

Using Nominal Price Data for 2009

This Study is Conducted by Association of American Education Analytics

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The REG Procedure

Model: MODEL1

Dependent Variable: X150

Full Professors' Salary May Have Cause College Student to Pay More Every Year?

By: Harjanto Djunaedi and Monica Djunaedi¹

We further our analyses on the impact of faculty salary and fringe benefit on college tuition or cost of college education. This effort is a continuation of our previous studies on student loans which shown that expenditure on faculty and teaching staff do not have significant impact on the loans. In this newly effort, we broke the faculty members' salary based on their ranks and also added the fringe benefit expenditures that paid by the institution to all its faculty and staff.

A sample of 50 universities was randomly pulled across the US from IPEDS and NCES data. We use two years of data i.e., 2008 and 2009 and applied regression analyses to test the maintained hypotheses that fringe benefit and faculty salary have zero impact on college tuition. The dependent variable is the in-state tuition and fees (sticker price). There are four independent variables in the model and these variables are paid fringe benefit, and salary paid by each institution to its faculty member by rank i.e., Full, Associate and Assistant Professor.

We test the Heterokedasticity on the residual for cross sectional data are used in the analyses. The results show that in any of the four regressions the null hypotheses of Homokedastic fail to be rejected. Two models were estimated for each academic year. The first estimated model is applied on nominal data while the second model was estimated after the variables are transformed (constant dollar) to minimize and remove the inflation effects.

Variable fringe-benefit and full professors' salary are significant and they have a negative and positive parameter estimate, respectively. This shows that expenditure on fringe-benefit has negative impacts on student tuition and therefore it is not the reason why tuition kept increasing. In fact, with its negative sign, it shown that faculty member and staff fringe benefits are declining over time. On the other hand, full professors' salaries have a significant positive impact on student tuition. The positive parameter estimate indicates that increasing tuition may have been used to cover full professors' salary increase. Salaries for other faculty member ranks such as Associate and Assistant Professors do not have practically zero impacts on student tuition. This could mean that full professors may have been overpaid. Needless to say, that most of the full professors are also the decision makers in many aspects at the Department level. One may ask a critical question. Could conflict of interests occur when college administrators have to make decisions who will get the most pie from the departmental budget?

¹ Founder and cofounder Association of American Education Analytics.

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The highest salary for full professor is paid by Harvard University, followed by Stanford; Princeton; the University of Chicago, Yale, California Institute of Technology, University of Pennsylvania, Northwestern University, Columbia University in the City of New York and Washington University in St Louis.

Complete results of the study can be seen below.

Number of Observations Read	50
Number of Observations Used	50

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	8377863986	2094465997	32.61	<.0001
Error	45	2890080568	64224013		
Corrected Total	49	11267944554			

Root MSE	8013.98856	R-Square	0.7435
Dependent Mean	20676	Adj R-Sq	0.7207
Coeff Var	38.75911		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-39656	8324.24230	-4.76	<.0001
X99	1	-0.00026394	0.00009244	-2.86	0.0065
X185	1	0.41777	0.13657	3.06	0.0037
X188	1	0.14897	0.28822	0.52	0.6078
X191	1	-0.00797	0.30282	-0.03	0.9791

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Dependent Variable: X150

Collinearity Diagnostics							
Number	Eigenvalue	Condition Index	Proportion of Variation				
			Intercept	X99	X185	X188	X191
1	4.82521	1.00000	0.00077308	0.00564	0.00016132	0.00007850	0.00010080
2	0.14663	5.73646	0.01097	0.82083	0.00065410	0.00061305	0.00050181
3	0.02467	13.98399	0.49196	0.04940	0.04096	0.00355	0.00224
4	0.00222	46.57513	0.44949	0.00360	0.73214	0.03273	0.50749
5	0.00126	61.82450	0.04680	0.12054	0.22609	0.96302	0.48966

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The REG Procedure

Model: MODEL1

Dependent Variable: X150

Test of First and Second Moment Specification		
DF	Chi-Square	Pr > ChiSq
14	18.26	0.1950

Durbin-Watson D	2.137
Number of Observations	50
1st Order Autocorrelation	-0.079

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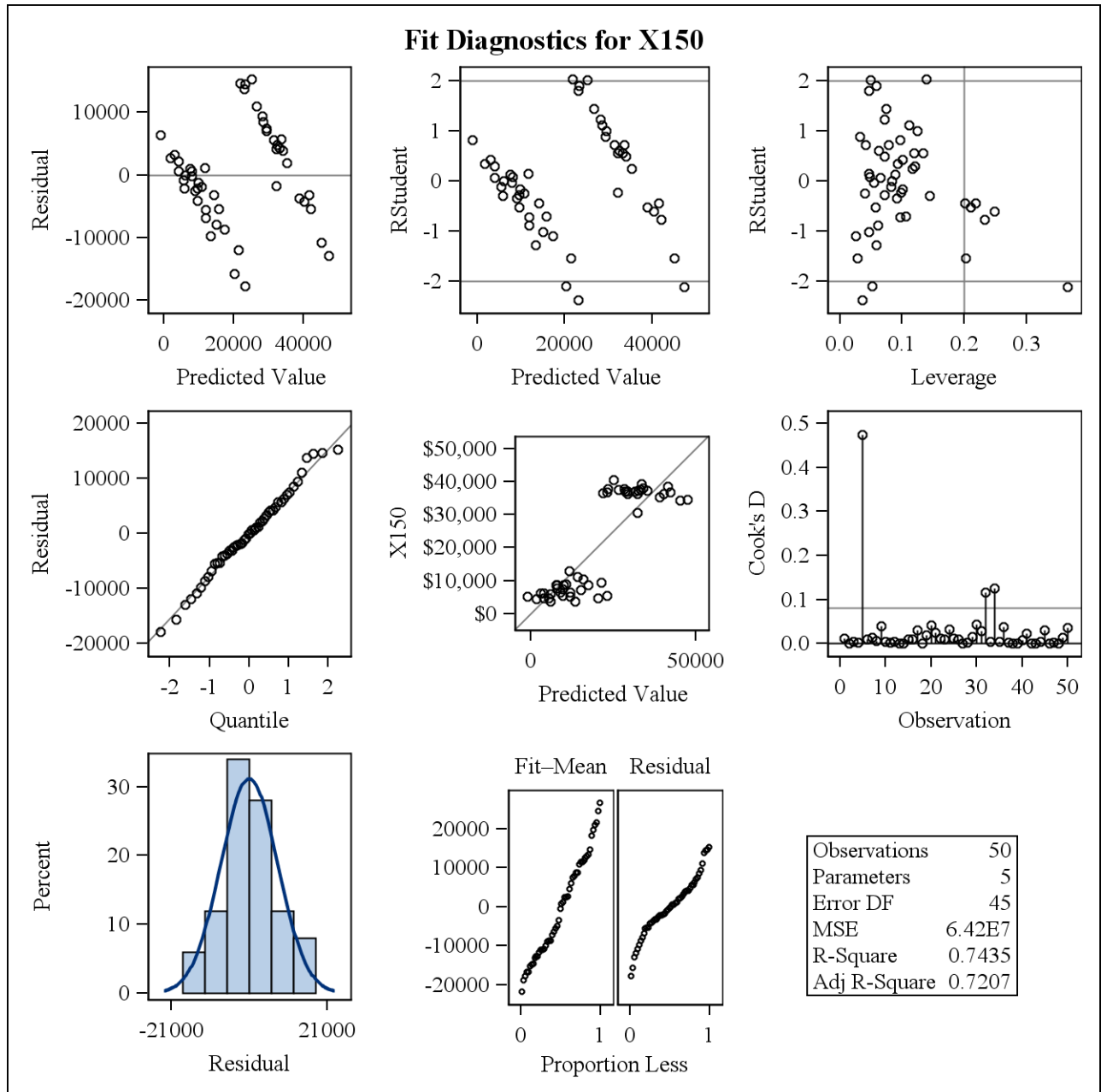
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The REG Procedure

Model: MODEL1

Dependent Variable: X150



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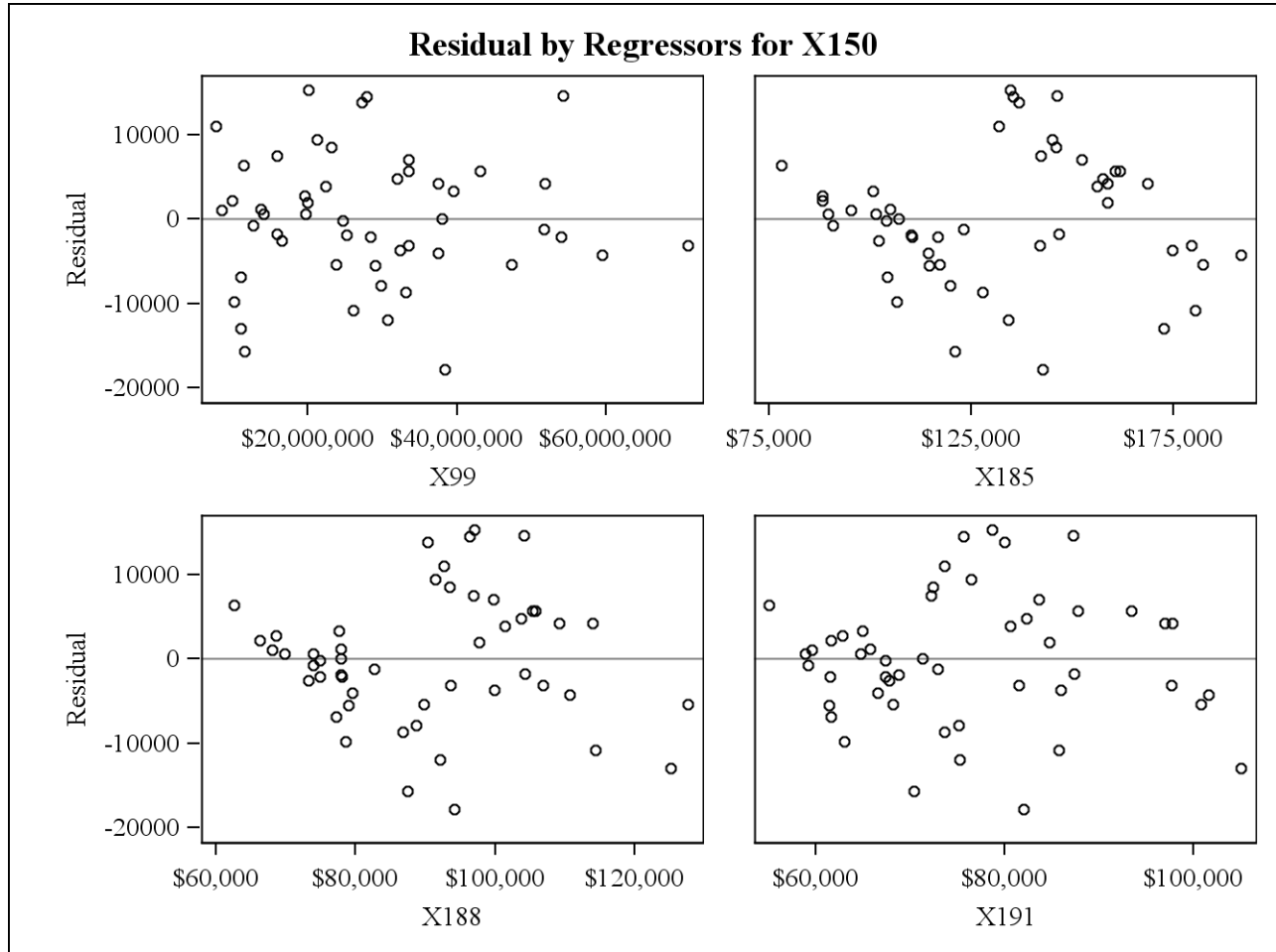
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The REG Procedure

Model: MODEL1

Dependent Variable: X150



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The REG Procedure

Model: MODEL1

Dependent Variable: X148

Number of Observations Read	50
Number of Observations Used	50

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	9198570801	2299642700	37.17	<.0001
Error	45	2784401395	61875587		
Corrected Total	49	11982972196			

Root MSE	7866.10365	R-Square	0.7676
Dependent Mean	21595	Adj R-Sq	0.7470
Coeff Var	36.42629		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-40401	8257.58991	-4.89	<.0001
X50	1	-0.00030775	0.00009005	-3.42	0.0014
X176	1	0.50530	0.14035	3.60	0.0008
X179	1	-0.02099	0.29388	-0.07	0.9434
X182	1	0.07209	0.25770	0.28	0.7809

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The REG Procedure

Model: MODEL1

Dependent Variable: X148

Collinearity Diagnostics							
Number	Eigenvalue	Condition Index	Proportion of Variation				
			Intercept	X50	X176	X179	X182
1	4.82909	1.00000	0.00075525	0.00539	0.00014343	0.00007178	0.00013035
2	0.14337	5.80362	0.01235	0.79583	0.00052090	0.00056568	0.00061588
3	0.02375	14.25819	0.49676	0.07271	0.03701	0.00325	0.00410
4	0.00259	43.14793	0.24823	0.01407	0.42013	0.00068676	0.75599
5	0.00119	63.77120	0.24191	0.11200	0.54220	0.99543	0.23916

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The REG Procedure

Model: MODEL1

Dependent Variable: X148

Test of First and Second Moment Specification		
DF	Chi-Square	Pr > ChiSq
14	18.29	0.1939

Durbin-Watson D	2.203
Number of Observations	50
1st Order Autocorrelation	-0.105

Using Nominal Price Data for 2009

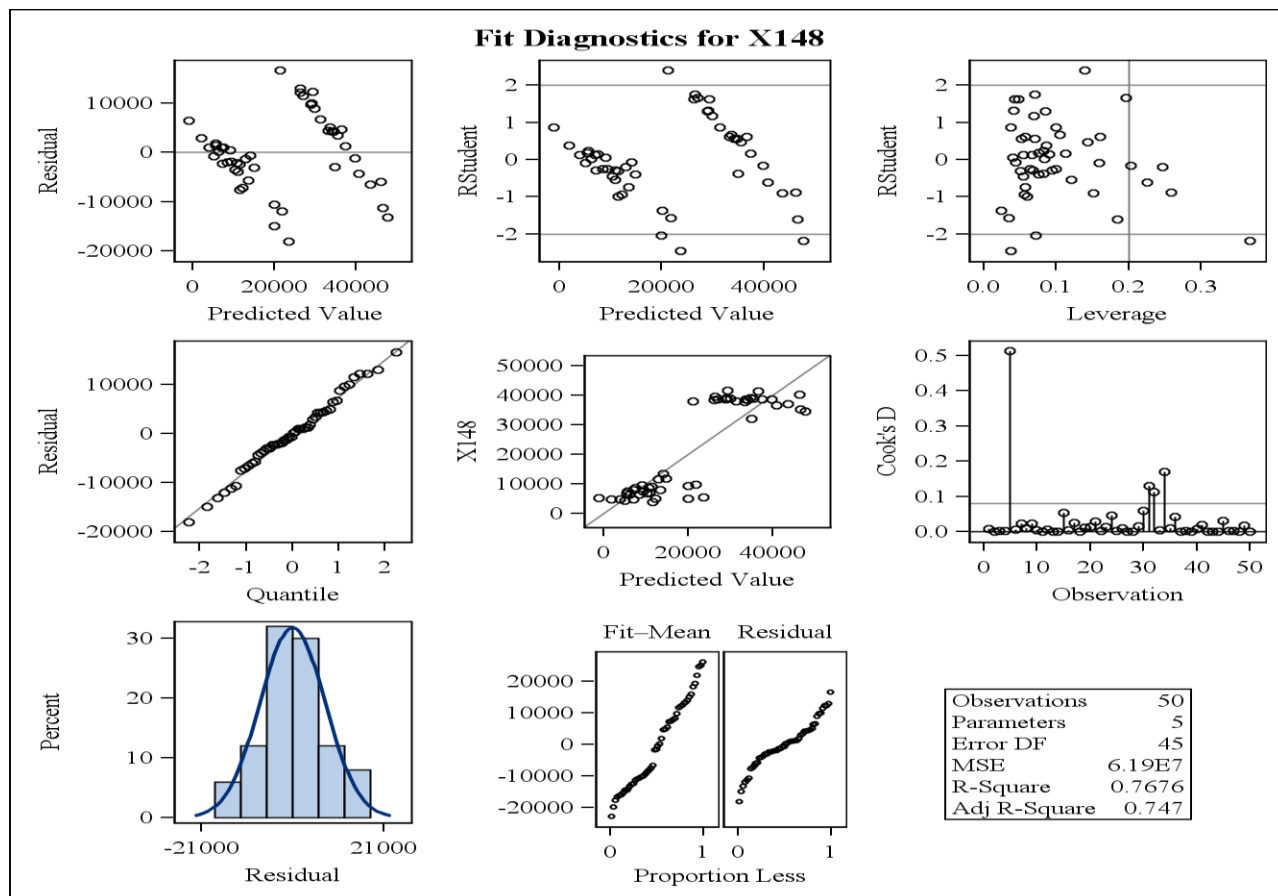
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The REG Procedure

Model: MODEL1

Dependent Variable: X148



Using Nominal Price Data for 2009

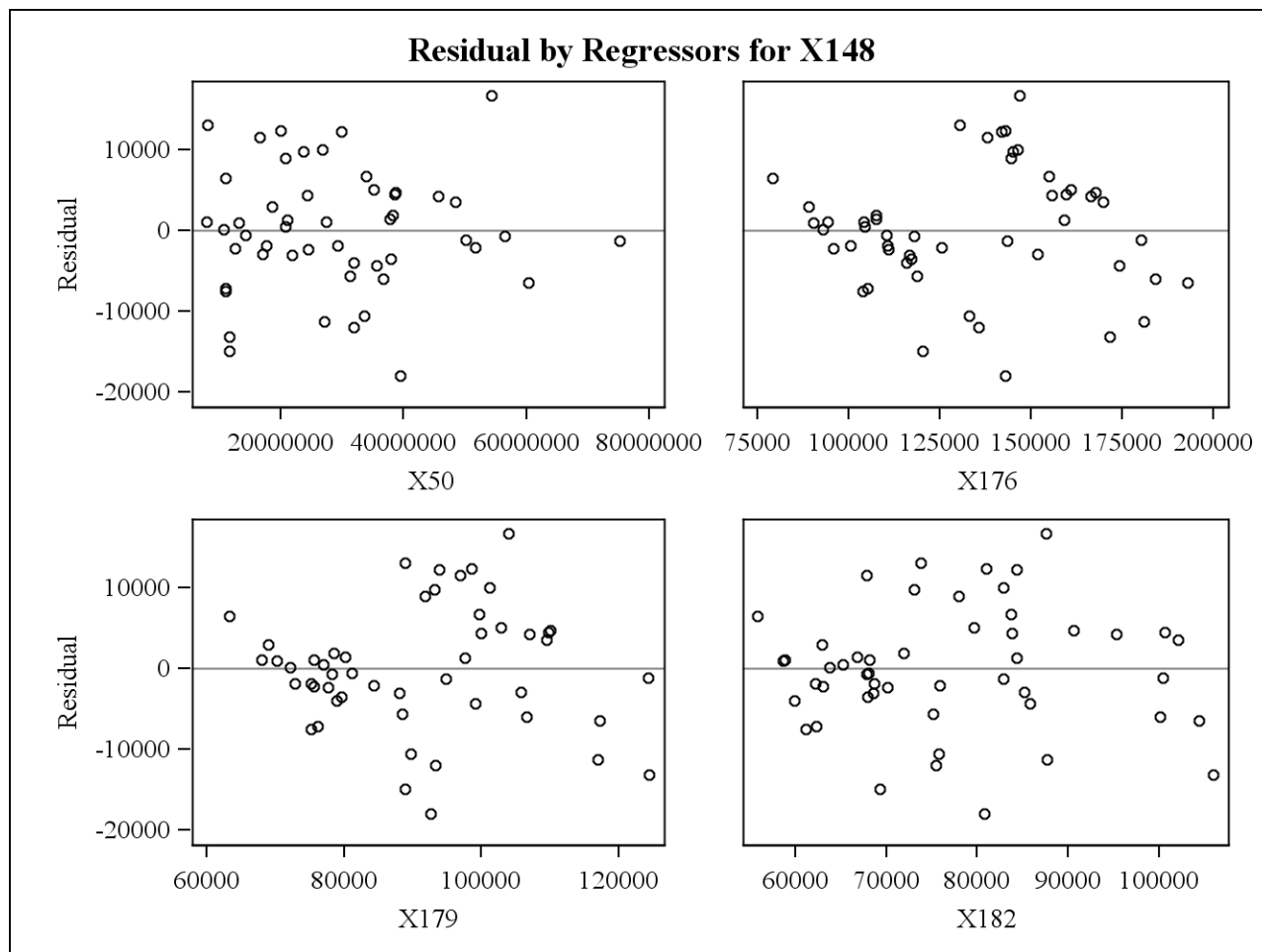
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The REG Procedure

Model: MODEL1

Dependent Variable: X148



Using Real Price Data for 2008

The REG Procedure

Model: MODEL1

Dependent Variable: RT150

Number of Observations Read	50
Number of Observations Used	50

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	17256352823	4314088206	32.03	<.0001
Error	45	6060536668	134678593		
Corrected Total	49	23316889490			

Root MSE	11605	R-Square	0.7401
Dependent Mean	29161	Adj R-Sq	0.7170
Coeff Var	39.79722		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-41804	9709.11926	-4.31	<.0001
RX99	1	-0.00028972	0.00009507	-3.05	0.0039
RS185	1	0.45103	0.13856	3.26	0.0022
RS188	1	0.14463	0.30478	0.47	0.6374
RS191	1	-0.17501	0.31004	-0.56	0.5752

Using Real Price Data for 2008

The REG Procedure

Model: MODEL1

Dependent Variable: RT150

Collinearity Diagnostics							
Number	Eigenvalue	Condition Index	Proportion of Variation				
			Intercept	RX99	RS185	RS188	RS191
1	4.81547	1.00000	0.00119	0.00557	0.00016685	0.00007522	0.00010276
2	0.14814	5.70135	0.02170	0.78902	0.00055497	0.00050487	0.00041955
3	0.03270	12.13570	0.57207	0.07988	0.02712	0.00323	0.00301
4	0.00251	43.82929	0.35336	0.00641	0.75006	0.03003	0.42669
5	0.00118	63.81669	0.05168	0.11912	0.22209	0.96616	0.56978

Using Real Price Data for 2008**The REG Procedure****Model: MODEL1****Dependent Variable: RT150**

Test of First and Second Moment Specification		
DF	Chi-Square	Pr > ChiSq
14	16.15	0.3043

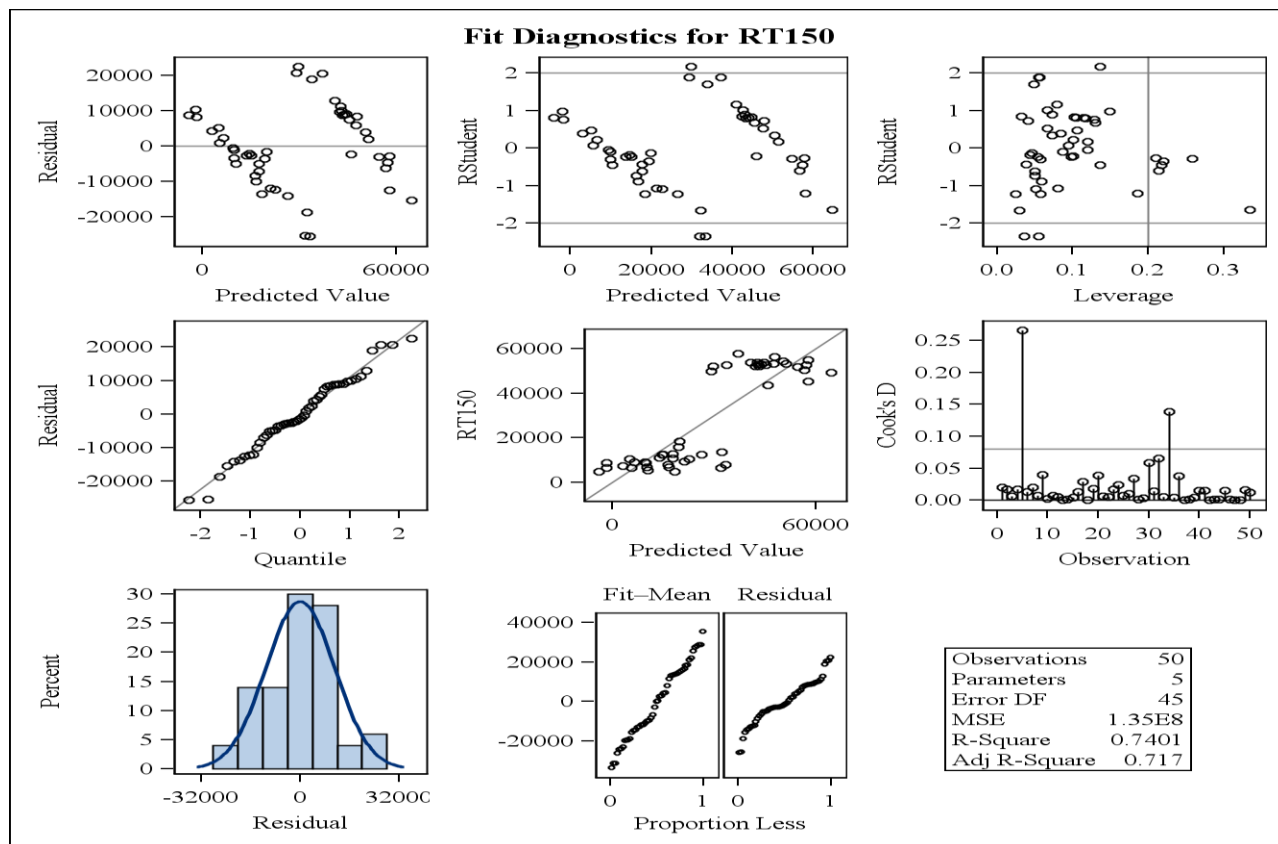
Durbin-Watson D	2.173
Number of Observations	50
1st Order Autocorrelation	-0.100

Using Real Price Data for 2008

The REG Procedure

Model: MODEL1

Dependent Variable: RT150

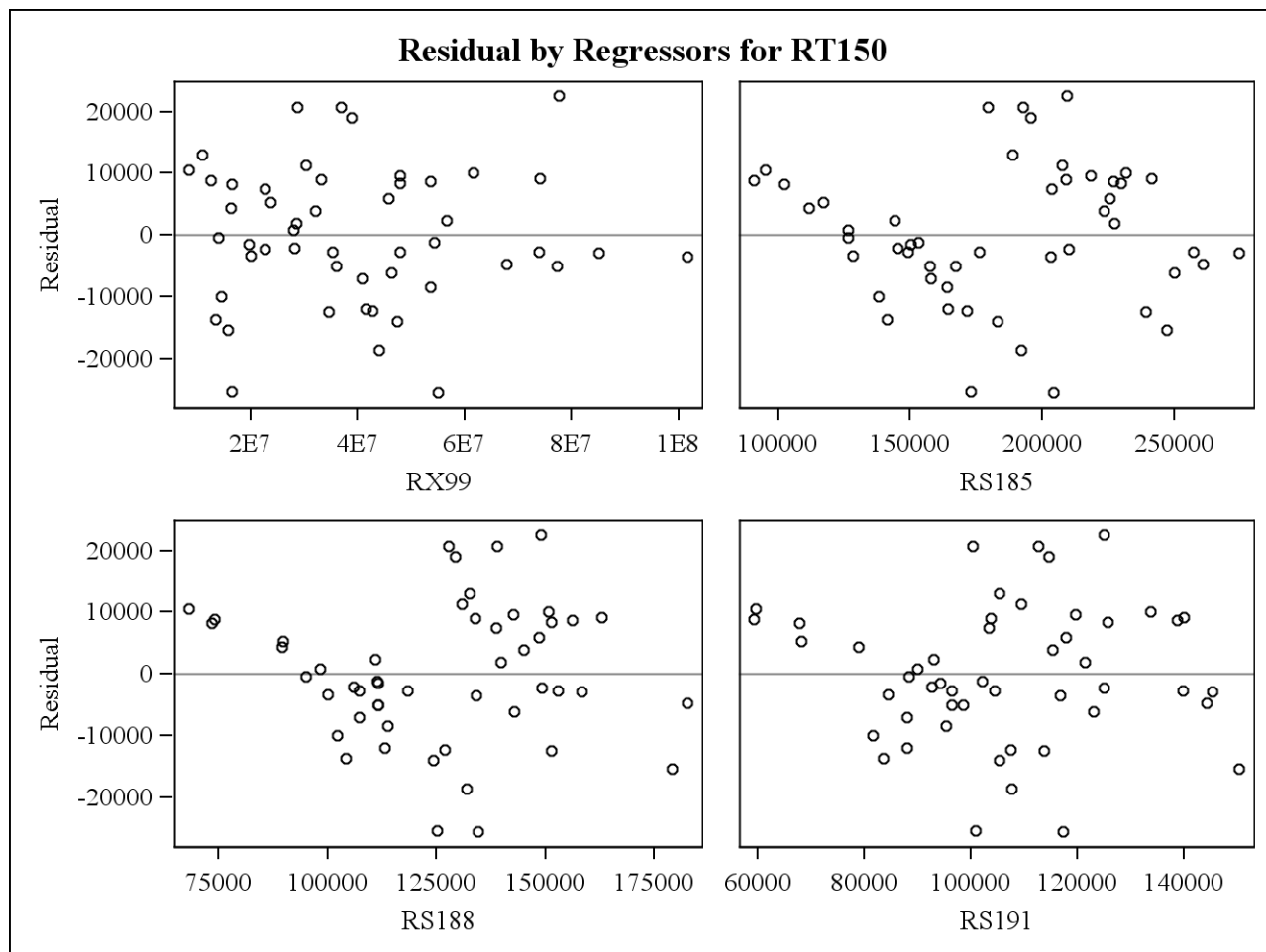


Using Real Price Data for 2008

The REG Procedure

Model: MODEL1

Dependent Variable: RT150



Using Real Price Data for 2009

The REG Procedure

Model: MODEL1

Dependent Variable: RT148

Number of Observations Read	50
Number of Observations Used	50

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	18855338404	4713834601	35.62	<.0001
Error	45	5955406582	132342368		
Corrected Total	49	24810744985			

Root MSE	11504	R-Square	0.7600
Dependent Mean	30453	Adj R-Sq	0.7386
Coeff Var	37.77619		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-42382	9794.94601	-4.33	<.0001
RX50	1	-0.00034495	0.00009322	-3.70	0.0006
RS176	1	0.54645	0.14303	3.82	0.0004
RS179	1	-0.12751	0.30088	-0.42	0.6737
RS182	1	0.01374	0.26923	0.05	0.9595

Using Real Price Data for 2009

The REG Procedure

Model: MODEL1

Dependent Variable: RT148

Collinearity Diagnostics							
Number	Eigenvalue	Condition Index	Proportion of Variation				
			Intercept	RX50	RS176	RS179	RS182
1	4.81984	1.00000	0.00114	0.00535	0.00014990	0.00007479	0.00013023
2	0.14479	5.76961	0.02430	0.76637	0.00043112	0.00049693	0.00048880
3	0.03143	12.38348	0.56411	0.11088	0.02508	0.00334	0.00471
4	0.00272	42.08063	0.22394	0.01553	0.50521	0.00026767	0.65634
5	0.00122	62.86808	0.18651	0.10187	0.46912	0.99582	0.33833

Using Real Price Data for 2009**The REG Procedure****Model: MODEL1****Dependent Variable: RT148**

Test of First and Second Moment Specification		
DF	Chi-Square	Pr > ChiSq
14	17.69	0.2214

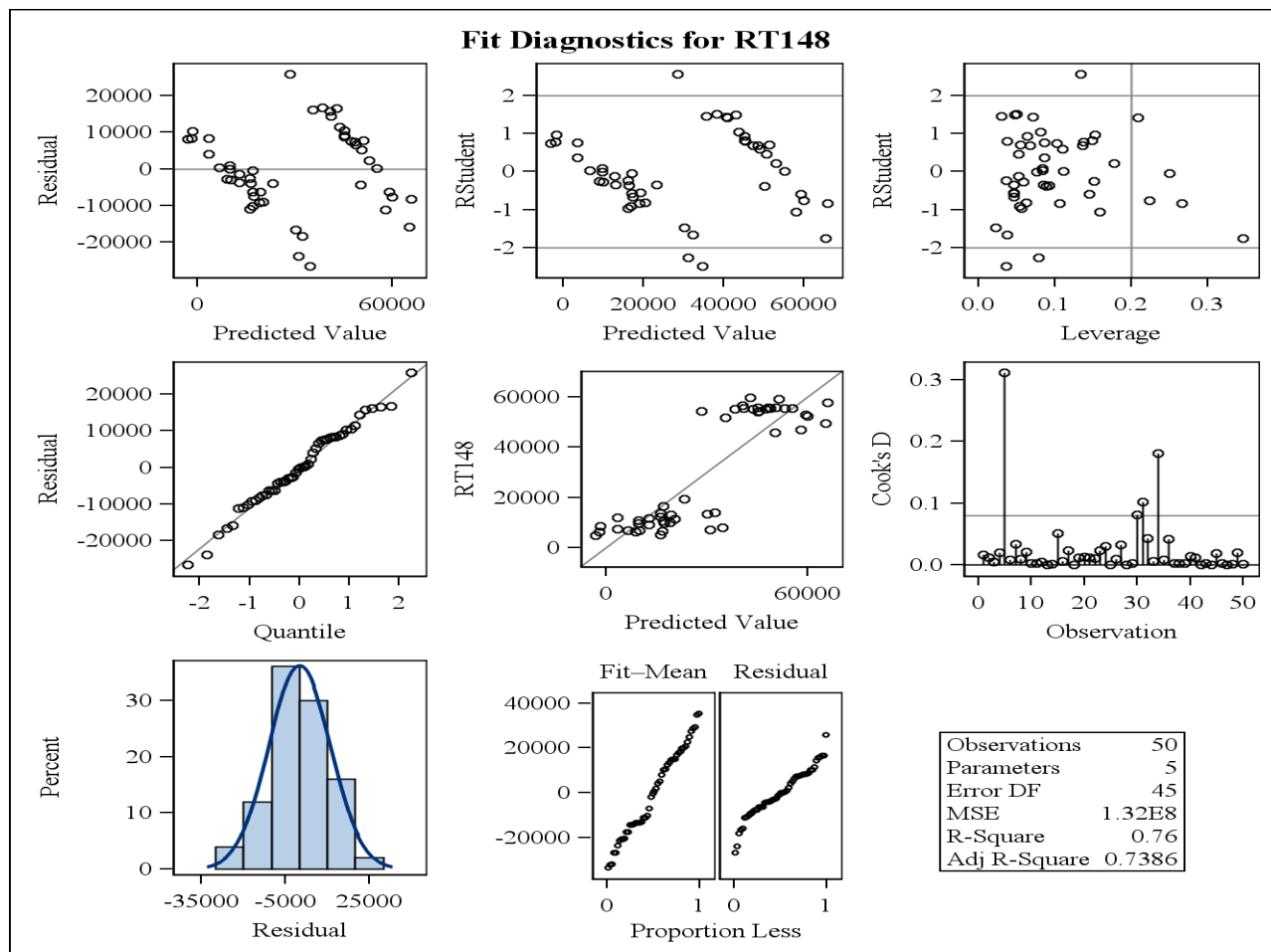
Durbin-Watson D	2.223
Number of Observations	50
1st Order Autocorrelation	-0.119

Using Real Price Data for 2009

The REG Procedure

Model: MODEL1

Dependent Variable: RT148

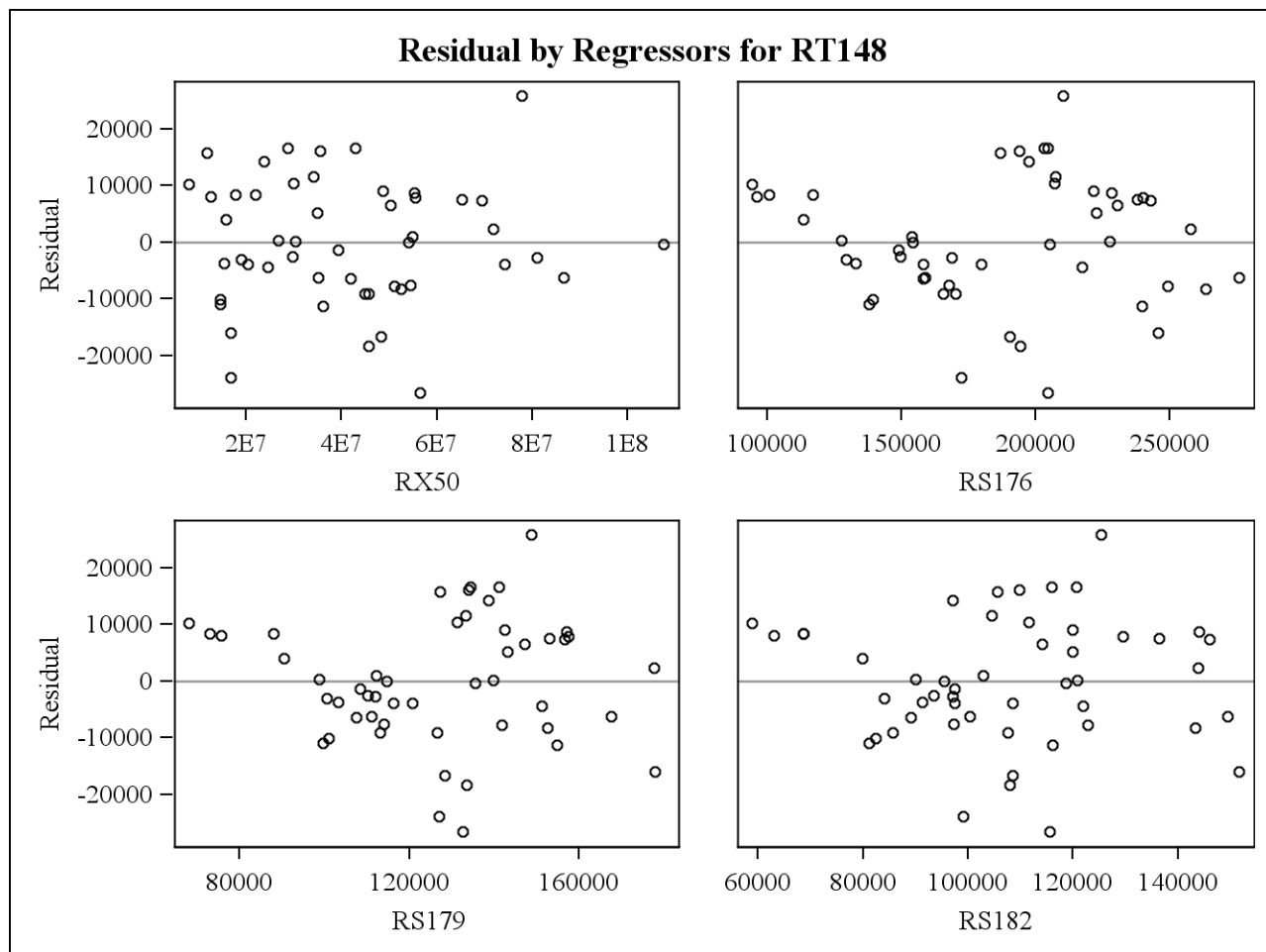


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Using Real Price Data for 2009

The REG Procedure

Model: MODEL1

Dependent Variable: RT148

Institution_Name	Tuition_and_Fees	Fringe_Benefit	Salary_Full	Salary_Associate	Salary_Assistant
The University of Alabama	\$6,400	\$29,035,733	\$114,719	\$79,023	\$61,476
University of Alaska Anchorage	\$4,690	\$12,639,761	\$90,819	\$73,949	\$59,241
University of Arizona	\$5,542	\$37,475,240	\$114,485	\$79,512	\$66,642
University of Arkansas	\$6,400	\$16,527,661	\$102,042	\$73,267	\$67,788
California Institute of Technology	\$34,437	\$10,968,408	\$172,596	\$125,200	\$105,072
University of Colorado Boulder	\$7,278	\$29,860,653	\$119,856	\$88,648	\$75,140
Yale University	\$35,300	\$32,323,868	\$174,715	\$99,833	\$85,981
University of Delaware	\$8,646	\$33,111,860	\$127,730	\$86,780	\$73,632
George Washington University	\$40,437	\$20,107,403	\$134,738	\$97,027	\$78,712
Georgetown University	\$37,947	\$22,396,450	\$156,059	\$101,353	\$80,629
University of Florida	\$3,778	\$53,984,974	\$116,678	\$77,974	\$67,387
Emory University	\$36,336	\$33,563,221	\$152,415	\$99,720	\$83,643
University of Georgia	\$6,030	\$37,985,226	\$106,971	\$77,889	\$71,303
University of Idaho	\$4,632	\$14,036,387	\$89,730	\$69,887	\$58,972
University of Chicago	\$38,453	\$33,504,217	\$179,519	\$106,800	\$97,696
Northwestern University	\$37,125	\$43,120,537	\$161,764	\$105,318	\$93,477
University of Notre Dame	\$36,847	\$27,227,568	\$136,704	\$90,280	\$80,081
University of Kentucky	\$7,736	\$24,691,868	\$104,119	\$74,875	\$67,393
University of Louisiana at Lafayette	\$3,574	\$10,120,317	\$106,498	\$78,609	\$63,038
Johns Hopkins University	\$37,700	\$27,911,148	\$135,295	\$96,379	\$75,694
Harvard University	\$36,173	\$59,500,810	\$191,703	\$110,600	\$101,619
University of Massachusetts Amherst	\$10,417	\$23,803,337	\$117,104	\$89,738	\$68,222
Massachusetts Institute of Technology	\$36,390	\$37,436,225	\$158,590	\$109,179	\$96,988
Williams College	\$37,640	\$7,666,765	\$131,906	\$92,679	\$73,649
University of Michigan-Ann Arbor	\$11,037	\$71,026,597	\$141,985	\$93,644	\$81,548
University of Mississippi	\$5,106	\$10,993,440	\$104,154	\$77,196	\$61,619
University of Missouri-St Louis	\$8,595	\$8,467,239	\$95,257	\$68,121	\$59,626
Washington University in St Louis	\$37,248	\$19,917,977	\$158,766	\$97,686	\$84,827
The University of Montana	\$5,180	\$11,341,423	\$78,135	\$62,563	\$55,088

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Institution_Name	Tuition_and_Fees	Fringe_Benefit	Salary_Full	Salary_Associate	Salary_Assistant
University of Nevada-Reno	\$4,563	\$11,547,532	\$120,887	\$87,481	\$70,484
Dartmouth College	\$36,915	\$15,898,996	\$142,229	\$96,939	\$72,261
Princeton University	\$34,290	\$26,090,139	\$180,337	\$114,290	\$85,823
Columbia University in the City of New York	\$39,326	\$33,525,776	\$160,631	\$105,763	\$87,808
Cornell University	\$36,504	\$54,302,568	\$146,131	\$104,104	\$87,337
Duke University	\$37,295	\$32,010,383	\$157,571	\$103,759	\$82,325
University of North Carolina at Chapel Hill	\$5,397	\$38,434,266	\$142,750	\$94,074	\$82,027
North Dakota State University-Main Campus	\$6,271	\$9,801,755	\$88,322	\$66,337	\$61,690
Ohio State University-Main Campus	\$8,679	\$51,670,939	\$123,145	\$82,652	\$73,000
University of Oklahoma Norman Campus	\$7,423	\$28,472,556	\$110,310	\$74,872	\$61,544
University of Pennsylvania	\$37,526	\$51,819,150	\$168,603	\$113,906	\$97,777
Brown University	\$37,718	\$21,263,700	\$144,910	\$91,394	\$76,494
University of Rhode Island	\$8,678	\$19,737,146	\$101,477	\$73,960	\$64,790
University of South Carolina-Columbia	\$8,838	\$25,213,924	\$110,061	\$77,931	\$68,817
The University of Tennessee	\$6,250	\$39,605,415	\$100,654	\$77,563	\$64,942
Vanderbilt University	\$37,005	\$23,155,170	\$145,944	\$93,476	\$72,459
Rice University	\$30,486	\$15,863,036	\$146,593	\$104,307	\$87,364
Utah State University	\$4,450	\$19,592,389	\$88,258	\$68,623	\$62,887
University of Vermont	\$12,844	\$13,745,980	\$104,978	\$77,903	\$65,832
University of Virginia-Main Campus	\$9,490	\$30,729,592	\$134,160	\$92,132	\$75,258
Stanford University	\$36,798	\$47,375,405	\$182,240	\$127,594	\$100,794