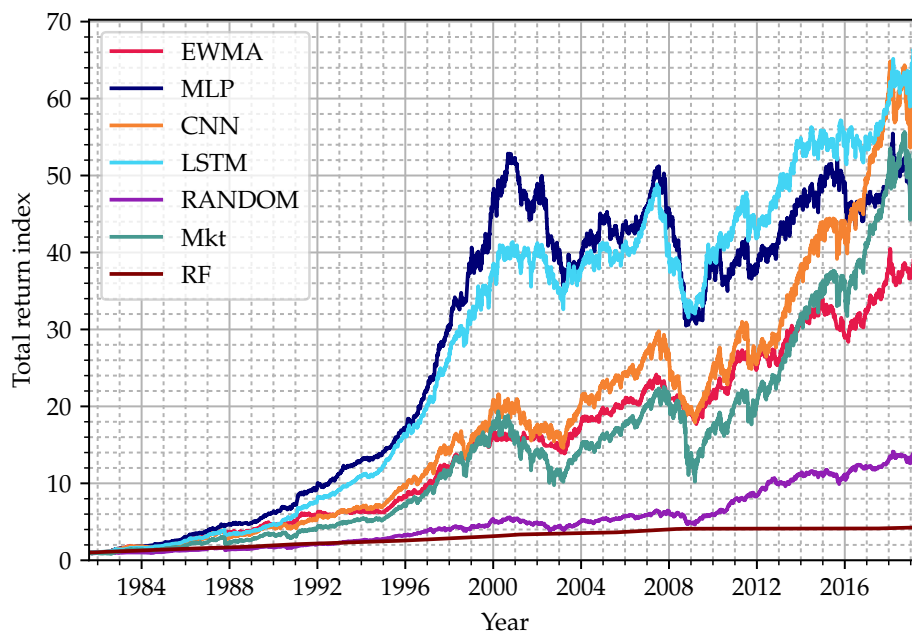


FIGURE D.1: Total return indices for the highest risk target (19.5% volatility)

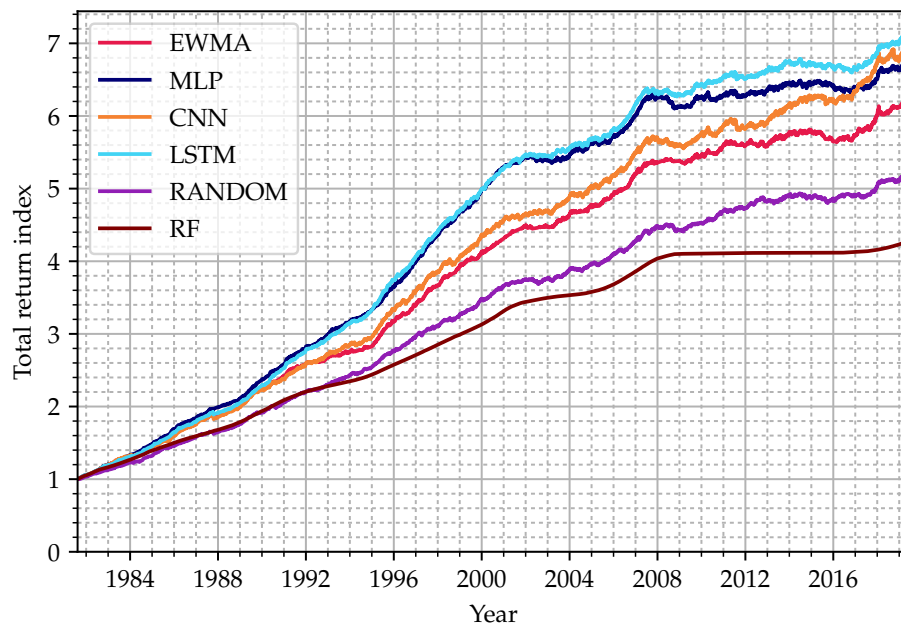


FIGURE D.2: Total return indices for the lowest risk target (2% volatility)

The market asset is omitted from this figure for an improved representation, as all models closely track the risk-free asset at this risk target.

E Monthly and Smoothed μ -Max DD Figures

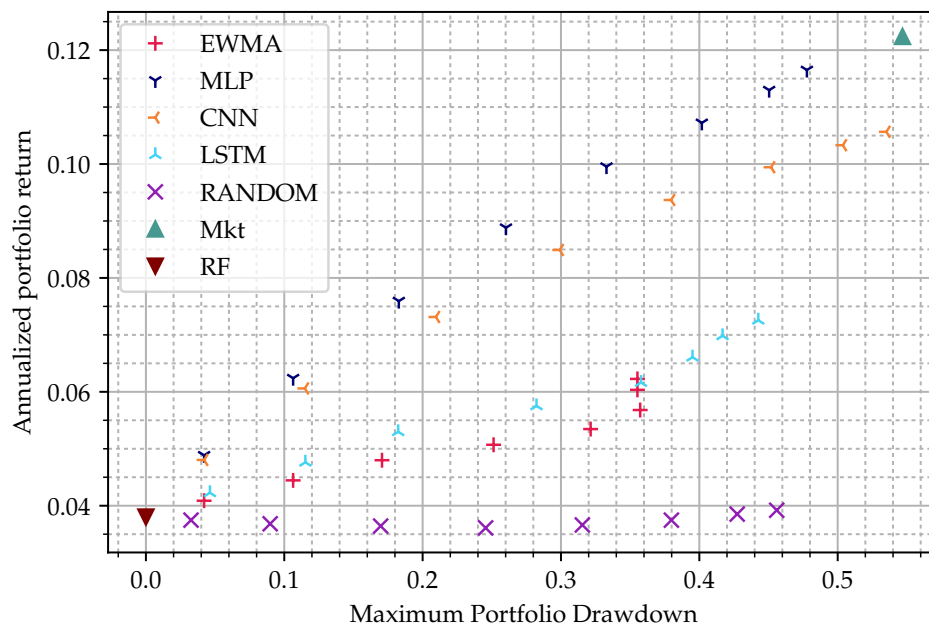


FIGURE E.1: Portfolio performances in μ -Max DD-space (monthly rebalancing, with TC)

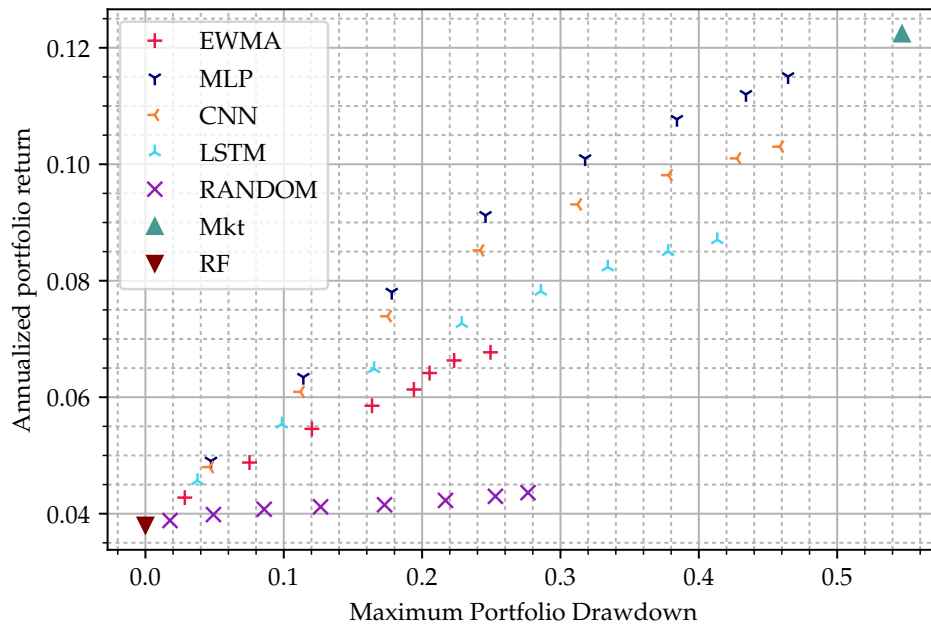


FIGURE E.2: Portfolio performances in μ -Max DD-space (smoothed daily rebalancing, with TC)

F Hyperparameter variation model architectures

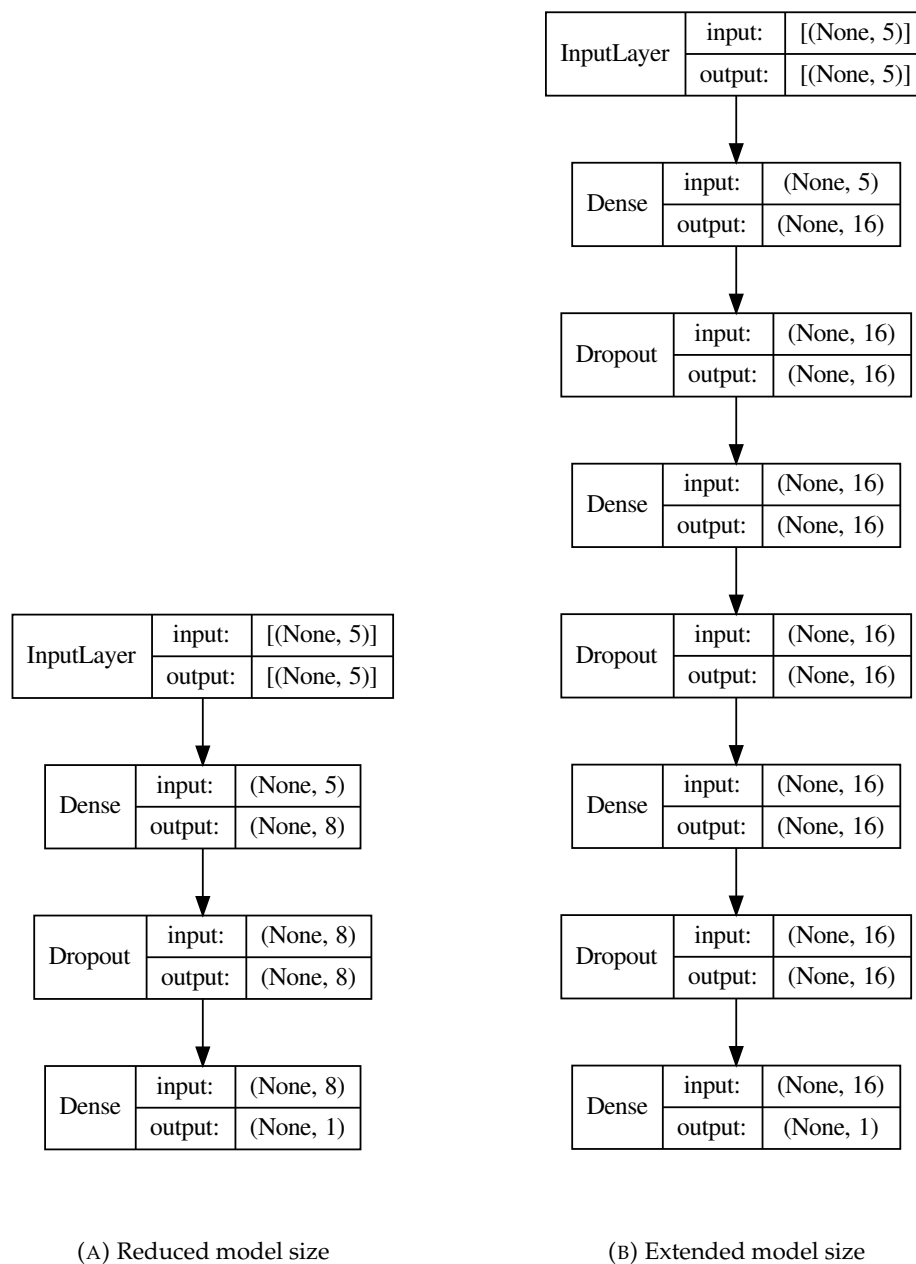


FIGURE F.1: MLP architecture variation

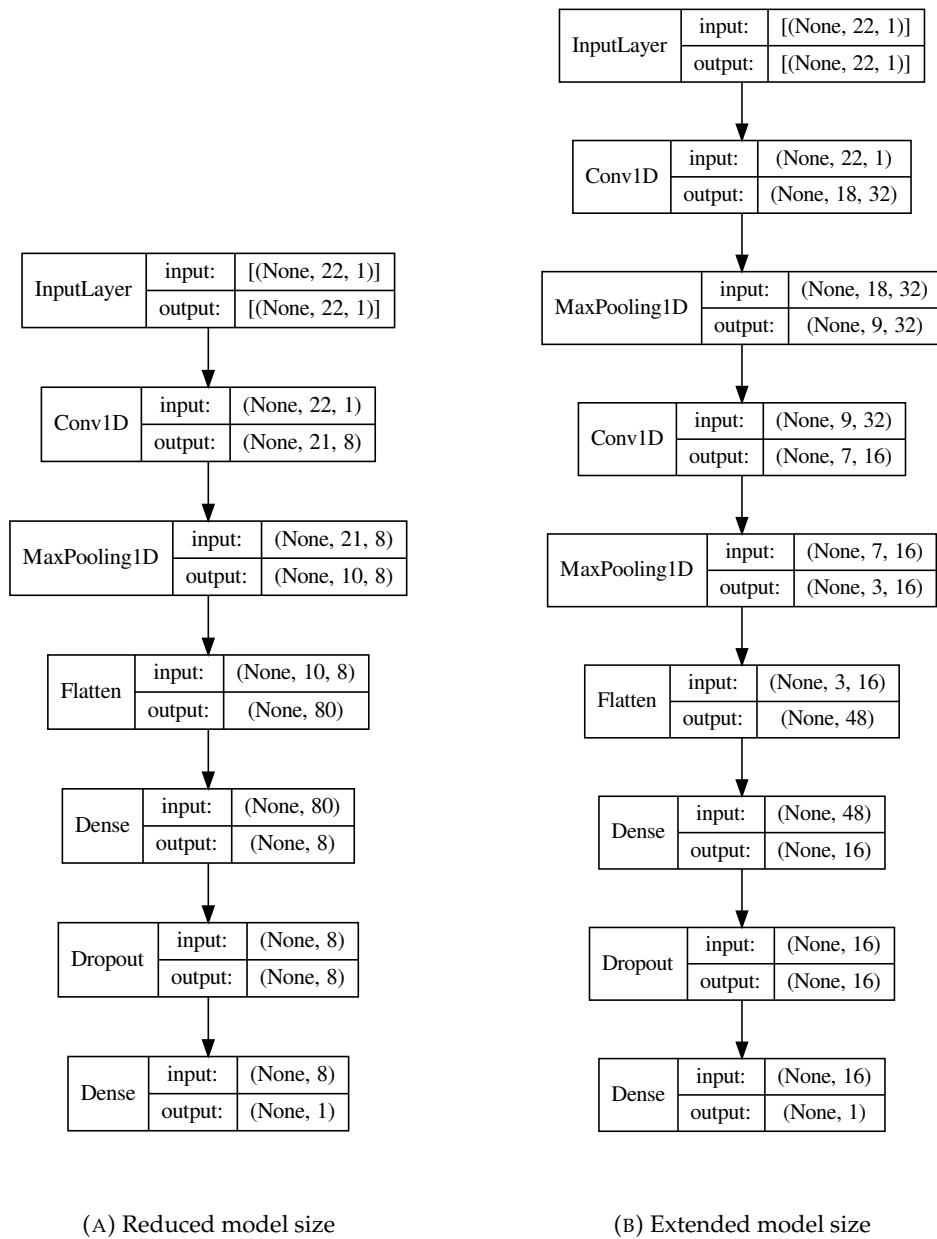
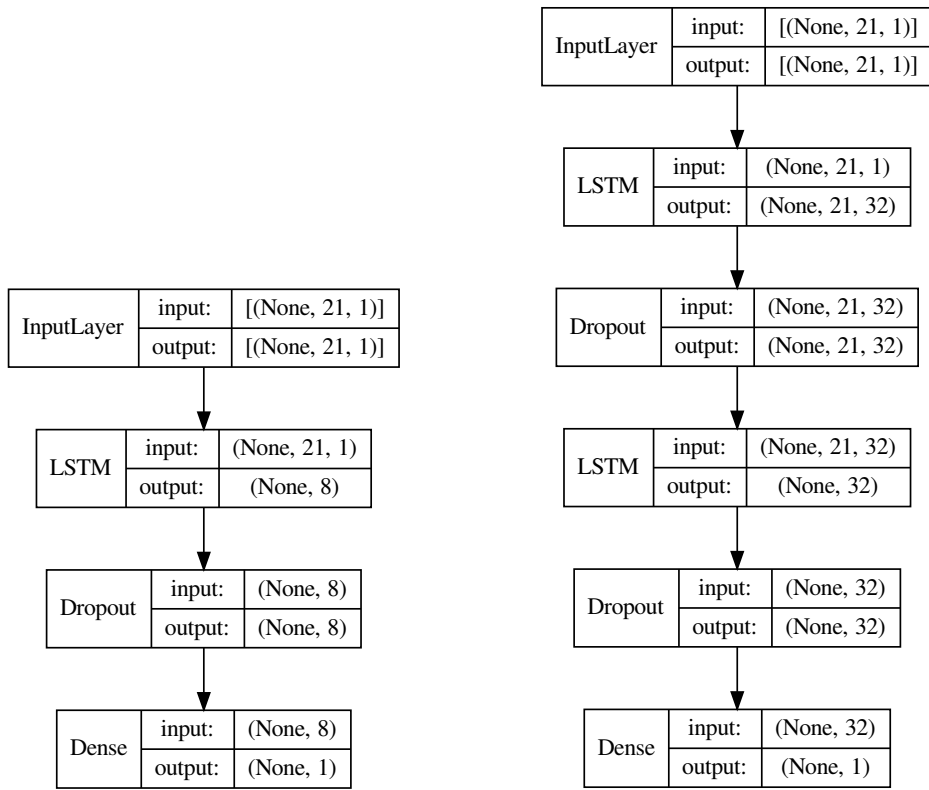


FIGURE F.2: CNN architecture variation



(A) Reduced model size

(B) Extended model size

FIGURE F.3: LSTM architecture variation