A NODEWISE REGRESSION APPROACH TO ESTIMATING LARGE PORTFOLIOS: EMPIRICAL APPLICATION

CANER, ULASAN, CALLOT, ÖNDER

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1. Data

1.1. Main Tables.

Monthly data in the main text is spanning from January 1994 to May 2018 consisting of $n = 293$ and $p = 304$. Return target is set to 0.7974% (monthly equivalent of 10% for a year). Daily data starts from 2013-07-02 to 2018-04-30 with $n = 1216$ and $p = 452$. Return target is set to 0.0378% (daily equivalent of 10% for a year). In-sample and out-of-sample periods:

Monthly data:

- $n_I = 195$, $n - n_I = 98$.Out-of-sample 98 period covers April 2010 to May 2018.
- $n_I = 173$, $n - n_I = 120$.Out-of-sample 120 period covers June 2008 to May 2018.

Daily data:

- $n_I = 1153$, $n - n_I = 63$. Out-of-sample 63 period covers 2018-01-30 to 2018-04-30.
- $n_I = 964$, $n - n_I = 252$. Out-of-sample 252 period covers 2017-05-01 to 2018-04-30.

1.2. Supplementary Tables.

We report extra tables for robustness checks in Appendix. Monthly data starts from August 2006 to April 2018 including $n = 141$ and $p = 419$. First daily data starts from 2017-06-01 to 2018-05-31 with $n = 252$ and $p = 442$. Second daily example starts from 2016-06-07 to 2018-05-31. $n = 500$ and $p = 442$. Return targets for monthly and daily data are set to 0.7974% and 0.0378%, respectively.

Monthly data:

- $n_I = 93$, $n - n_I = 48$. Out-of-sample 48 period covers May 2014 to April 2018.
- $n_I = 81$, $n - n_I = 60$. Out-of-sample 60 period covers May 2013 to April 2018.

Daily data:

- $n_I = 126$, $n - n_I = 126$. Out-of-sample 126 period covers 2017-11-29 to 2018-05-31 (First).
- $n_I = 437$, $n - n_I = 63$. Out-of-sample 63 period covers 2018-03-02 to 2018-05-31 (Second).

2. Results

Date: September 13, 2018.

Table 1. Monthly Porfolio Performance of $n_I = 195$, $n - n_I = 98$

Estimator	**Global Minimum Portfolio**				**Markowitz Portfolio**			
	Return	Variance	Sharpe	Turnover	Return	Variance	Sharpe	Turnover
without transaction cost								
POET	0.02499	0.01953	0.1788	0.2080	0.03317	0.05248	0.14481	0.2497
NodeWise	0.02644	0.01580	0.2104	0.1268	0.03503	0.04585	0.16358	0.1709
Ledoit-Wolf	0.07140	0.18421	0.1664	0.2150	-0.01128	0.24568	-0.02276	0.4421
with transaction cost								
POET	0.02497	0.01964	0.1782	NA	0.03324	0.05274	0.14474	NA
NodeWise	0.02650	0.01590	0.2102	NA	0.03517	0.04613	0.16374	NA
Ledoit-Wolf	0.07175	0.18545	0.1666	NA	-0.01166	0.24733	-0.02345	NA

Table 2. Monthly Porfolio Performance of $n_I = 173$, $n - n_I = 120$

Estimator	**Global Minimum Portfolio**				**Markowitz Portfolio**			
	Return	Variance	Sharpe	Turnover	Return	Variance	Sharpe	Turnover
without transaction cost								
POET	0.02078	0.01805	0.1547	0.1806	0.022689	0.02537	0.14246	0.2232
NodeWise	0.02158	0.01254	0.1927	0.1357	0.024571	0.02054	0.17143	0.1759
Ledoit-Wolf	0.05039	0.11844	0.1464	0.2795	-0.009022	0.13209	-0.02482	1.8899
with transaction cost								
POET	0.02070	0.01813	0.1538	NA	0.022634	0.02548	0.14180	NA
NodeWise	0.02156	0.01261	0.1920	NA	0.024580	0.02064	0.17109	NA
Ledoit-Wolf	0.05041	0.11904	0.1461	NA	-0.009442	0.13282	-0.02591	NA

TABLE 3. Daily Porfolio Performance of $n_I = 964$, $n - n_I = 252$

Estimator	**Global Minimum Portfolio**				**Markowitz Portfolio**			
	Return	Variance	Sharpe	Turnover	Return	Variance	Sharpe	Turnover
without transaction cost								
POET	4.537e-04	4.757e-05	0.065774	0.06856	0.0003757	4.630e-05	0.05521	0.08844
NodeWise	4.424e-04	4.499e-05	0.065957	0.05701	0.0003731	4.421e-05	0.05611	0.07217
Ledoit-Wolf	4.103e-04	3.566e-05	0.068707	0.34305	0.0005329	3.738e-05	0.08716	0.35390
with transaction cost								
POET	4.225e-04	4.765e-05	0.061205	NA	0.0003268	4.629e-05	0.04804	NA
NodeWise	4.161e-04	4.492e-05	0.062080	NA	0.0003319	4.416e-05	0.04995	NA
Ledoit-Wolf	4.174e-05	3.563e-05	0.006994	NA	0.0001490	3.766e-05	0.02428	NA

TABLE 4. Daily Porfolio Performance of $n_I = 1153$, $n - n_I = 63$

Estimator	**Global Minimum Portfolio**				**Markowitz Portfolio**			
	Return	Variance	Sharpe	Turnover	Return	Variance	Sharpe	Turnover
without transaction cost								
POET	-0.0009237	1.330e-04	-0.08008	0.01109	-0.0010352	1.217e-04	-0.09383	0.03717
NodeWise	-0.0008794	1.262e-04	-0.07828	0.05404	-0.0009344	1.187e-04	-0.08577	0.07096
Ledoit-Wolf	-0.0008008	5.874e-05	-0.10448	0.32694	-0.0007186	6.119e-05	-0.09187	0.34190
with transaction cost								
POET	-0.0008059	1.341e-04	-0.06958	NA	-0.0009325	1.226e-04	-0.08422	NA
NodeWise	-0.0008323	1.276e-04	-0.07368	NA	-0.0009019	1.200e-04	-0.08233	NA
Ledoit-Wolf	-0.0012583	5.942e-05	-0.16323	NA	-0.0012106	6.221e-05	-0.15349	NA

TABLE 5. Monthly Porfolio Performance of $n_I = 93$, $n - n_I = 48$

Estimator	Global Minimum Portfolio				Markowitz Portfolio			
	Return	Variance	Sharpe	Turnover	Return	Variance	Sharpe	Turnover
without transaction cost								
POET	0.010962	0.0009158	0.3622	0.06648	0.009260	0.0009567	0.2994	0.1768
NodeWise	0.010202	0.0006495	0.4003	0.16511	0.008762	0.0006994	0.3313	0.2466
Ledoit-Wolf	0.009892	0.0036172	0.1645	0.08129	-0.030062	0.0113491	-0.2822	0.1608
with transaction cost								
POET	0.011106	0.0009331	0.3636	NA	0.009198	0.0009756	0.2945	NA
NodeWise	0.010181	0.0006621	0.3957	NA	0.008525	0.0007133	0.3192	NA
Ledoit-Wolf	0.009897	0.0036978	0.1628	NA	-0.030948	0.0116061	-0.2873	NA

TABLE 6. Monthly Porfolio Performance of $n_I = 81$, $n - n_I = 60$

Estimator	Global Minimum Portfolio				Markowitz Portfolio			
	Return	Variance	Sharpe	Turnover	Return	Variance	Sharpe	Turnover
without transaction cost								
POET	0.008610	0.0024127	0.1753	0.1786	0.007004	0.0027565	0.1334	0.2867
NodeWise	0.011891	0.0006604	0.4627	0.1624	0.010726	0.0007659	0.3876	0.2572
Ledoit-Wolf	0.016445	0.0041433	0.2555	0.0797	-0.036767	0.0165209	-0.2861	0.1967
with transaction cost								
POET	0.008453	0.0024584	0.1705	NA	0.006645	0.0028086	0.1254	NA
NodeWise	0.011876	0.0006702	0.4587	NA	0.010507	0.0007785	0.3766	NA
Ledoit-Wolf	0.016543	0.0042104	0.2550	NA	-0.037628	0.0168314	-0.2900	NA

Table 7. Daily Porfolio Performance of $n_I = 126$, $n - n_I = 126$

Estimator	**Global Minimum Portfolio**				**Markowitz Portfolio**			
	Return	Variance	Sharpe	Turnover	Return	Variance	Sharpe	Turnover
without transaction cost								
POET	1.218e-04	7.940e-05	0.0136711	0.4532	1.684e-04	7.619e-05	0.019291	0.4224
NodeWise	4.065e-04	8.188e-05	0.0449221	0.1542	3.762e-04	7.987e-05	0.042097	0.1753
Ledoit-Wolf	3.479e-04	4.651e-05	0.0510130	0.3991	3.955e-04	4.681e-05	0.057807	0.3992
with transaction cost								
POET	-2.633e-04	8.206e-05	-0.0290615	NA	-1.856e-04	7.850e-05	-0.020947	NA
NodeWise	3.192e-04	8.218e-05	0.0352120	NA	2.678e-04	8.019e-05	0.029909	NA
Ledoit-Wolf	2.383e-06	4.711e-05	0.0003472	NA	5.006e-05	4.762e-05	0.007254	NA

Table 8. Daily Porfolio Performance of $n_I = 437$, $n - n_I = 63$

Estimator	**Global Minimum Portfolio**				**Markowitz Portfolio**			
	Return	Variance	Sharpe	Turnover	Return	Variance	Sharpe	Turnover
without transaction cost								
POET	0.0003121	7.650e-05	0.03568	0.02623	0.0002721	7.108e-05	0.03227	0.0445
NodeWise	0.0003022	7.642e-05	0.03457	0.09568	0.0002943	7.376e-05	0.03427	0.1056
Ledoit-Wolf	-0.0002426	4.061e-05	-0.03806	0.44835	-0.0001681	4.071e-05	-0.02635	0.4550
with transaction cost								
POET	0.0004437	7.621e-05	0.05082	NA	0.0003863	7.077e-05	0.04592	NA
NodeWise	0.0003700	7.596e-05	0.04246	NA	0.0003533	7.331e-05	0.04126	NA
Ledoit-Wolf	-0.0005871	4.103e-05	-0.09165	NA	-0.0005113	4.117e-05	-0.07970	NA