

Basic Econometrics

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Theory

In This Issue

- 1. Learn how to run *Risk Simulator's* Basic Econometrics models.
- 2. Discover how you can run hundreds of models at once.

"How do you model or identify the relationship among multiple variables?"

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admin@realoptionsvaluation.com www.realoptionsvaluation.com www.rovusa.com Econometrics refers to a branch of business analytics, modeling, and forecasting techniques for modeling the behavior or forecasting certain business, financial, economic, physical science, and other variables. Running the *Basic Econometrics* models is similar to regular regression analysis except that the dependent and independent variables are allowed to be modified before a regression is run. The report generated is the same as shown in the Multiple Regression article and the interpretations are identical to those described in that article.

Procedure

- Start Excel and enter your data or open an existing worksheet with historical data to forecast (the illustration shown in Figure 1 uses the file example file *Advanced Forecasting Models* in the *Examples* menu of *Risk Simulator*).
- Select the data in the *Basic Econometrics* worksheet and select *Risk Simulator* | *Forecasting* | *Basic Econometrics*.
- Enter the desired dependent and independent variables (see Figure 1 for some basic examples) and click *OK* to run the model and report, or click on *Show Results* to view the results before generating the report in case you need to make any changes to the model.

Notes

- To run an econometric model, simply select the data (B5:G55) including headers and click on *Risk Simulator* | *Forecasting* | *Basic Econometrics.* You can then type in the variables and their modifications for the dependent and independent variables (Figure 1). Note that only one variable is allowed as the Dependent Variable (*Y*), whereas multiple variables are allowed in the Independent Variables (*X*) section, separated by a semicolon (;) and that basic mathematical functions can be used (e.g., LN, LOG, LAG, +, -, /, *, TIME, RESIDUAL, DIFF). Click on *Show Results* to preview the computed model and click *OK* to generate the econometric model report.
- You can also automatically generate multiple models by entering a sample model and using the predefined *INTEGER(N)* variable as well as *Shifting Data* up or down specific rows repeatedly. For instance, if you use the variable LAG(VAR1, INTEGER1) and you set *INTEGER1* to be between MIN = 1 and MAX = 3, then the following three models will be run: first LAG(VAR1,1), then LAG(VAR1,2), and, finally, LAG(VAR1,3). Also, sometimes you might want to test if the timeseries data has structural shifts or if the behavior of the model is consistent over time by shifting the data and then running the same model. For example, if you have 100 months of data listed chronologically, you can shift down 3 months at a time for 10 times (i.e., the model will be run on months 1–100, 4–100, 7–100, etc.). Using this *Multiple Models* section in *Basic Econometrics*, you can run hundreds of models by simply entering a single model equation if you use these predefined integer variables and shifting methods.

A	В	С	D	E	F	G	HI	J	K	L	M	N	0	P	Q R	S	T U	V	1
	Basic Econometrics Data Set						R Basi	Basic Econometrics											
Г	Y	X1	X2	X3	X4	X5	This to	ol is used to ru	n basic ec	onometric mo	dels by firs	t transforming th	e input vari	ables before					
	521	18308	185	4.041	79.6	7.2	running	the multivaria	Each mode	on analysis. Is on a new	tou can en	ter in multiple ec ithin each line th	onometric n be first varia	hodel					
	367	1148	600	0.55	1	8.5	depend	ent variable fo	llowed by a	t least one o	r more inde	pendent variable	s separated	by semi-colons.					
	443	18068	372	3.665	32.3	5.7	In the f	ollowing examp	ole, LN(VAP	R1) and VAR.	3 are depen	ident variables ir	1 two model:	s and the					
	365	7729	142	2.351	45.1	7.3	LNO	(AR1); LN(VAF	2); VAR3+	VAR4; TIME	the two ecc	mometric models	э.						
	614	100484	432	29.76	190.8	7.5	VAR	3; LAG(VAR2,3); DIFF(VA	R1); RESIDU	JAL(VAR3;\	/AR4)							
	385	16728	290	3.294	31.8	5	Transmission of the second												
	286	14630	346	3.287	678.4	6.7	VAR1	VAR2	VAR3	VAR4	VAR5	VAR6							
	397	4008	328	0.666	340.8	6.2	521	18308	185	4.041	79.6	7.2							
	764	38927	354	12.938	239.6	7.3	367	1148	600	0.55	1	8.5							
	427	22322	266	6.478	111.9	5	443	18068	372	3.665	32.3	5.7							
	153	3711	320	1.108	172.5	2.8	365	7729	142	2.351	45.1	7.3							
	231	3136	197	1.007	12.2	6.1	614	100484	432	29.76	190.8	7.5							
	524	50508	266	11.431	205.6	7.1	385	16728	290	3.294	31.8	5							
	328	28886	173	5.544	154.6	5.9	286	14630	346	3.287	678.4	6.7							
	240	16996	190	2.777	49.7	4.6	@ Sin	ala Model											
	286	13035	239	2.478	30.3	4.4		gie model											
	285	12973	190	3.685	92.8	7.4	Deper	dent Variable	Indep	endent Varia	ables:								
	569	16309	241	4.22	96.9	7.1	L NO/	(D1)	LNA	AD21-1/AD2*			(ADC)						
	96	5227	189	1.228	39.8	7.5	Liver		TIME	/u.sz), v/u.so	170 HR, EPIG	(474133, 1), 2011 (4	Parsoj,						
	498	19235	358	4.781	489.2	5.9	e.g., u	N(VARI)		0000000000			CID I I AI	Chan Baruth					
	481	44487	315	6.016	767.6	9	+*/	LN.LOG.LAG	(VAR1,	VAR3); TIME; FOR	RECAST(VAR3,	VAR4); DIFF(VAR5); R	ATE(VAR6)	Show Result					
	468	44213	303	9.295	163.6	9.2					6								
	177	23619	228	4.375	55	5.1	Mu 🔘 Mu	tiple Models			<u>u</u>	g econometric	s results					C=	
	198	9106	134	2.573	54.9	8.6					-								
	458	24917	189	5.117	74.3	6.6						R-Squared (C	oefficient of	Determination):	0.	5231			
	108	3872	196	0.799	5.5	6.9						Adjusted R-So	quared:		0.	4663			
	246	8945	183	1.578	20.5	2.7						Multiple R (Mu	ultiple Corre	lation Coefficient):	0.	/233			
	291	2373	417	1.202	10.9	5.5						Standard Erro	r of the Estin	nates (SEy):	0.	4000			
	68	7128	233	1.109	123.7	7.2	INTE	GER1: Min	Ma	х		ANOVA F Stat	tistic:		9.	2137			
	311	23624	349	7.73	1042	6.6	INTE	GER2: Min	Ma	xe		ANOVA p-Vali	ue:		0.	0000			
	606	5242	284	1.515	12.5	6.9	INTE	GER3 Min	M	av			Intercent	INA/AP2)	VAR2*VAR4	LAGO/ARE 1)	DIEE0/ARO	TIME	
	512	92629	499	17.99	381	7.2	IN TE		IVIA			Coofficients	2 1040	0.2726	0.0000	0.0011	0.0219	0.0125	
	426	28795	231	6.629	136.1	5.8						Standard Error	0.8947	0.2726	0.0000	0.0003	0.0215	0.0125	
	47	4487	143	0.639	9.3	4.1						t-Statistic	3.4703	2.8001	0.7885	3.8576	0.6796	-2.5234	
	265	48799	249	10.847	264.9	6.4	L		_			p-Value	0.0012	0.0077	0.4348	0.0004	0.5005	0.0155	
	370	14067	195	3.146	45.8	6.7													
	312	12693	288	2.842	29.6	6													
	222	62184	229	11.882	265.1	6.9						Dependent Var	lable:				Co	CI	lose
	280	9153	287	1.003	960.3	8.5						LN(VAR1)							
	759	14250	224	3.487	115.8	6.2					L		_						_
	114	3680	161	0.696	92	34													

Figure 1. Basic Econometrics Module