

Writing Equations with VORSIM in the Model Equation Workbook

As an example, we will consider a production equation for bolts for the Eastern region in the LUMP model. The coding chosen from the model is shown below:

Sheet	Description.....		
E	-		East
WR	-		Western-Region
MCM	-		Market-Clearing-Mechanism
Category	Description.....		
BL	-		BoLts
NUT	-		NUTs
W	-		Washers
Variable	Format	Lag	Description.....
fs	0.00	0	shift-(unexpected change in)-sales(%)
pw	0.00	2	price-wholesale(\$/lb)
qp	0	0	quantity-produced(1000 lb)
qs	0	0	quantity-sold(1000 lb){if MC = market-clearing-variable}
new	0	0	new-construction(index,1990=100)
t	0	0	time

These codes resulted in the variable list for the LUMP model shown below. We want an equation for the variable EqpBL, the quantity of bolts produced in the Eastern region. We

LUMP	E	WR	MCM
fsBL	EfsBL	WRfsBL	
fsNUT	EfsNUT	WRfsNUT	
fsW	EfsW	WRfsW	
pwBL			MCMpwBL
pwNUT			MCMpwNUT
pwW			MCMpwW
qpBL	EqpBL	WRqpBL	
qpNUT	EqpNUT	WRqpNUT	
qpW	EqpW	WRqpW	
qsBL	EqsBL	WRqsBL	MCMqsBL
qsNUT	EqsNUT	WRqsNUT	MCMqsNUT
qsW	EqsW	WRqsW	MCMqsW
new	Enew	WRnew	MCMnew
t			MCMt
pw:1BL			MCMpw:1BL
pw:2BL			MCMpw:2BL
pw:1NUT			MCMpw:1NUT
pw:2NUT			MCMpw:2NUT
pw:1W			MCMpw:1W
pw:2W			MCMpw:2W

choose to write the equation in an exponential form (constant elasticity). The explanatory variables are the prices of bolts, nuts, and washers where the prices are kept in the market clearing mechanism sheet. Price variables would be MCMpwBL, MCMpwNUT, and MCMpwW. In addition we want to include the possibility of lagging prices up to two periods (years) and we want to include a growth rate. In traditional math notation, the equation would be:

$$EqpBL = \text{constant} * MCMpwBL^{0.33} * MCMpwNUT^{0.0} * MCMpwW^{0.0} * MCMpwBL(-1)^{0.13} * MCMpwNUT(-1)^{0.0} * MCMpwW(-1)^{0.0} * MCMpwBL(-2)^{0.03} * MCMpwNUT(-2)^{0.0} * MCMpwW(-2)^{0.0} * (1+MCMt)^{0.02}$$

Substituting the Excel notation ^ for exponentiation, the VORSIM convention :1 for a variable lag of one period etc., and removing terms with zero exponents (the term collapses to a value of 1), the equation simplifies to:

$$EqpBL = \text{constant} * MCMpwBL^{0.33} * MCMpwBL:1^{0.13} * MCMpw:2BL^{0.03} * (1+MCMt)^{0.02}$$

After calculating the intercept (1734.25), the VORSIM equation is:

EqpBL	1734.25*MCMpwBL^0.33*MCMpw:1BL^0.13*MCMpw:2BL^0.03*(1+MCMt)^0.02
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In VORSIM, we begin equation writing by clicking [Add Equation Parameter Matrix].