

Schiele, Philipp

Article

Modern Approaches to Dynamic Portfolio Optimization

Junior Management Science (JUMS)

Provided in Cooperation with:

Junior Management Science e. V.

Suggested Citation: Schiele, Philipp (2021) : Modern Approaches to Dynamic Portfolio Optimization, Junior Management Science (JUMS), ISSN 2942-1861, Junior Management Science e. V., Planegg, Vol. 6, Iss. 1, pp. 149-189,
<https://doi.org/10.5282/jums/v6i1pp149-189>

This Version is available at:

<https://hdl.handle.net/10419/294949>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>



Online-Appendix zu

„Modern Approaches to Dynamic Portfolio Optimization“

Philipp Schiele

Ludwig-Maximilians-Universität München

Junior Management Science 6(1) (2021) 149-189

A Risk-Free Asset Correlogram

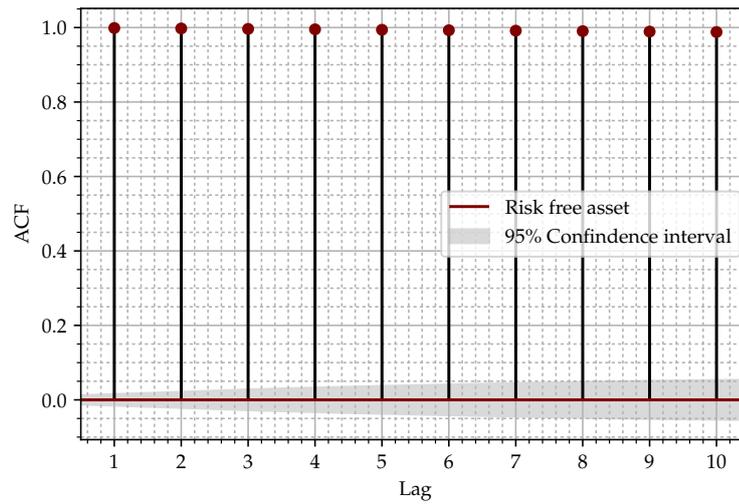


FIGURE A.1: Full sample correlogram for the risk-free asset

B Daily Volatility Figures

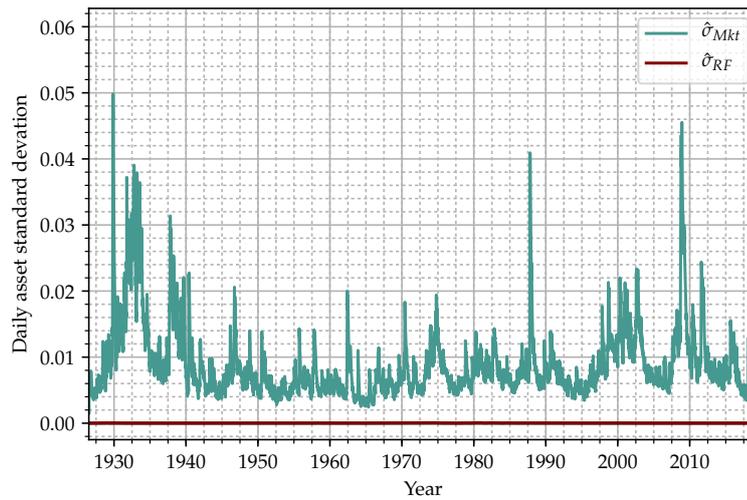


FIGURE B.1: Daily asset standard deviation over time

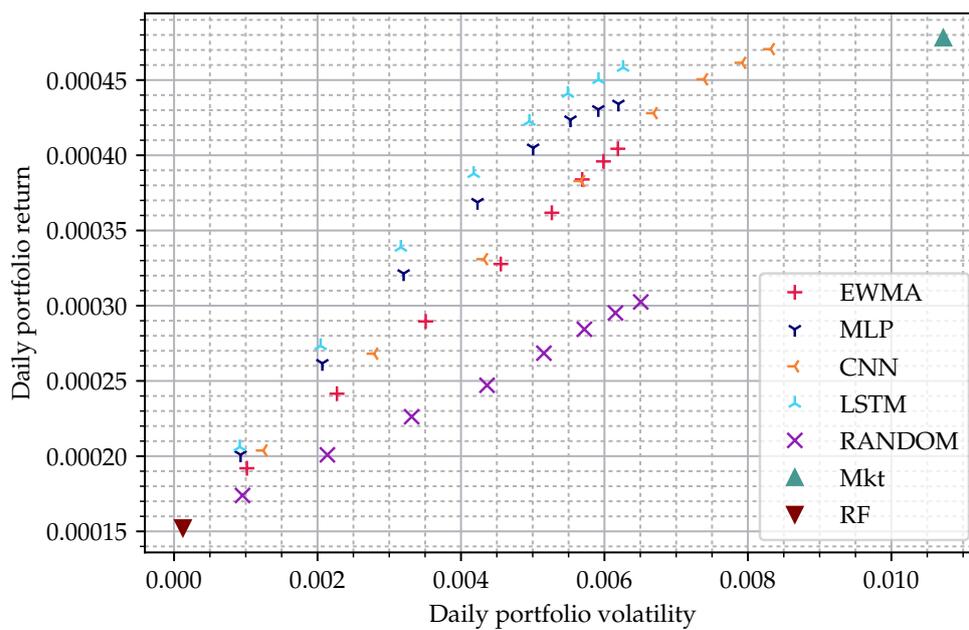


FIGURE B.2: Portfolio performances in μ - σ -space (daily rebalancing, no TC)

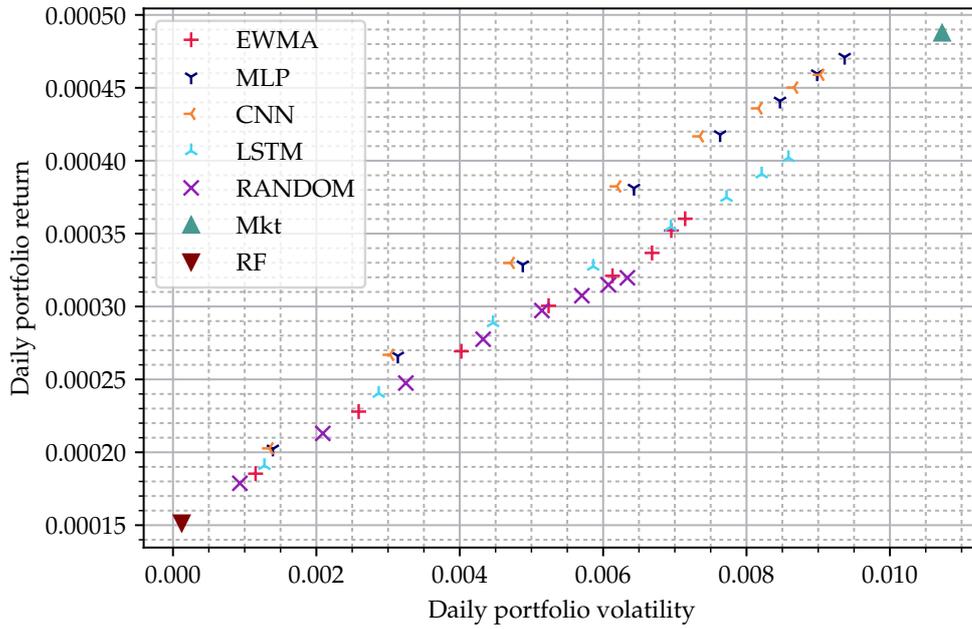


FIGURE B.3: Portfolio performances in μ - σ -space (monthly rebalancing, no TC)

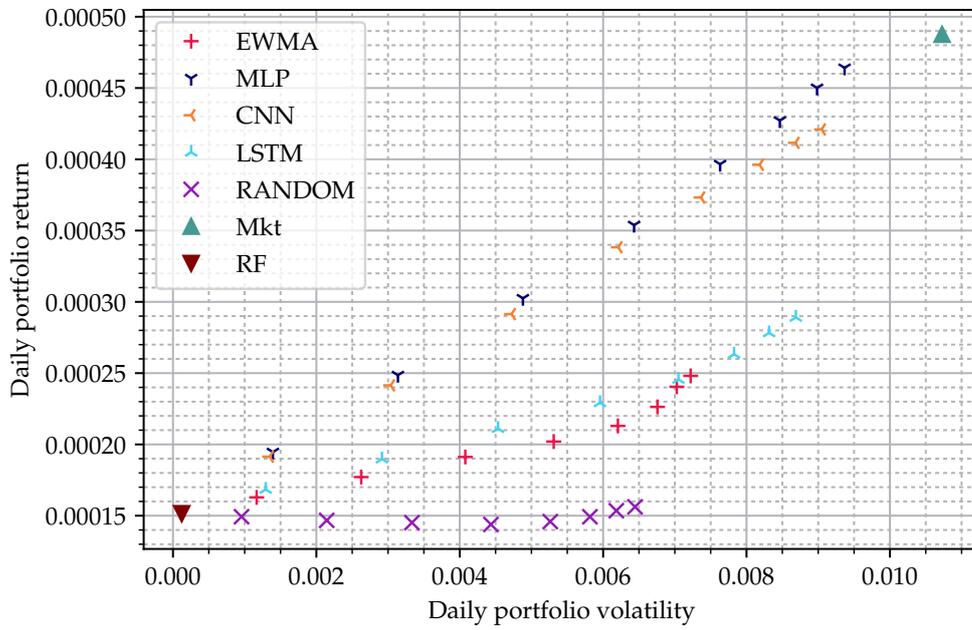


FIGURE B.4: Portfolio performances in μ - σ -space (monthly rebalancing, with TC)

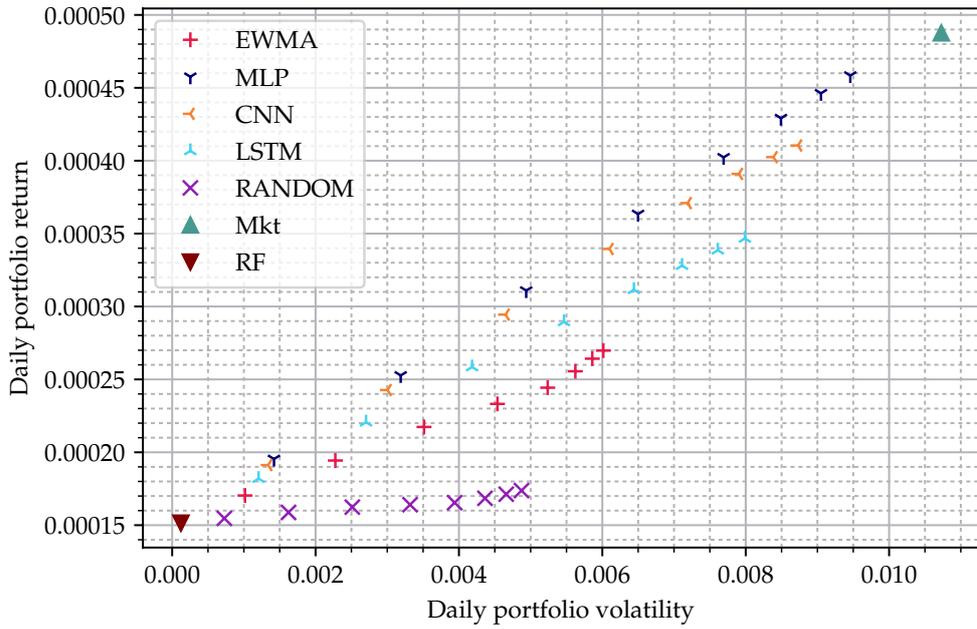


FIGURE B.5: Portfolio performances in μ - σ -space (smoothed daily rebalancing, with TC)

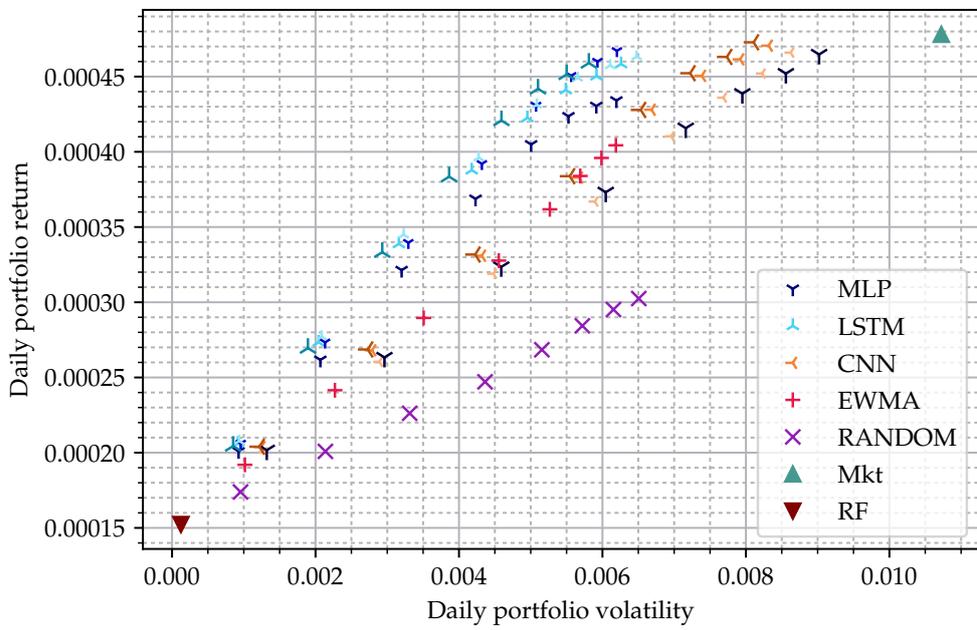


FIGURE B.6: Portfolio performances in μ - σ -space (small and large models, daily rebalancing, no TC)

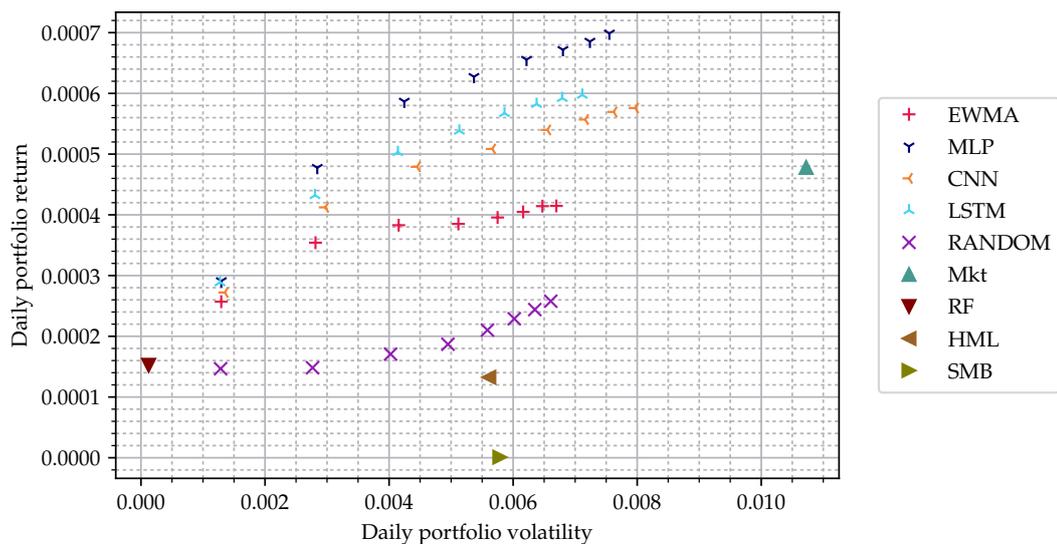


FIGURE B.7: Portfolio performances in μ - σ -space (all assets, daily rebalancing, no TC)

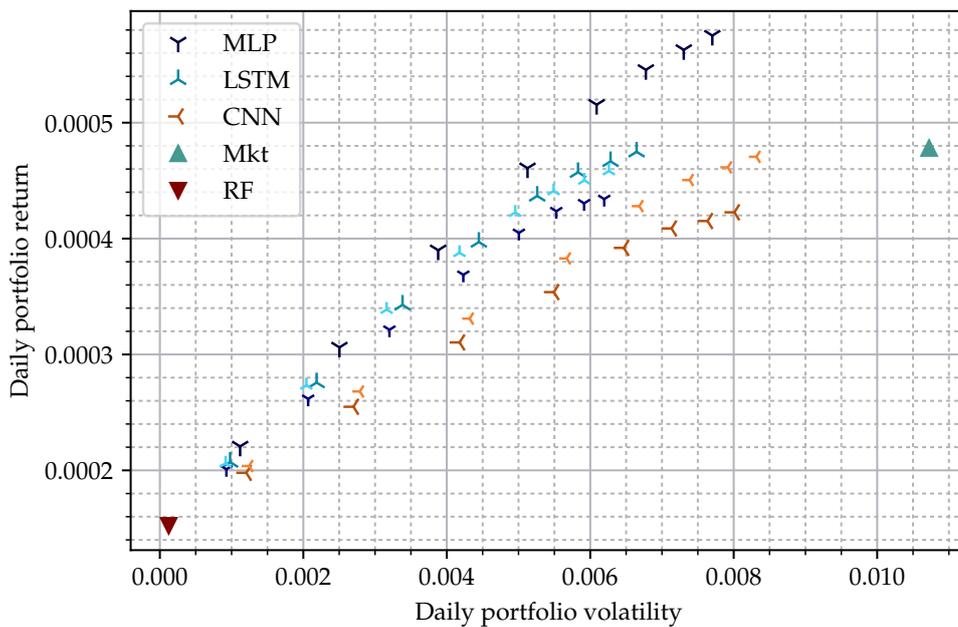


FIGURE B.8: Portfolio performances in μ - σ -space (recalibrated, daily rebalancing, no TC)

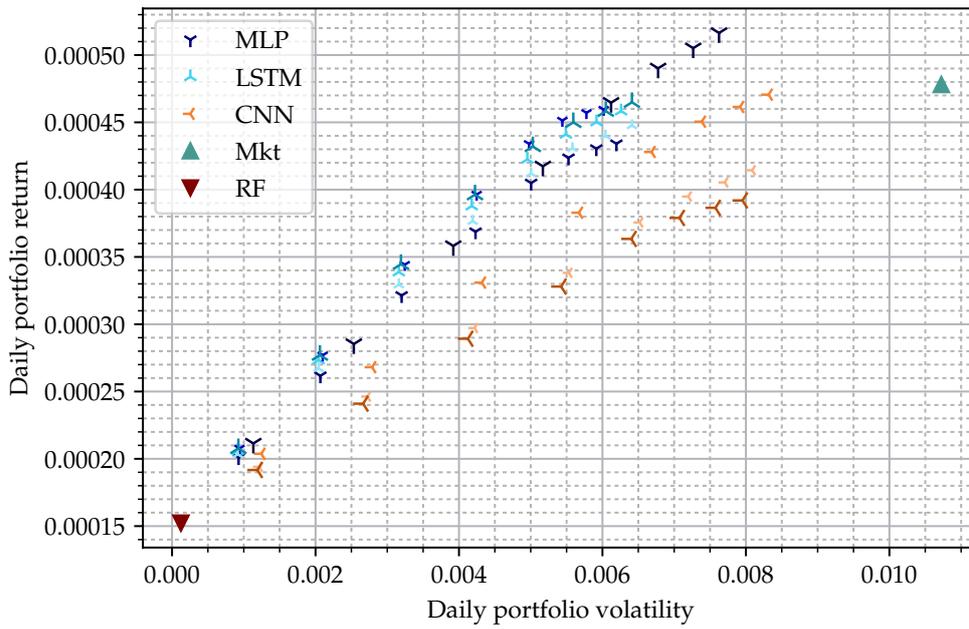


FIGURE B.9: Portfolio performances in μ - σ -space (rerun consistency, daily rebalancing, no TC)

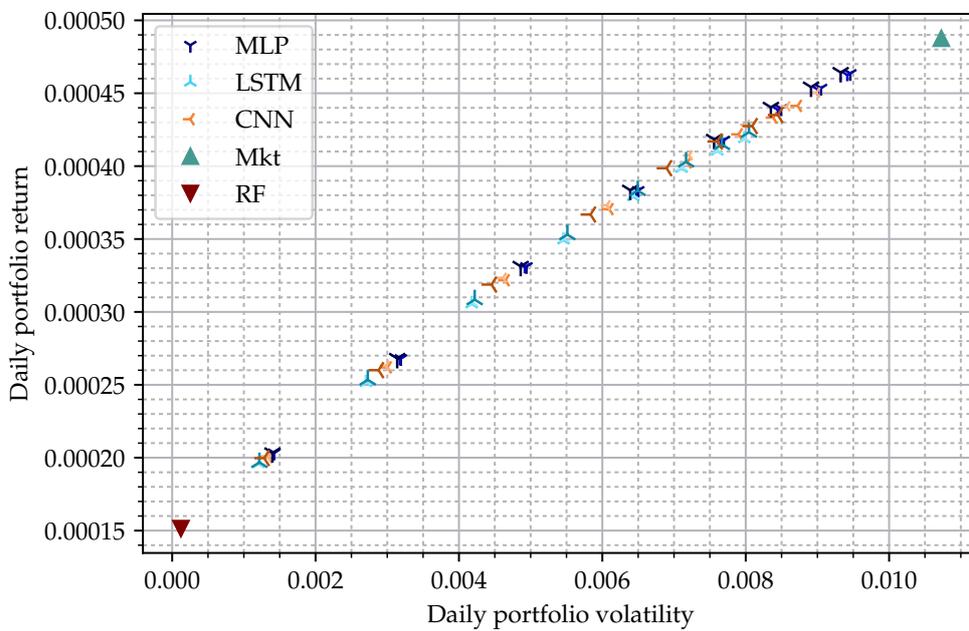


FIGURE B.10: Portfolio performances in μ - σ -space (rerun consistency, smoothed daily rebalancing, no TC)

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

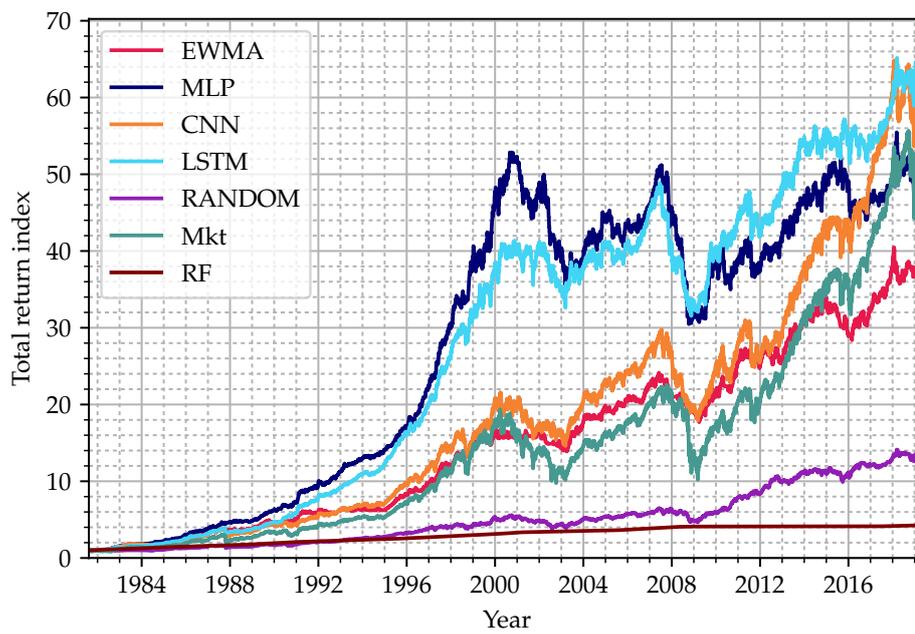


FIGURE D.1: Total return indices for the highest risk target (19.5% volatility)

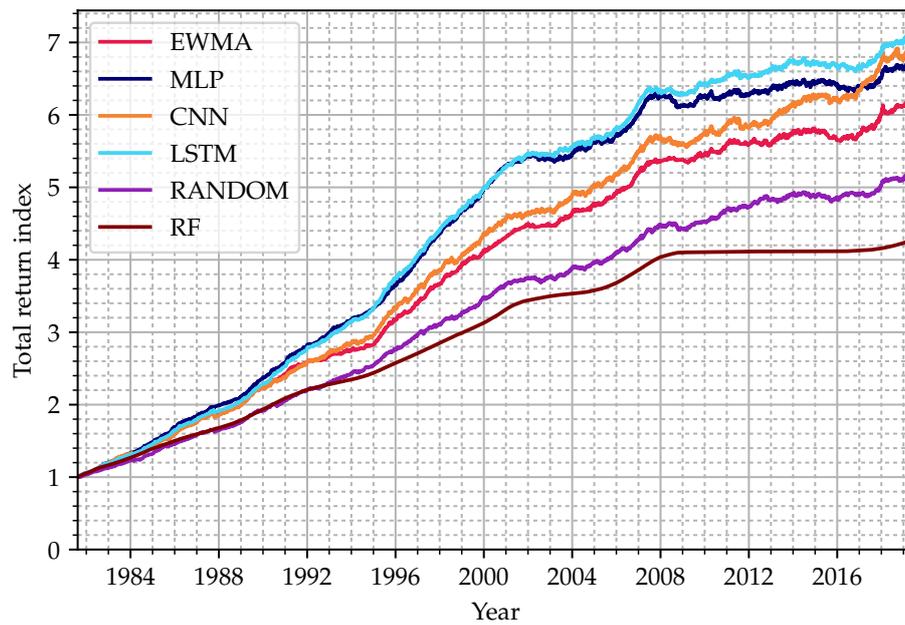


FIGURE D.2: Total return indices for the lowest risk target (2% volatility)

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

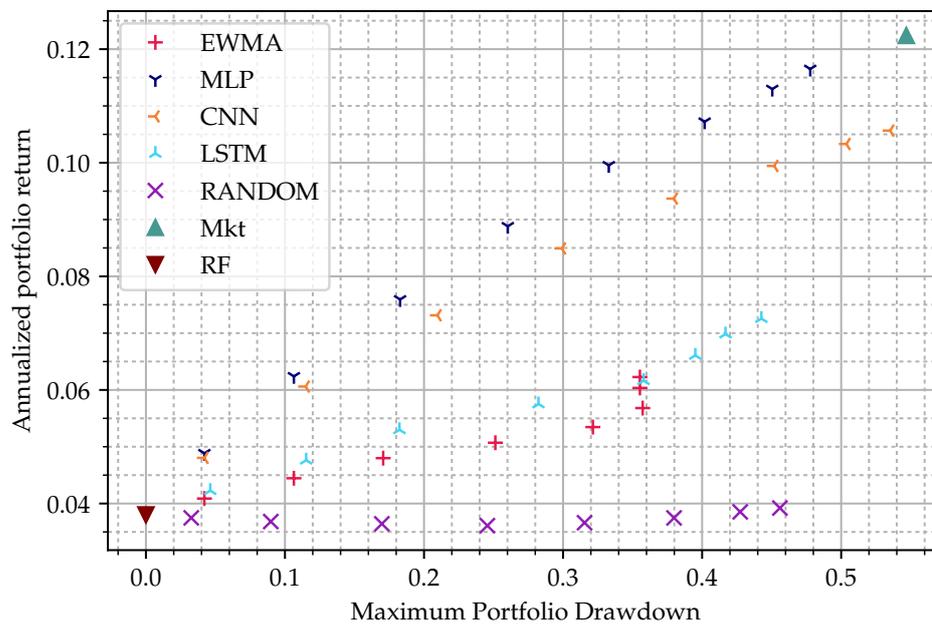


FIGURE E.1: Portfolio performances in μ -Max DD-space (monthly rebalancing, with TC)

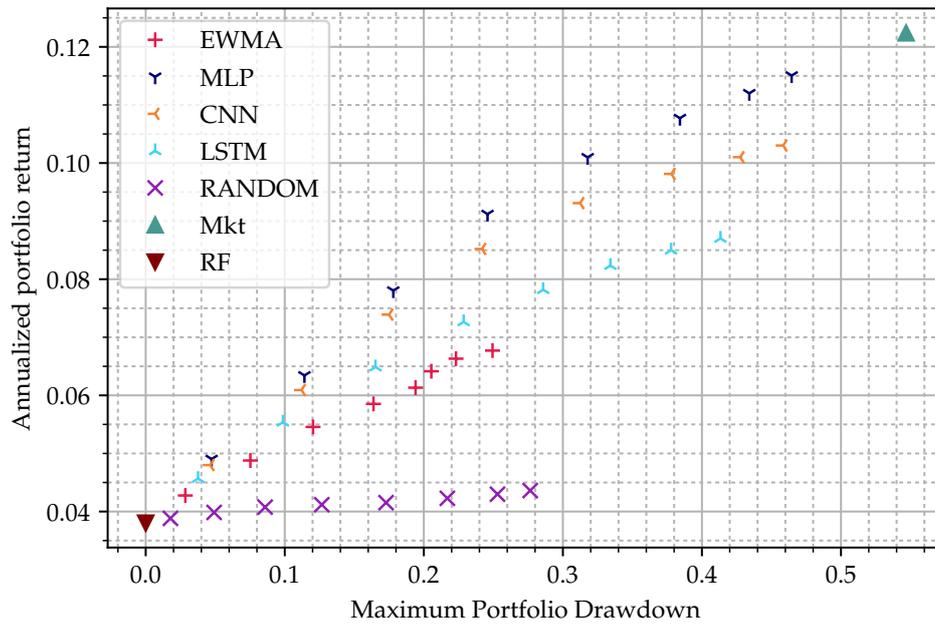


FIGURE E.2: Portfolio performances in μ -Max DD-space (smoothed daily rebalancing, with TC)

F Hyperparameter variation model architectures

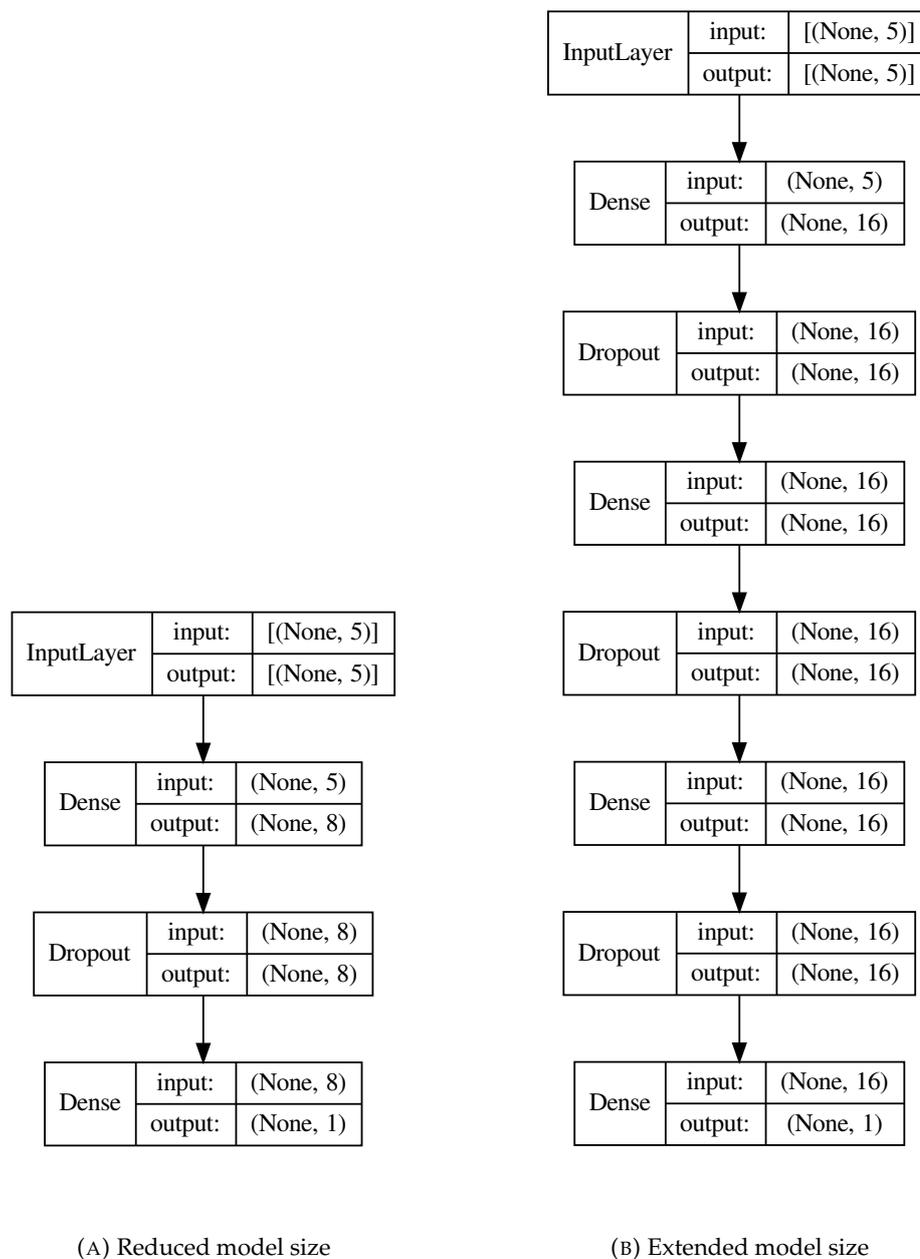


FIGURE F.1: MLP architecture variation

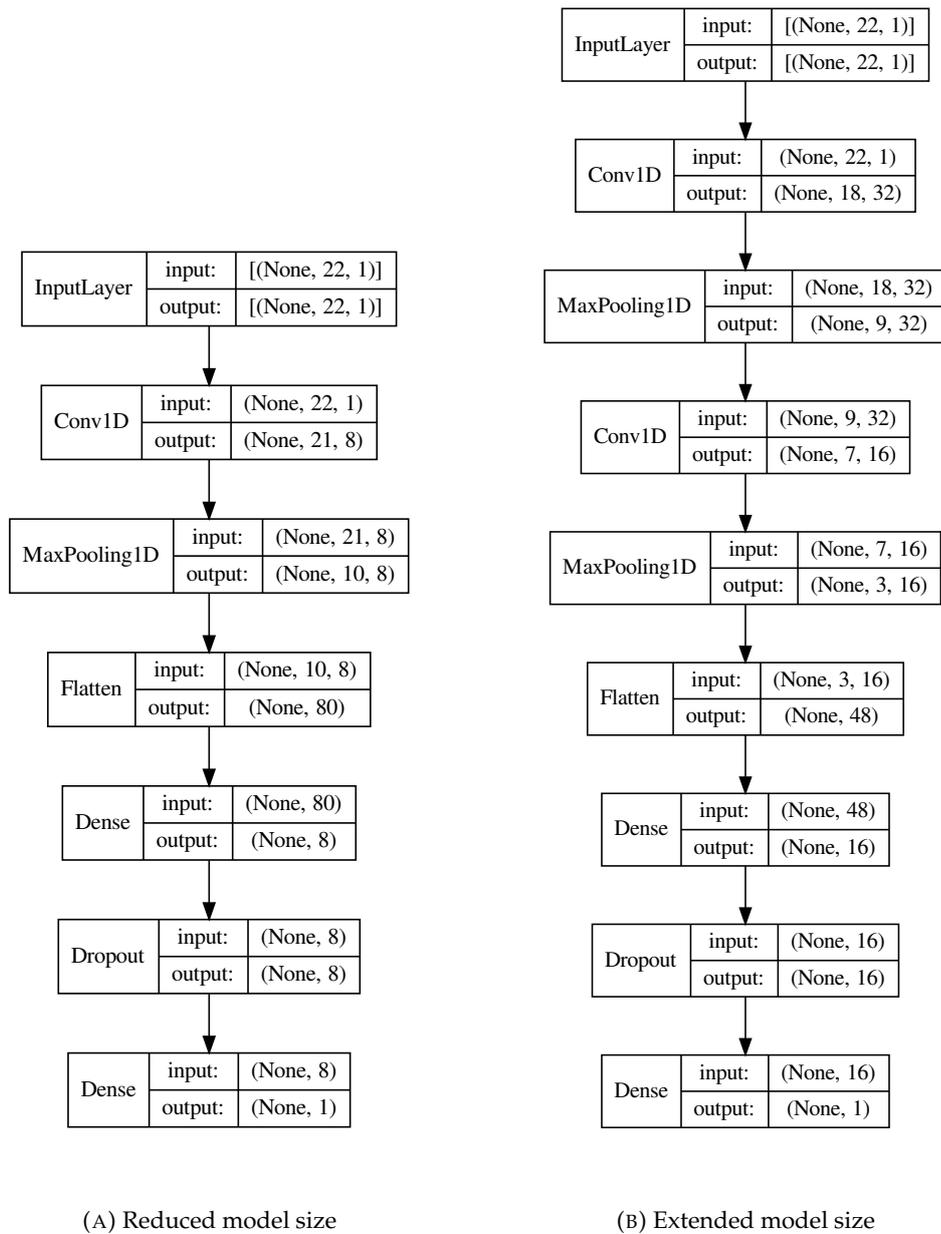
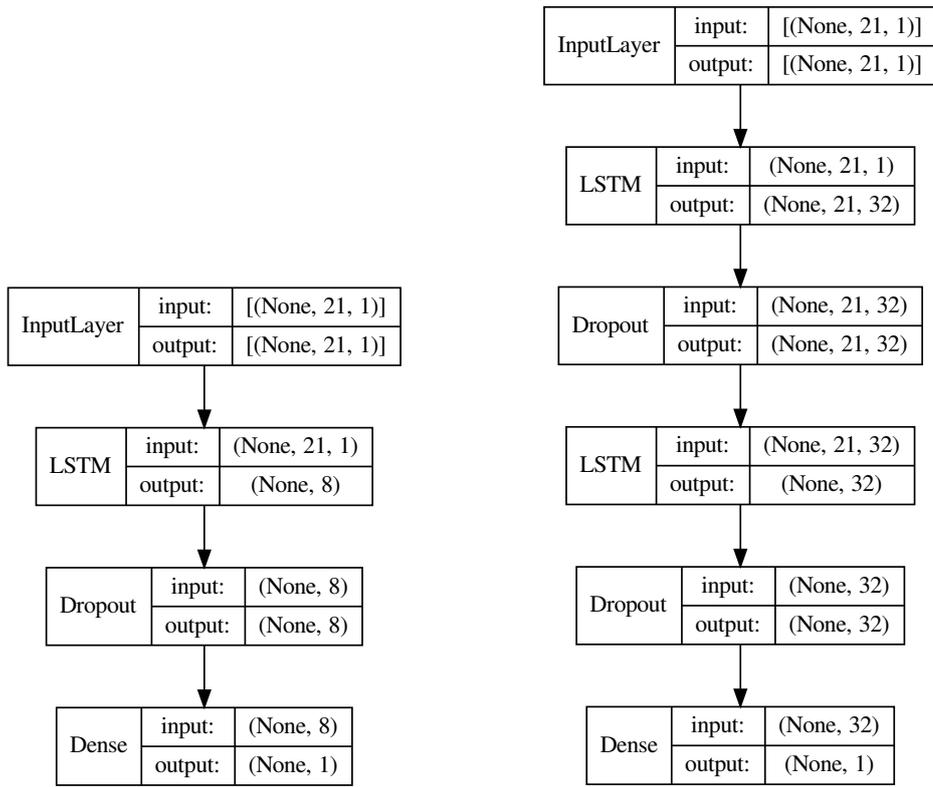


FIGURE F.2: CNN architecture variation



(A) Reduced model size

(B) Extended model size

FIGURE F.3: LSTM architecture variation