

Lampiran 22

Uji Asumsi Autokorelasi

Dari persamaan regresi linier berganda diketahui bahwa:

$$b_0 = 34,564 \quad b_1 = 0,345 \quad b_2 = 0,234 \quad b_3 = 0,379$$

Sehingga nilai galat model regresi dapat dihitung melalui tabel berikut,

Res	X1	X2	X3	Y	\hat{Y}	e_t	e_t^2	e_t^3	e_{t-1}	$e_t - e_{t-1}$	$e_t - e_t - e_{t-1}$
1	68	70	62	51	94.212	26.100	681.202	655.102	586.989	-586.989	1173.979
2	48	60	60	58	91.641	43.837	1921.667	1877.830	1830.026	-1830.026	3660.051
3	54	68	53	73	95.863	41.705	1739.271	1697.567	1643.409	-1643.409	3286.817
4	54	74	63	48	95.579	41.153	1693.583	1652.430	1598.004	-1598.004	3196.008
5	67	47	62	51	85.678	18.461	340.794	322.334	255.117	-255.117	510.233
6	61	57	51	51	85.407	24.455	598.027	573.573	512.620	-512.620	1025.240
7	44	55	59	71	92.227	48.460	2348.340	2299.880	2256.113	-2256.113	4512.226
8	58	52	70	68	94.467	36.399	1324.914	1288.515	1230.447	-1230.447	2460.894
9	68	58	59	57	90.062	22.244	494.817	472.572	404.755	-404.755	809.510
10	68	67	61	59	94.893	26.587	706.872	680.285	611.979	-611.979	1223.958
11	64	70	75	67	102.461	38.103	1451.828	1413.725	1349.367	-1349.367	2698.733
12	68	64	67	72	98.941	30.745	945.242	914.497	846.301	-846.301	1692.602
13	70	58	63	61	92.442	22.745	517.337	494.592	424.895	-424.895	849.789
14	64	73	72	51	99.122	35.282	1244.842	1209.560	1145.721	-1145.721	2291.441
15	66	67	66	62	97.141	30.954	958.132	927.178	860.991	-860.991	1721.983
16	70	64	63	59	94.356	24.734	611.794	587.059	517.438	-517.438	1034.875
17	54	64	79	55	98.883	44.469	1977.494	1933.025	1878.611	-1878.611	3757.222
18	66	47	60	50	84.938	18.871	356.104	337.233	271.166	-271.166	542.332

19	60	67	63	61	95.956	36.281	1316.324	1280.043	1220.368	-1220.368	2440.735
20	69	71	82	60	103.730	34.478	1188.700	1154.222	1084.969	-1084.969	2169.939
21	65	62	60	56	91.797	26.770	716.657	689.887	624.860	-624.860	1249.719
22	63	65	53	60	91.445	28.418	807.582	779.164	716.137	-716.137	1432.275
23	68	62	80	59	99.480	31.864	1015.286	983.423	915.806	-915.806	1831.612
24	59	63	64	64	95.467	36.704	1347.151	1310.447	1251.684	-1251.684	2503.368
25	67	61	53	65	91.174	23.724	562.812	539.089	471.638	-471.638	943.276
26	60	64	63	69	96.822	36.415	1326.069	1289.654	1229.247	-1229.247	2458.494
27	54	67	60	71	97.500	43.874	1924.939	1881.065	1827.439	-1827.439	3654.877
28	57	60	45	65	87.645	30.611	937.016	906.405	849.371	-849.371	1698.742
29	63	58	71	65	96.164	33.146	1098.653	1065.508	1002.489	-1002.489	2004.978
30	59	64	70	61	97.446	38.902	1513.373	1474.471	1415.928	-1415.928	2831.855
31	49	70	65	65	98.407	49.623	2462.477	2412.854	2364.070	-2364.070	4728.140
32	61	56	79	67	98.414	37.749	1424.994	1387.245	1326.580	-1326.580	2653.160
33	58	57	59	61	90.732	32.907	1082.871	1049.964	992.139	-992.139	1984.278
34	73	58	60	63	92.133	18.747	351.439	332.692	259.306	-259.306	518.613
35	72	61	59	67	93.557	21.589	466.076	444.487	372.519	-372.519	745.038
36	58	63	70	50	94.556	36.241	1313.380	1277.139	1218.824	-1218.824	2437.648
37	62	66	68	62	97.740	36.081	1301.835	1265.754	1204.095	-1204.095	2408.190
38	50	68	65	56	95.837	45.645	2083.462	2037.817	1987.625	-1987.625	3975.251
39	57	58	82	66	100.179	43.238	1869.552	1826.313	1769.372	-1769.372	3538.745
40	67	57	56	62	90.054	23.409	547.967	524.558	457.912	-457.912	915.825
41	61	63	55	59	91.648	30.211	912.684	882.474	821.036	-821.036	1642.073
42	66	61	82	64	100.932	34.804	1211.289	1176.485	1110.357	-1110.357	2220.714
43	70	60	65	56	92.763	23.081	532.714	509.634	439.951	-439.951	879.903
44	57	52	53	65	87.832	30.890	954.199	923.309	866.367	-866.367	1732.734
45	72	57	59	57	89.821	17.384	302.199	284.815	212.378	-212.378	424.757
46	71	50	54	50	84.049	12.691	161.072	148.381	77.024	-77.024	154.047
47	71	53	49	54	84.290	12.933	167.261	154.328	82.971	-82.971	165.942

48	77	63	70	59	96.711	19.394	376.120	356.726	279.408	-279.408	558.816
49	65	69	65	55	95.965	30.694	942.114	911.420	846.149	-846.149	1692.298
50	77	64	56	45	88.685	12.124	146.983	134.860	58.299	-58.299	116.597
51	66	74	82	57	103.932	37.772	1426.728	1388.956	1322.797	-1322.797	2645.593
52	64	71	56	55	93.586	29.661	879.756	850.095	786.170	-786.170	1572.339
53	65	64	70	70	99.384	34.292	1175.962	1141.670	1076.578	-1076.578	2153.157
54	62	60	55	69	92.529	30.493	929.828	899.335	837.299	-837.299	1674.598
55	61	59	59	55	90.310	28.858	832.779	803.922	742.470	-742.470	1484.939
56	48	51	63	58	89.163	41.138	1692.372	1651.234	1603.209	-1603.209	3206.418
57	57	60	62	47	89.352	32.596	1062.528	1029.932	973.177	-973.177	1946.354
58	75	62	58	54	90.567	15.165	229.982	214.817	139.416	-139.416	278.832
59	48	66	70	63	98.587	50.350	2535.156	2484.805	2436.568	-2436.568	4873.137
60	61	49	59	58	87.127	26.364	695.071	668.707	607.944	-607.944	1215.888
61	53	51	63	64	90.308	37.570	1411.498	1373.928	1321.190	-1321.190	2642.379
62	70	59	58	66	92.715	22.371	500.471	478.100	407.756	-407.756	815.512
63	70	48	68	54	88.693	18.339	336.332	317.992	247.638	-247.638	495.276
64	52	50	52	69	87.744	36.035	1298.520	1262.485	1210.776	-1210.776	2421.552
65	58	59	59	69	93.064	35.001	1225.084	1190.082	1132.020	-1132.020	2264.040
66	59	62	54	69	92.696	33.239	1104.859	1071.620	1012.163	-1012.163	2024.325
67	72	60	60	75	95.413	23.314	543.562	520.248	448.149	-448.149	896.299
68	59	51	57	62	88.055	29.169	850.823	821.654	762.769	-762.769	1525.537
69	42	57	59	74	94.110	51.977	2701.639	2649.662	2607.530	-2607.530	5215.060
70	57	55	56	63	89.623	32.444	1052.597	1020.154	962.974	-962.974	1925.948
71	56	61	52	61	89.883	34.038	1158.566	1124.528	1068.683	-1068.683	2137.366
72	48	63	51	53	88.532	40.253	1620.284	1580.032	1531.753	-1531.753	3063.505
73	41	63	56	56	90.929	50.133	2513.362	2463.228	2422.432	-2422.432	4844.865
74	44	49	60	51	85.911	41.837	1750.369	1708.531	1664.457	-1664.457	3328.915
75	45	74	65	58	98.238	53.333	2844.357	2791.025	2746.119	-2746.119	5492.238
76	53	65	57	73	96.187	43.298	1874.708	1831.411	1778.521	-1778.521	3557.042

77	54	64	61	48	91.185	36.707	1347.409	1310.702	1256.224	-1256.224	2512.448
78	68	70	65	51	95.325	27.395	750.486	723.091	655.161	-655.161	1310.322
79	55	64	61	51	91.798	36.639	1342.421	1305.782	1250.623	-1250.623	2501.247
80	38	67	63	71	98.287	59.935	3592.221	3532.286	3493.935	-3493.935	6987.869
81	56	61	64	68	95.418	39.563	1565.213	1525.650	1469.795	-1469.795	2939.590
82	52	66	70	57	97.197	45.385	2059.836	2014.450	1962.639	-1962.639	3925.278
83	42	65	61	59	94.301	51.958	2699.651	2647.692	2605.350	-2605.350	5210.699
84	36	65	59	67	95.579	59.796	3575.577	3515.781	3479.999	-3479.999	6959.997
Jumlah	5041	5151	5243	5079	7852.97	2812.34	103457.5	83501	95604.55	-95604.55	156456

$$d = \frac{\sum e_t - e_t - e_{t-1}}{\sum e_t^3}$$

$$d = \frac{156456}{83501} = 1,873$$



Nilai Durbin Watson kemudian dibandingkan dengan nilai d-tabel, Hasil perbandingan akan menghasilkan kesimpulan seperti kriteria sebagai berikut (Gujarati:1993):

1, Jika $d < dL$, berarti terdapat autokorelasi positif

- 2, Jika $d > (4 - dL)$, berarti terdapat autokorelasi negatif
- 3, Jika $dU < d < (4 - dU)$, berarti tidak terdapat autokorelasi
- 4, Jika $dL < d < dU$ atau $(4 - dU)$, berarti tidak dapat disimpulkan

Dari Tabel Durbin Watson (DW) diketahui bahwa nilai batas bawah (dL) = 1,612 dan batas atas (dU) = 2,000, Nilai d hasil perhitungan sebesar 1,873 berada pada rentang antara dU dan $4-dU$ sehingga **tidak terdapat autokorelasi** dalam model regresi.

Mencari Uji Autokorelasi

a. Mencari \hat{Y}

$$\begin{aligned}\hat{Y} &= a + bx_1 + bx_2 + bx_3 \\ &= 34,564 + 0,345 (62) + 0,234 (51) + 0,379 (70) \\ &= 34,564 + 21,39 + 11,934 + 26,53 \\ &= 94,212\end{aligned}$$

b. Mencari e_t

$$\begin{aligned}e_t &= \hat{Y} - \text{variabel } Y \\ &= 94,212 - 68 \\ &= 26,100\end{aligned}$$

c. Mencari e_t^2

$$\begin{aligned}e_t^2 &= e_t \times e_t \\ &= 26,100 \times 26,100 \\ &= 681,202\end{aligned}$$

d. Mencari e_t^3

$$\begin{aligned}e_t^3 &= e_t^2 - e_t \\ &= 681,202 - 26,100 \\ &= 655,102\end{aligned}$$

e. Mencari e_{t-1}

$$\begin{aligned}e_{t-1} &= e_t^2 - \hat{Y} \\ &= 681,202 - 94,212 \\ &= 586,989\end{aligned}$$

f. Mencari $e_t - e_{t-1}$

$$\begin{aligned}e_t - e_{t-1} &= \hat{Y} - e_t^2 \\ &= 94,212 - 681,202 \\ &= -586,989\end{aligned}$$

g. Mencari $e_t - e_{t-1}$

$$\begin{aligned}e_t - e_{t-1} &= e_{t-1} - e_t - e_{t-1} \\ &= 586,989 - (-586,989) \\ &= 1173,979\end{aligned}$$