JMP Pro 11 output for Prediction of observed LTDelderly (age 65 to 84) estimates ...to establish their Heterogeneity

I.E. Show that LTDelderly effect-sizes behave like predictable fixed (rather than random) effects.

Each unique analysis platform within JMP software that fits statistical models appears to have its own "best" way to estimate goodness-of-fit-statistics such as R-squared and adjusted R-squared.

In ordinary linear regression theory with a single X-confounder (OLS), the square of the Pearson-product-moment correlation between the values of the Y-variable and their least square predictions is the value of "adjusted R-squared."

To make consistent, objective comparisons on goodness-of-fit of alternative statistical methodologies for predicting local treatment differences (LTDs) in elderly mortality, the Obenchain and Young paper on LC Strategy (2015) exclusively uses this "simple linear regression" definition of "adjusted R-squared."

The JMP output documented here consists of four types:

1. Results from the JMP "Multivariate" platform are presented first to document the correlations and adjusted R-squared values reported in Obenchain and Young (2015). Results from the JMP "Model Comparison" platform are also included.

2. Next, results from the JMP "Partition" platform (for the single best tree) are presented. The R-squared value reported here agrees with the OLS definition.

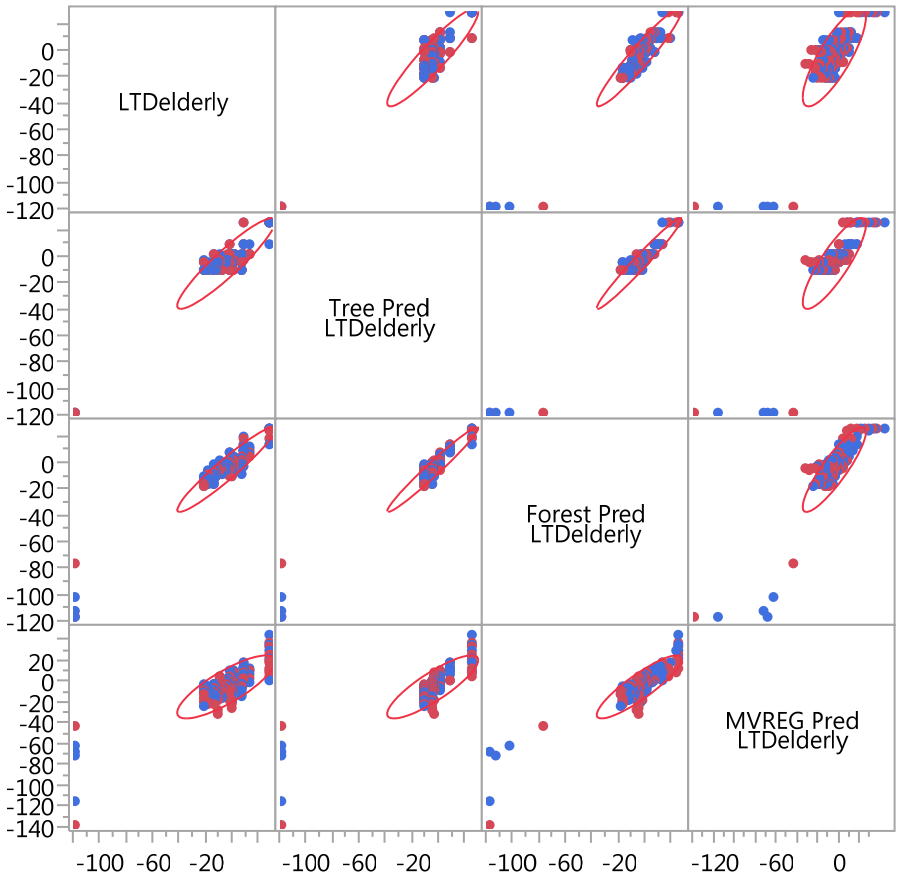
3. Results from the JMP Pro "Bootstrap Forest" platform (model averaging over 100 trees) are presented third. The R-squared value reported here not only differs slightly from the OLS definition but also would be likely to **change** if the calculations were redone. Bootstrapping is not deterministic; results depend upon the (usually unknown) initial random number seed value.

4. Results from the JMP "Fit Model" platform (Multi-Variable Regression of degree at most Two) using 4 REIS confounders are presented next. Alternative models that include TSP as a potential predictor are presented last. The R-squared values reported here also disagree with the single-X OLS definition.

LTDelderly Prediction Correlations

	LTDelderly	TreePred	ForestPred	MVRegPred
LTDelderly	1.0000	0.9277	0.9525	0.8152
TreePred	0.9277	1.0000	0.9771	0.8521
ForestPred	0.9525	0.9771	1.0000	0.8830
MVRegPred	0.8152	0.8521	0.8830	1.0000
Adj R-squared		**.8606**	**.9073**	**.6646**

Scatterplot Matrix

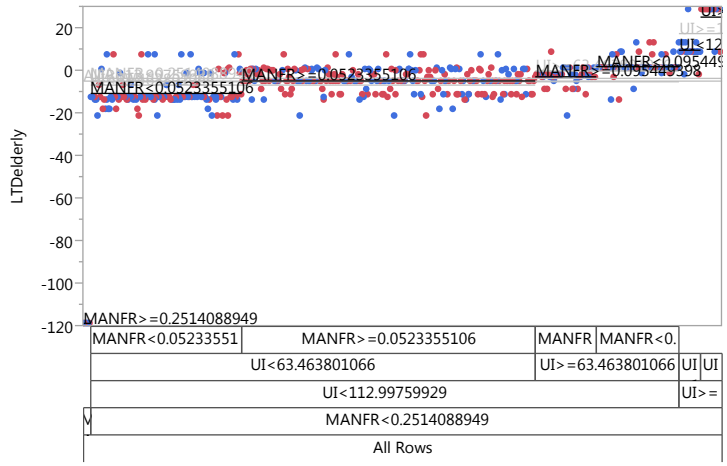


JMP "Model Comparison" option...

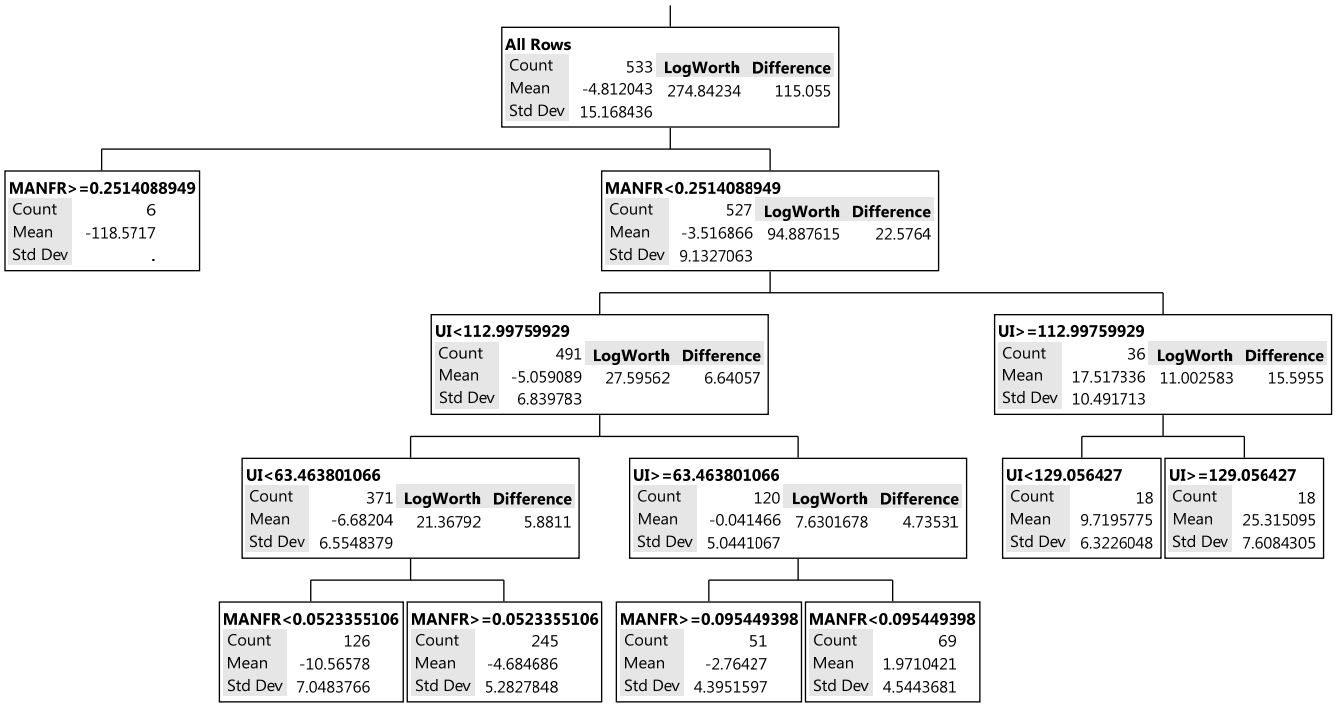
Measures of Fit for LTDelderly

Predictor	Creator		RSquare	RASE	AAE	Freq
Tree Pred LTDelderly	Partition		0.8607	5.6564	3.9417	533
Forest Pred LTDelderly	Bootstrap Forest		0.8996	4.8018	3.3548	533
MVREG Pred LTDelderly	Fit Least Squares		0.6645	8.7779	5.7942	533

Partition Tree for LTDelderly



RSquare	RMSE	N	Number of Splits	AICc
0.861	5.656406	533	6	3376.02



Bootstrap Forest for LTDelderly

Specifications

Target Column:	LTDelderly
Number of trees in the forest:	100
Number of terms sampled per split:	3
Training rows:	533
Validation rows:	0
Test rows:	0
Number of terms:	4
Bootstrap samples:	533
Minimum Splits Per Tree:	7
Minimum Size Split:	2

Overall Statistics

Individual Trees	RMSE
In Bag	3.855238
Out of Bag	8.713975

RSquare	RMSE	N
0.900	4.791064	533

Per-Tree Summaries

Tree	Splits	Rank	OOB Loss	OOB Loss/N	RSquare	IB SSE	IB SSE/N
1	29	99	73441.479	380.5258	0.5432	17454.312	32.747303
2	29	37	9320.8121	46.372199	0.9076	8382.5507	15.727112
3	29	51	9486.6223	49.929591	0.9191	7320.446	13.73442
4	29	78	21490.234	111.9283	0.8744	9951.9869	18.671645
5	29	65	10738.803	58.681984	0.8756	8305.1437	15.581883
6	29	23	8134.0159	43.731268	0.8982	7203.179	13.514407
7	29	48	9156.4025	49.494068	0.9144	6623.5745	12.426969
8	29	30	9664.5122	45.587322	0.7057	18068.916	33.900406
9	29	9	7339.3555	39.672192	0.8708	8721.1966	16.36247
10	29	80	23274.212	115.21887	0.9272	6875.9325	12.900436
11	29	3	6429.2463	32.30777	0.9391	5631.3215	10.565331
12	29	25	9296.7017	44.911603	0.9410	5491.728	10.30343
13	29	34	9044.9984	46.147951	0.9119	7982.0326	14.975671
14	29	76	23039.273	110.76574	0.8682	7057.395	13.240891
15	29	29	8879.4467	45.3033	0.9043	6459.4537	12.11905
16	29	82	21668.441	116.49699	0.8900	7660.3047	14.372054
17	29	20	9031.6071	43.213431	0.9411	5410.4207	10.150883
18	29	59	11153.979	53.368318	0.9298	7113.4243	13.346012

Tree	Splits	Rank	OOB Loss	OOB Loss/N	RSquare	IB SSE	IB SSE/N
19	29	77	22153.354	111.88563	0.7901	15651.212	29.364375
20	29	68	19818.967	99.094835	0.9005	8146.5395	15.284314
21	29	97	50444.643	266.90287	0.8375	9216.9411	17.292572
22	29	93	34059.874	177.39517	0.8911	7255.4201	13.61242
23	29	14	8244.9701	41.432011	0.9076	7183.0568	13.476654
24	29	89	24548.226	123.35792	0.9150	6609.1136	12.399838
25	29	61	10639.945	54.009875	0.8824	9052.7132	16.984453
26	29	1	5297.7569	28.179558	0.9264	5958.4624	11.179104
27	29	8	7187.2622	38.641195	0.8695	7285.6153	13.669072
28	29	19	8245.258	43.16889	0.8750	10040.831	18.838332
29	29	86	23151.317	121.21109	0.8875	8622.5668	16.177424
30	29	6	7436.1739	37.180869	0.9104	7625.8819	14.307471
31	29	84	22363.122	117.70064	0.8825	7887.083	14.797529
32	29	27	8869.3198	45.251632	0.9251	6824.37	12.803696
33	29	55	9981.3009	51.716585	0.9341	6042.5861	11.336935
34	29	7	7684.6171	37.855257	0.9190	7553.003	14.170737
35	29	54	10049.315	51.534947	0.9208	7393.5926	13.871656
36	29	13	8597.6167	40.746999	0.8241	8953.8068	16.798887
37	29	87	24294.745	121.47372	0.8532	8463.2836	15.878581
38	29	69	19996.334	101.50423	0.8630	7462.6582	14.001235
39	29	24	8790.3977	44.172853	0.9143	8256.1796	15.490018
40	29	22	8347.7564	43.705531	0.9039	7618.8178	14.294217
41	29	16	8341.3153	41.706576	0.8881	7653.9035	14.360044
42	29	38	9497.141	46.783946	0.9051	7908.3882	14.837501
43	29	33	8869.6896	45.956941	0.8858	7897.9406	14.8179
44	29	35	9289.9148	46.218481	0.8813	9066.2957	17.009936
45	29	5	6639.8061	35.506984	0.8976	9507.3661	17.83746
46	29	95	35059.226	183.55616	0.8965	6970.3569	13.077593
47	29	28	8878.2175	45.297028	0.9208	7267.0517	13.634243
48	29	32	8713.773	45.861963	0.8853	9163.6541	17.192597
49	29	92	34908.819	165.44464	0.9160	6601.5142	12.38558
50	29	62	10950.574	54.21076	0.9301	6353.6114	11.920472
51	29	43	9271.7712	47.304955	0.8617	9139.2766	17.14686
52	29	66	11835.508	61.966009	0.8563	9775.6126	18.340736
53	29	46	9432.7937	48.622648	0.9106	7349.8392	13.789567
54	29	53	10266.253	51.331263	0.8723	7034.5668	13.198061
55	29	40	9083.0371	47.062368	0.9158	8749.6328	16.415821
56	29	17	8401.1194	42.645276	0.9047	7421.2165	13.923483
57	29	94	36774.881	182.95961	0.8580	7294.0257	13.684851
58	29	11	7648.9391	40.046801	0.9224	5384.2834	10.101845
59	29	15	7910.6694	41.635102	0.8567	8064.6292	15.130636
60	29	44	9774.3715	47.679861	0.9222	7112.6213	13.344505
61	29	12	7584.4565	40.558591	0.8790	7896.2643	14.814755
62	29	57	10199.898	53.124467	0.9216	7990.6113	14.991766
63	29	67	13263.198	70.175651	0.9241	6308.969	11.836715
64	29	31	8952.7213	45.67715	0.8932	7393.1839	13.870889
65	29	2	6372.5826	30.490826	0.8850	7278.0477	13.654874
66	29	47	9568.6183	48.819481	0.9324	6406.4197	12.019549
67	29	71	20678.197	102.8766	0.9054	8933.8114	16.761372
68	29	58	10135.614	53.345339	0.9056	7386.8178	13.858945
69	29	36	9267.3388	46.336694	0.8988	7998.5223	15.006608
70	29	70	20032.15	102.72898	0.8874	5910.6286	11.089359
71	29	79	21454.976	112.32972	0.8462	8629.4322	16.190304

Tree	Splits	Rank	OOB Loss	OOB Loss/N	RSquare	IB SSE	IB SSE/N
72	29	26	8731.8834	45.009708	0.8880	7084.9482	13.292586
73	29	75	21605.819	109.67421	0.8935	7392.3797	13.86938
74	29	63	10074.49	54.752664	0.9307	7538.8449	14.144174
75	29	4	6823.9999	33.615763	0.9138	6661.9759	12.499017
76	29	100	89717.693	421.20983	0.6917	7416.2724	13.914207
77	29	72	20261.753	106.08248	0.8512	8234.2874	15.448944
78	29	90	24158.11	125.17156	0.8535	7659.9188	14.37133
79	29	81	23054.531	115.85191	0.9278	5843.8068	10.96399
80	29	50	9350.2795	49.735529	0.9188	7581.1783	14.223599
81	29	39	9489.7398	46.97891	0.9350	6016.9359	11.28881
82	29	21	8894.2402	43.386537	0.9407	6324.7104	11.866248
83	29	60	10525.163	53.975197	0.8934	7060.0295	13.245834
84	29	49	9069.5595	49.560434	0.9345	7145.3414	13.405894
85	29	88	24286.418	123.28131	0.8683	6947.352	13.034432
86	29	45	9449.918	47.726859	0.8860	9351.5645	17.545149
87	29	56	10148.853	52.045398	0.8971	6675.1378	12.523711
88	29	10	8102.4635	39.717958	0.9254	6202.2864	11.63656
89	29	83	21360.462	116.72383	0.9155	6941.6748	13.02378
90	29	52	9939.5813	50.972212	0.9316	6333.5811	11.882891
91	29	96	47171.007	237.04023	0.8676	7138.5545	13.393161
92	29	18	7892.554	42.662454	0.8770	9809.5656	18.404438
93	29	41	8582.8223	47.158364	0.8938	8788.4376	16.488626
94	29	85	23572.992	117.86496	0.9140	7556.2943	14.176912
95	29	73	20640.239	107.50124	0.8341	11210.779	21.033356
96	29	98	50163.263	268.25275	0.8573	7873.0284	14.77116
97	29	42	9074.4363	47.262689	0.9215	6267.7715	11.759421
98	29	91	27452.556	150.83822	0.6259	15554.165	29.182299
99	29	74	21249.435	108.97146	0.9087	7320.3515	13.734243
100	29	64	10172.979	55.590047	0.9197	7593.807	14.247293

MVReg fits: Response LTDelderly

Primary REIS confounder **MCARE** displays no significant main-effects, squared term or interactions with the other 3 REIS variables in predicting LTDelderly.

Summary of Fit

RSquare	0.664481
RSquare Adj	0.659358
Root Mean Square Error	8.852987
Mean of Response	-4.81204
Observations (or Sum Wgts)	533

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	81334.64	10166.8	129.7197
Error	524	41068.70	78.4	**Prob > F**
C. Total	532	122403.34		<.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	-9.737846	2.002457	-4.86	<.0001*
EARN	0.0004766	0.000261	1.83	0.0683
MANFR	18.180405	8.565876	2.12	0.0343*
UI	0.0613709	0.015959	3.85	0.0001*
(EARN-7811.9)*(MANFR-0.08772)	-0.010656	0.004368	-2.44	0.0150*
(MANFR-0.08772)*(UI-51.5508)	-0.838797	0.241971	-3.47	0.0006*
(EARN-7811.9)*(EARN-7811.9)	-2.247e-7	9.029e-8	-2.49	0.0131*
(MANFR-0.08772)*(MANFR-0.08772)	-1750.578	83.62746	-20.93	<.0001*
(UI-51.5508)*(UI-51.5508)	0.0024438	0.000272	8.97	<.0001*

MVReg: Attempt to use TSP as well as 3 primary REIS confounders…

RSquare	0.675597
RSquare Adj	0.669383
Root Mean Square Error	8.721747
Mean of Response	-4.81204
Observations (or Sum Wgts)	533

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	82695.39	8269.54	108.7112
Error	522	39707.95	76.07	**Prob > F**
C. Total	532	122403.34		<.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	-9.919151	2.117176	-4.69	<.0001*
EARN	0.0003897	0.00026	1.50	0.1343
MANFR	18.334405	8.513541	2.15	0.0317*
UI	0.0643495	0.015768	4.08	<.0001*
MTSPGM	0.0095205	0.016039	0.59	0.5531
(EARN-7811.9)*(MANFR-0.08772)	-0.013512	0.004359	-3.10	0.0020*
(MANFR-0.08772)*(UI-51.5508)	-0.795581	0.238631	-3.33	0.0009*
(MANFR-0.08772)*(MTSPGM-65.4098)	1.2100248	0.290336	4.17	<.0001*
(EARN-7811.9)*(EARN-7811.9)	-2.268e-7	8.91e-8	-2.55	0.0112*
(MANFR-0.08772)*(MANFR-0.08772)	-1771.899	82.81124	-21.40	<.0001*
(UI-51.5508)*(UI-51.5508)	0.002388	0.000269	8.89	<.0001*

Note: No TSP interactions with REIS confounders are significant. The TSP main-effect is also clearly not significant.

The only non-significant p-value (at 5% level) for a REIS main-effect is again the one for EARN, at 0.13.