Hierarchical Regression

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A researcher wants to test some hypotheses regarding the relationship between size and age of a firm and its performance in a particular industry.

Size was measured by the number of employees (in 100s) working in the firm, age was the number of years for which the firm has been operating, and performance was measured by return on equity. A sample of 50 firms was selected at random.

The researcher wanted to test the following two hypotheses:
H1: Performance of a firm is positively related to its size.
H2: Performance of a firm is positively related to its age.

Firm ID	Performance	Size	Age	Firm ID	Performance	Size	Age
1	10.24	20	40	26	0.86	19	43
2	3.84	2	41	27	32.92	4	50
3	10.45	20	43	28	4.01	8	44
4	27.42	19	25	29	24.10	6	35
5	14.80	3	29	30	13.93	9	24
6	11.42	33	7	31	2.48	65	29
7	1.90	4	30	32	8.27	4	43
8	23.51	29	57	33	2.65	8	41

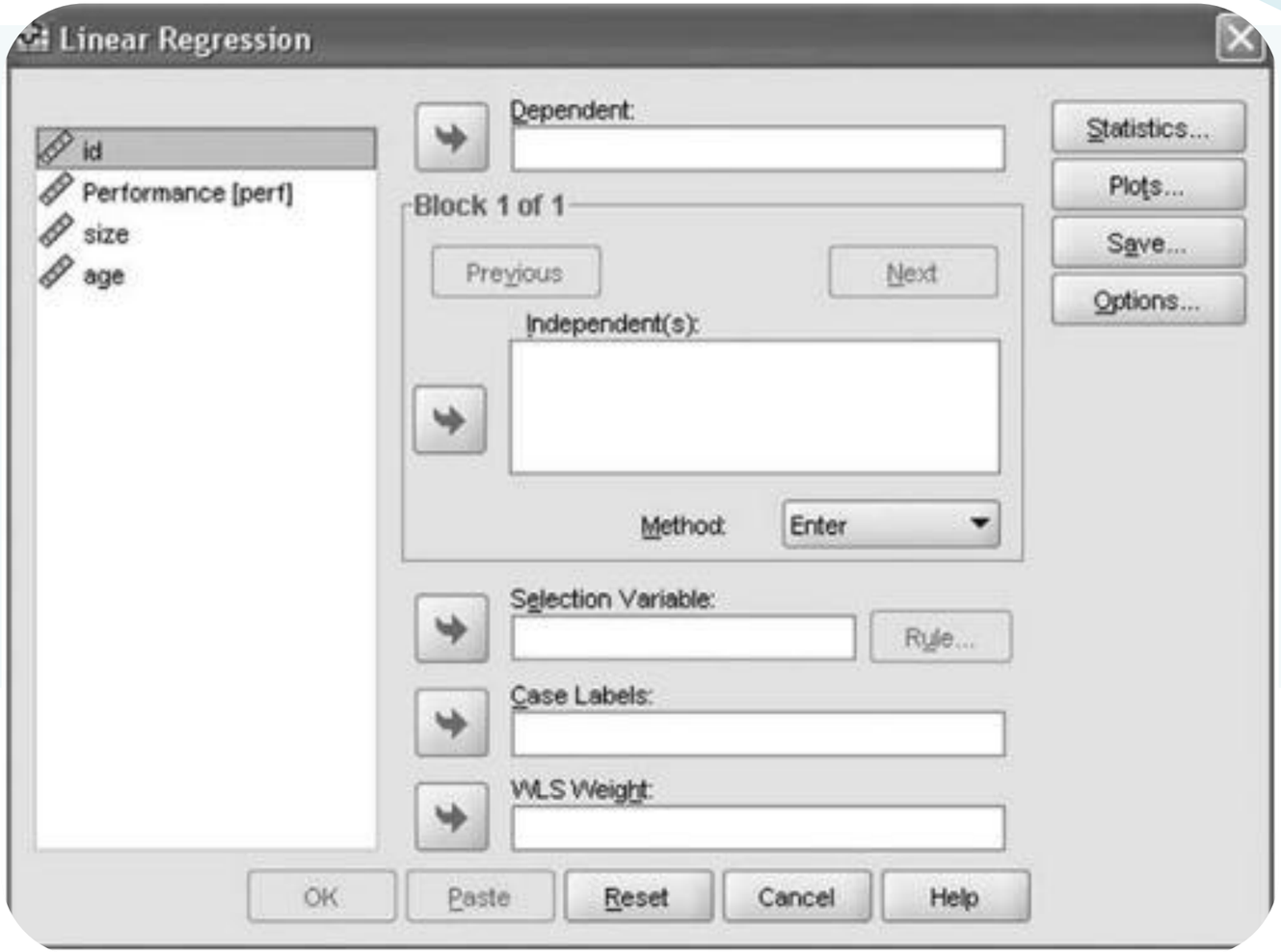
Firm ID	Performance	Size	Age	Firm ID	Performance	Size	Age
9	15.52	87	15	34	13.48	7	48
10	6.40	29	48	35	3.30	28	18
11	–2.53	11	44	36	6.44	15	32
12	5.77	20	34	37	–3.89	9	32
13	–4.35	17	16	38	1.26	78	14
14	2.81	8	18	39	24.48	99	12
15	24.70	13	16	40	14.40	8	15
16	11.92	66	17	41	0.76	6	19
17	–18.75	8	40	42	2.29	1	21
18	50.32	85	16	43	26.91	4	86
19	–16.83	1	44	44	24.64	1	56
20	15.31	5	34	45	20.62	51	21
21	5.51	7	22	46	6.72	1	22
22	6.06	61	31	47	13.80	7	61
23	14.81	21	16	48	23.91	5	88
24	42.42	93	12	49	1.88	1	11
25	–3.18	2	17	50	1.79	66	25

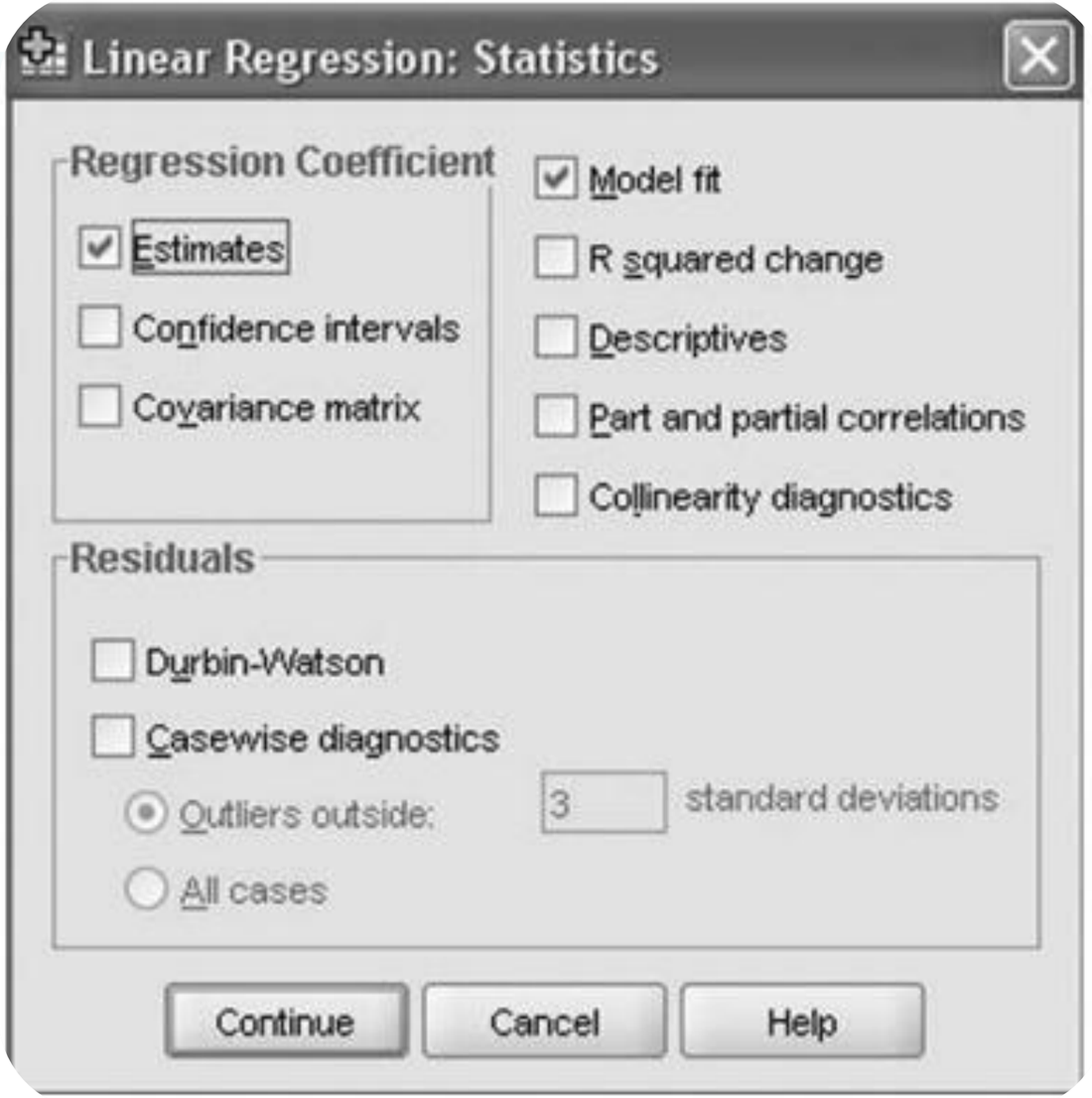
Hierarchical regression is in many ways similar to a standard multiple regression, the only difference being in the way IVs are entered in the model.

For example, in the above solved example, theoretical considerations may demand that we first assess the model with only the size of the firm and introduce the age of the firm in the second stage.

Transfer *Performance* into the box labeled *Dependent* and *size* into the box labeled *Independent(s)*.

Once *size* is entered, a button labeled *Next* becomes active above this box. Clicking on *Next* will again empty the box labeled *Independent(s)*. Transfer the second IV, *age* into this box.




Linear Regression: Statistics
Regression Coefficient
Estimates
Confidence intervals
Covariance matrix
Model fit
R squared change
Descriptives
Part and partial correlations
Collinearity diagnostics
Residuals
Durbin-Watson
Casewise diagnostics
Outliers outside:
3
standard deviations
All cases
Continue
Cancel
Help

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	size[a]	.	Enter
2	age[a]	.	Enter

[a]All requested variables entered.
[b]Dependent Variable: Performance.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.343[a]	.118	.099	12.44516	.118	6.397	1	48	.015
2	.416[b]	.173	.138	12.17781	.055	3.131	1	47	.083

[a]Predictors: (Constant), size.
[b]Predictors: (Constant), size, age.

The first table labeled titled *Entered/Removed* shows that *size* was entered in Model 1 followed by *age* in Model 2. Please note that Model 1 includes only *size* as IV whereas Model 2 includes both *size* as well as *age* as IVs.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	6.867	2.305		2.980	.005		
	size	.160	.063	.343	2.529	.015	1.000	1.000
2	(Constant)	−.356	4.664		−.076	.939		
	size	.209	.068	.447	3.081	.003	.835	1.198
	age	.190	.107	.257	1.769	.083	.835	1.198

[a]Dependent Variable: Performance.

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	age	.257[a]	1.769	.083	.250	.835	1.198	.835

[a]Predictors in the Model: (Constant), size.
[b]Dependent Variable: Performance.

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	size	age
1	1	1.646	1.000	.18	.18	
	2	.354	2.155	.82	.82	
2	1	2.311	1.000	.02	.05	.03
	2	.609	1.948	.01	.55	.09
	3	.080	5.372	.97	.40	.88

[a]Dependent Variable: Performance.

INTEPRETASIKAN SELURUH OUTPUT REGRESI HIRARKI SESUAI PROSEDUR.

REFLEKSI

1. **Informasi penting hari ini**

2. **Manfaat penting dari informasi penting hari ini**

3. **Tindak lanjut yang dapat saudara lakukan**

THANK YOU!

ANY QUESTIONS?