

ภาคผนวก

มหาวิทยาลัยเชียงใหม่
Chiang Mai University

ภาคผนวก ก

วิธีคำนวณค่าสถิติโพรบิต (probit)

มหาวิทยาลัยเชียงใหม่
Chiang Mai University

***** PROBIT ANALYSIS *****

DATA Information

223 unweighted cases accepted.
0 cases rejected because of missing data.
357 cases are in the control group.

MODEL Information

ONLY Normal Sigmoid is requested.

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***** PROBIT ANALYSIS *****

>Warning # 13527

>Parameter estimates did not converge in maximum number of iterations.

Number of iterations = 20
 Optimal solution not found.

Parameter Estimates (PROBIT model: (PROBIT(p)) = Intercept + BX):

	Regression Coeff.	Standard Error	Coeff./S.E.
INC	.07388	.04709	1.56897
EXPR	.52993	.25780	2.05558
DEBT	-2.39155	1.18073	-2.02548
OBJ	1.75676	.79660	2.20532
OWNE	-1.50888	.79758	-1.89184
COLL	-1.13138	.68455	-1.65274
CAPA	-2.84972	.78696	-3.62117

Intercept	Standard Error	Intercept/S.E.
-.24366	1.97733	-.12323

Pearson Goodness-of-Fit Chi Square = 7.831 DF = 215 P = 1.000

Since Goodness-of-Fit Chi square is NOT significant; no heterogeneity factor is used in the calculation of confidence limits.

 Covariance (below) and Correlation (above) Matrices of Parameter Estimates

	INC	EXPR	DEBT	OBJ	OWNE	COLL
INC	.00222	.24286	-.19783	-.03715	-.03706	-.09800
EXPR	.00295	.06646	-.24954	-.02670	-.12566	-.10204
DEBT	-.01100	-.07596	1.39412	-.24152	.18989	.05001
OBJ	-.00139	-.00548	-.22717	.63457	-.28275	.15556
OWNE	-.00139	-.02584	.17882	-.17964	.63613	.01639
COLL	-.00316	-.01801	.04042	.08483	.00895	.46860
CAPA	-.00689	-.09764	.23403	.02615	.14633	.00842

	CAPA
INC	-.18588
EXPR	-.48129
DEBT	.25187
OBJ	.04171
OWNE	.23313
COLL	.01563
CAPA	.61931

P R O B I T			A N A L Y S I S		
18.90	1.0	.0	.071	-.071	.07148
18.90	1.0	.0	.000	.000	.00012
18.90	1.0	.0	.002	-.002	.00175
19.00	1.0	.0	.000	.000	.00000
19.00	1.0	.0	.000	.000	.00003
19.00	1.0	.0	.007	-.007	.00739
19.00	1.0	1.0	.908	.092	.90848
19.00	1.0	.0	.000	.000	.00012
19.05	1.0	.0	.000	.000	.00002
19.50	1.0	.0	.000	.000	.00003
19.60	1.0	.0	.000	.000	.00000
19.60	1.0	.0	.000	.000	.00001
19.70	1.0	.0	.000	.000	.00001
19.80	1.0	.0	.013	-.013	.01324
19.80	1.0	.0	.000	.000	.00043
19.80	1.0	.0	.000	.000	.00000
19.80	1.0	.0	.096	-.096	.09631
19.80	1.0	.0	.000	.000	.00009
19.80	1.0	.0	.000	.000	.00000
19.80	1.0	.0	.000	.000	.00003
19.80	1.0	.0	.000	.000	.00000
19.80	1.0	1.0	1.000	.000	.99997
19.80	1.0	.0	.036	-.036	.03641
19.90	1.0	.0	.000	.000	.00000
19.90	1.0	.0	.000	.000	.00037
19.90	1.0	.0	.000	.000	.00003
20.00	1.0	.0	.000	.000	.00000
20.00	1.0	1.0	.743	.257	.74300
20.00	1.0	.0	.000	.000	.00004
20.00	1.0	.0	.000	.000	.00000
20.00	1.0	1.0	1.000	.000	.99999
20.00	1.0	1.0	.987	.013	.98686
20.00	1.0	.0	.000	.000	.00003
20.00	1.0	1.0	.962	.038	.96163
20.00	1.0	1.0	.998	.002	.99825
20.00	1.0	1.0	1.000	.000	.99999
20.10	1.0	1.0	1.000	.000	.99994
20.30	1.0	1.0	.867	.133	.86711
20.50	1.0	1.0	.996	.004	.99552
20.50	1.0	.0	.031	-.031	.03069
20.60	1.0	.0	.000	.000	.00003
20.70	1.0	.0	.035	-.035	.03529
21.00	1.0	.0	.012	-.012	.01166
21.00	1.0	.0	.000	.000	.00000
21.00	1.0	1.0	.906	.094	.90555
21.00	1.0	.0	.001	-.001	.00087
21.00	1.0	.0	.000	.000	.00004
21.00	1.0	1.0	1.000	.000	.99972
21.00	1.0	.0	.002	-.002	.00209
21.00	1.0	1.0	.996	.004	.99581
21.00	1.0	1.0	1.000	.000	.99998
21.10	1.0	.0	.000	.000	.00000
21.10	1.0	.0	.000	.000	.00000

* * * * * P R O B I T A N A L Y S I S * * * * *

Observed and Expected Frequencies

INC	Number of Subjects	Observed Responses	Expected Responses	Residual	Prob
13.50	1.0	.0	.001	-.001	.00063
15.60	1.0	.0	.000	.000	.00008
16.60	1.0	.0	.000	.000	.00019
16.60	1.0	.0	.000	.000	.00000
16.70	1.0	.0	.020	-.020	.01996
16.78	1.0	.0	.000	.000	.00000
16.80	1.0	.0	.000	.000	.00000
17.00	1.0	.0	.047	-.047	.04732
17.00	1.0	.0	.000	.000	.00000
17.00	1.0	.0	.000	.000	.00001
17.00	1.0	.0	.008	-.008	.00784
17.60	1.0	.0	.000	.000	.00014
17.70	1.0	.0	2.8457E-09	-2.8457E-09	2.8E-09
17.70	1.0	.0	.000	.000	.00002
17.70	1.0	.0	.000	.000	.00001
17.80	1.0	.0	.000	.000	.00002
17.90	1.0	.0	4.8081E-11	-4.8081E-11	4.8E-11
17.90	1.0	.0	.000	.000	.00001
18.00	1.0	.0	.000	.000	.00001
18.00	1.0	.0	.000	.000	.00000
18.00	1.0	.0	.001	-.001	.00127
18.00	1.0	.0	.001	-.001	.00085
18.00	1.0	.0	.000	.000	.00000
18.00	1.0	.0	.002	-.002	.00235
18.00	1.0	.0	.000	.000	.00002
18.50	1.0	.0	.000	.000	.00000
18.50	1.0	.0	.000	.000	.00000
18.50	1.0	.0	.002	-.002	.00159
18.50	1.0	.0	.000	.000	.00001
18.60	1.0	.0	.011	-.011	.01051
18.67	1.0	.0	.001	-.001	.00125
18.70	1.0	.0	.000	.000	.00002
18.70	1.0	.0	.035	-.035	.03507
18.80	1.0	.0	.000	.000	.00000
18.80	1.0	.0	.000	.000	.00000
18.80	1.0	.0	.000	.000	.00000
18.80	1.0	.0	.000	.000	.00000
18.80	1.0	.0	.010	-.010	.00978
18.80	1.0	.0	.000	.000	.00002
18.80	1.0	.0	.000	.000	.00002
18.80	1.0	.0	.000	.000	.00002
18.80	1.0	.0	.000	.000	.00002
18.80	1.0	.0	.000	.000	.00007
18.90	1.0	.0	8.4404E-09	-8.4404E-09	8.4E-09
18.90	1.0	.0	.000	.000	.00002
18.90	1.0	.0	.000	.000	.00002

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21.10	1.0	.0	.000	.000	.00000						
21.10	1.0	.0	.002	-.002	.00172						
21.10	1.0	.0	.000	.000	.00011						
21.10	1.0	1.0	1.000	.000	1.00000						
21.10	1.0	1.0	1.000	.000	1.00000						
21.10	1.0	1.0	1.000	.000	.99965						
21.20	1.0	1.0	1.000	.000	.99999						
21.20	1.0	.0	.000	.000	.00001						
21.20	1.0	1.0	1.000	.000	.99973						
21.30	1.0	.0	.000	.000	.00000						
21.30	1.0	1.0	.984	.016	.98410						
21.40	1.0	.0	.000	.000	.00005						
21.40	1.0	.0	4.2086E-09	-4.2086E-09	4.2E-09						
21.40	1.0	1.0	1.000	.000	1.00000						
21.40	1.0	.0	.133	-.133	.13258						
21.40	1.0	1.0	.996	.004	.99610						
21.40	1.0	.0	.000	.000	.00007						
21.40	1.0	1.0	1.000	.000	.99999						
21.50	1.0	1.0	.978	.022	.97774						
21.50	1.0	.0	.000	.000	.00000						
21.50	1.0	.0	.000	.000	.00000						
21.50	1.0	1.0	.997	.003	.99664						
21.50	1.0	1.0	1.000	.000	.99986						
21.50	1.0	1.0	.998	.002	.99800						
21.60	1.0	1.0	1.000	.000	.99996						
21.70	1.0	.0	.279	-.279	.27929						
21.80	1.0	.0	.000	.000	.00000						
21.80	1.0	.0	.000	.000	.00001						
21.80	1.0	1.0	1.000	.000	.99999						
22.00	1.0	.0	.002	-.002	.00223						
22.00	1.0	.0	.000	.000	.00001						
22.00	1.0	.0	.073	-.073	.07286						
22.00	1.0	1.0	1.000	.000	1.00000						
22.00	1.0	.0	.001	-.001	.00082						
22.20	1.0	.0	.801	-.801	.80134						
22.20	1.0	.0	.000	.000	.00008						
22.20	1.0	.0	.000	.000	.00018						
22.40	1.0	.0	.000	.000	.00000						
22.40	1.0	.0	.000	.000	.00020						
22.40	1.0	.0	.006	-.006	.00551						
22.40	1.0	.0	.000	.000	.00006						
22.50	1.0	.0	.000	.000	.00000						
22.50	1.0	.0	.000	.000	.00007						
22.50	1.0	1.0	1.000	2.6662E-09	1.00000						
22.60	1.0	1.0	1.000	.000	1.00000						
22.70	1.0	1.0	.873	.127	.87262						
22.80	1.0	.0	.000	.000	.00000						
22.80	1.0	.0	.000	.000	.00023						
22.80	1.0	.0	.000	.000	.00003						
22.80	1.0	1.0	1.000	.000	.99999						
23.00	1.0	.0	.000	.000	.00007						
23.20	1.0	.0	.018	-.018	.01801						

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* * * * * P R O B I T      A N A L Y S I S * * * * *
23.30      1.0      .0      .000      .000      .00000
23.30      1.0      .0      1.2313E-11 -1.2313E-11 1.2E-11
23.30      1.0      .0      .000      .000      .00001
23.30      1.0      .0      .000      .000      .00000
23.45      1.0      1.0      1.000      .000      .99967
23.50      1.0      .0      .000      .000      .00001
24.40      1.0      .0      .002      -.002      .00231
24.50      1.0      .0      .000      .000      .00000
24.50      1.0      .0      .001      -.001      .00102
25.00      1.0      .0      .000      .000      .00007
25.00      1.0      1.0      1.000      .000      1.00000
25.10      1.0      .0      .001      -.001      .00077
25.20      1.0      .0      .007      -.007      .00659
25.20      1.0      1.0      1.000      .000      .99999
25.50      1.0      .0      .000      .000      .00007
25.50      1.0      .0      .010      -.010      .00972
25.80      1.0      1.0      1.000      .000      1.00000
26.00      1.0      .0      .024      -.024      .02407
26.40      1.0      1.0      1.000      .000      .99994
26.40      1.0      1.0      .991      .009      .99078
26.60      1.0      1.0      .994      .006      .99437
26.60      1.0      1.0      1.000      .000      1.00000
26.60      1.0      1.0      1.000      .000      1.00000
26.70      1.0      1.0      .999      .001      .99922
26.70      1.0      1.0      1.000      .000      1.00000
26.90      1.0      1.0      1.000      .000      .99998
27.00      1.0      1.0      1.000      .000      .99957
27.40      1.0      1.0      1.000      .000      1.00000
27.50      1.0      1.0      1.000      6.9135E-12 1.00000
27.60      1.0      1.0      .531      .469      .53082
27.60      1.0      1.0      1.000      .000      1.00000
27.70      1.0      1.0      .978      .022      .97822
27.80      1.0      1.0      .996      .004      .99599
28.10      1.0      1.0      1.000      .000      1.00000
28.30      1.0      1.0      .990      .010      .98983
28.50      1.0      1.0      1.000      .000      1.00000
28.50      1.0      1.0      1.000      .000      1.00000
28.70      1.0      .0      .006      -.006      .00557
28.80      1.0      1.0      1.000      .000      1.00000
28.80      1.0      1.0      1.000      1.4700E-10 1.00000
28.80      1.0      1.0      .924      .076      .92449
28.90      1.0      1.0      1.000      .000      1.00000
28.90      1.0      1.0      1.000      .000      1.00000
29.00      1.0      1.0      1.000      .000      .99999
29.20      1.0      1.0      1.000      2.7840E-09 1.00000
29.40      1.0      1.0      .995      .005      .99462
29.40      1.0      1.0      .999      .001      .99932
29.40      1.0      1.0      .998      .002      .99818
29.50      1.0      1.0      1.000      .000      1.00000
29.50      1.0      1.0      .996      .004      .99606
29.50      1.0      1.0      .999      .001      .99935
29.50      1.0      1.0      .988      .012      .98781

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* * * * * P R O B I T      A N A L Y S I S * * * * *
29.60      1.0      1.0      .985      .015      .98479
29.60      1.0      1.0      1.000      .000      1.00000
29.60      1.0      1.0      1.000      7.1512E-11      1.00000
29.70      1.0      1.0      .990      .010      .99018
29.70      1.0      1.0      1.000      .000      1.00000
29.70      1.0      1.0      1.000      .000      1.00000
29.70      1.0      1.0      1.000      .000      1.00000
29.80      1.0      1.0      1.000      .000      .99998
29.80      1.0      1.0      .958      .042      .95820
29.90      1.0      1.0      1.000      3.9279E-10      1.00000
30.90      1.0      1.0      1.000      6.4274E-09      1.00000
31.00      1.0      1.0      .985      .015      .98485
31.00      1.0      1.0      1.000      .000      .99986
31.00      1.0      1.0      1.000      3.2569E-10      1.00000
31.10      1.0      1.0      .997      .003      .99653
31.10      1.0      1.0      .999      .001      .99892
32.20      1.0      1.0      1.000      .000      .99986
35.40      1.0      1.0      1.000      .000      1.00000
37.50      1.0      1.0      .796      .204      .79649
39.40      1.0      1.0      1.000      .000      1.00000
50.00      1.0      .0      .215      -.215      .21477

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มหาวิทยาลัยเชียงใหม่
Chiang Mai University

ภาคผนวก ข
วิธีคำนวณค่าสถิติ regression

มหาวิทยาลัยเชียงใหม่
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Model Summary^b

Model	Change Statistics					Durbin-Watson
	R Square Change	F Change	df1	df2	Sig. F Change	
1	.991	90.327	5	4	.000	2.220

a. Predictors: (Constant), TOTL, UNEM, INFLATIO, GDP, EXPORT

b. Dependent Variable: NPL

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.46E+11	5	1.09E+11	90.327	.000 ^a
	Residual	4.83E+09	4	1.21E+09		
	Total	5.50E+11	9			

a. Predictors: (Constant), TOTL, UNEM, INFLATIO, GDP, EXPORT

b. Dependent Variable: NPL

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1344206.5	293943.18		4.573	.010	528102.61	2160310.3
	EXPORT	.708	.296	.282	2.390	.075	-.114	1.530
	INFLATIO	-35387.14	17317.203	-.144	-2.043	.111	-83466.63	12692.340
	UNEM	59656.275	16351.223	.196	3.648	.022	14258.740	105053.81
	GDP	-.179	.025	-.435	-7.300	.002	-.247	-.111
	TOTL	.290	.030	1.020	9.798	.001	.208	.372

Coefficients^a

Model		Correlations			Collinearity Statistics	
		Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)					
	EXPORT	.795	.767	.112	.158	6.328
	INFLATIO	.280	-.715	-.096	.442	2.260
	UNEM	-.111	.877	.171	.758	1.320
	GDP	.204	-.964	-.342	.617	1.621
	TOTL	.900	.980	.459	.202	4.940

a. Dependent Variable: NPL

Coefficient Correlations^a

Model		TOTL	UNEM	INFLATIO	GDP	EXPORT
1	Correlations					
	TOTL	1.000	-.174	.438	-.508	-.808
	UNEM	-.174	1.000	-.397	.112	.392
	INFLATIO	.438	-.397	1.000	-.232	-.692
	GDP	-.508	.112	-.232	1.000	.263
	EXPORT	-.808	.392	-.692	.263	1.000
	Covariances					
	TOTL	8.768E-04	-84.205	224.730	-3.689E-04	-7.084E-03
	UNEM	-84.205	2.67E+08	-1.1E+08	45.114	1898.408
	INFLATIO	224.730	-1.1E+08	3.00E+08	-98.546	-3548.582
	GDP	-3.689E-04	45.114	-98.546	6.015E-04	1.912E-03
	EXPORT	-7.084E-03	1898.408	-3548.582	1.912E-03	8.773E-02

a. Dependent Variable: NPL

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index
1	1	5.817	1.000
	2	.129	6.725
	3	2.917E-02	14.122
	4	2.019E-02	16.974
	5	3.991E-03	38.178
	6	6.627E-04	93.690

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
NPL	325430.10	247303.81	10
EXPORT	520725.30	98396.03	10
INFLATIO	5.3920	1.0058	10
UNEM	2.240	.814	10
GDP	12436122	601461.44	10
TOTL	3088991.6	869636.52	10

Correlations

		NPL	EXPORT	INFLATIO	UNEM	GDP	TOTL
Pearson Correlation	NPL	1.000	.795	.280	-.111	.204	.900
	EXPORT	.795	1.000	.608	-.316	.410	.825
	INFLATIO	.280	.608	1.000	.081	.251	.339
	UNEM	-.111	-.316	.081	1.000	-.152	-.267
	GDP	.204	.410	.251	-.152	1.000	.578
	TOTL	.900	.825	.339	-.267	.578	1.000
Sig. (1-tailed)	NPL		.003	.216	.380	.286	.000
	EXPORT	.003		.031	.187	.120	.002
	INFLATIO	.216	.031		.412	.243	.169
	UNEM	.380	.187	.412		.338	.228
	GDP	.286	.120	.243	.338		.040
	TOTL	.000	.002	.169	.228	.040	
N	NPL	10	10	10	10	10	10
	EXPORT	10	10	10	10	10	10
	INFLATIO	10	10	10	10	10	10
	UNEM	10	10	10	10	10	10
	GDP	10	10	10	10	10	10
	TOTL	10	10	10	10	10	10

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	TOTL, UNEM, INFLATIO, GDP, EXPORT ^a		Enter

a. All requested variables entered.

b. Dependent Variable: NPL

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.996 ^a	.991	.980	34757.15

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Collinearity Diagnostics^a

Model	Dimension	Variance Proportions					
		(Constant)	EXPORT	INFLATIO	UNEM	GDP	TOTL
1	1	.00	.00	.00	.00	.00	.00
	2	.00	.00	.00	.44	.00	.02
	3	.01	.00	.05	.38	.00	.22
	4	.01	.01	.38	.01	.01	.01
	5	.00	.83	.50	.13	.02	.41
	6	.98	.16	.07	.05	.97	.33

a. Dependent Variable: NPL

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	156895.31	928037.44	325430.10	246215.88	10
Residual	-38167.09	44191.69	2.04E-11	23171.43	10
Std. Predicted Value	-.685	2.447	.000	1.000	10
Std. Residual	-1.098	1.271	.000	.667	10

a. Dependent Variable: NPL

ประวัติผู้เขียน

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