

Example of combining constants and indicator variables

Model 1: An overall constant, freeway constant and arterial constant

```
|-> regress;lhs=speed;rhs=one,frwy,art,cage,x5$
```

```
-----
Ordinary      least squares regression .....
LHS=SPEED    Mean                =          26.37265
Fit          R-squared          =          .30917  R-bar squared    .29024
-----+-----
```

SPEED	Coefficient	Standard Error	t	Prob. t >T*	95% Confidence Interval	
Constant	12.6876***	3.29322	3.85	.0002	6.2330	19.1422
FRWY	6.43366**	2.70770	2.38	.0188	1.12667	11.74065
ART	.69168	1.49070	.46	.6433	-2.23004	3.61340
CAGE	-.27938*	.15021	-1.86	.0649	-.57379	.01503
X5	.29186***	.07146	4.08	.0001	.15180	.43192

***, **, * ==> Significance at 1%, 5%, 10% level.

Model was estimated on Sep 05, 2018 at 10:34:27 AM

Model 2: An overall constant, rural constant and arterial constant

```
|-> regress;lhs=speed;rhs=one,rur,art,cage,x5$
```

```
-----
Ordinary      least squares regression .....
LHS=SPEED    Mean                =          26.37265
Fit          R-squared          =          .30917  R-bar squared    .29024
-----+-----
```

SPEED	Coefficient	Standard Error	t	Prob. t >T*	95% Confidence Interval	
Constant	19.1213***	5.38177	3.55	.0005	8.5732	29.6693
RUR	-6.43366**	2.70770	-2.38	.0188	-11.74065	-1.12667
ART	-5.74198**	2.71674	-2.11	.0363	-11.06670	-.41726
CAGE	-.27938*	.15021	-1.86	.0649	-.57379	.01503
X5	.29186***	.07146	4.08	.0001	.15180	.43192

***, **, * ==> Significance at 1%, 5%, 10% level.

Model was estimated on Sep 05, 2018 at 10:34:27 AM

Model 3: An overall constant, rural constant and freeway constant

```
|-> regress;lhs=speed;rhs=rur,frwy,art,cage,x5$
```

```
-----
Ordinary least squares regression .....
LHS=SPEED Mean = 26.37265
Fit R-squared = .30917 R-bar squared .29024
-----
```

SPEED	Coefficient	Standard Error	t	Prob. t >T*	95% Confidence Interval	
RUR	12.6876***	3.29322	3.85	.0002	6.2330	19.1422
FRWY	19.1213***	5.38177	3.55	.0005	8.5732	29.6693
ART	13.3793***	3.74437	3.57	.0005	6.0405	20.7181
CAGE	-.27938*	.15021	-1.86	.0649	-.57379	.01503
X5	.29186***	.07146	4.08	.0001	.15180	.43192

```
***, **, * ==> Significance at 1%, 5%, 10% level.
```

```
Model was estimated on Sep 05, 2018 at 10:34:27 AM
```

Model 4: An overall constant, rural constant, freeway constant and arterial constant - cannot be estimated

```
|-> regress;lhs=speed;rhs=one,rur,frwy,art,cage,x5$
```

```
Error 131: Models - Regression; regressors are collinear.
```

Discussion

Note that all models have exactly the same R-squared. Also, in all models:

1. Commuters taking the freeway have a base speed of 19.12 mi/h
 $\text{freeway base speed} = \text{constant} + \text{frwy}$
2. Commuters taking the rural road have a base speed of 12.69 mi/h
 $\text{rural-road base speed} = \text{constant} + \text{rur}$
3. Commuters taking the arterial have a base speed of 19.12 mi/h
 $\text{arterial base speed} = \text{constant} + \text{art}$