Bank Failure Prediction

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Abstract

Commercial bank failure or corporate failure prediction has been studied in advanced countries (Altman, 1968) and developing countries like Nigeria (Osaze, 1981). Both showed the ratio of retained earnings/total asset as most significant in a failing firm. These studies were carried out in the late sixties and early eighties, respectively .If they complied with the recommendation for checkmating the failure incidence, why is there still rampant corporate failure as evidenced by the recent global financial melt-down and the current Nigerian banking crisis of failure? The issue or problem now is whether the same default ratio is prevalent in Nigerian banking failure using more current data 2003 to 2007 with four packages of analysis, i.e. multiple-discriminant analysis, ordinary least squares regression, correlation Matrix and Logit - Probit regression, for sophistication and effectiveness. Instead of the 'rule of the thumb' remarks on some earlier studies. The finding is that

working capital/total asset (default ratio) among others should be closely taken care of and the major recommendation is that bank officials or corporate managers whose firms failed should not be with impunity.

Introduction

The problem is predicting commercial bankruptcy which is suicidal to the society. Banking failure hinges on the criminal mind within and outside the establishment arising from fraud cases, i.e. those of the agencies, problems and their collaborators. This leaves much to be desired despite the curtailing role of the Deposit Insurance Corporation (Sinkel,1979; Osiagbu, 2008. Ahmed, 1995; Okereke, 2008; Amadasu, 2011) Corporate failure studies have been carried out (Osaze ,1981; Altman, 1969) using MDA (Multiple Discriminant Analysis) identifying the behaviour of some crucial ratios, predicting such failure even 5 years to the final crash. Notwithstanding, some of today's banks still crash or face distress. There is need to fill this gap in terms of reclassifying for the highest contributor ratios to failure, even if they agree with earlier studies but from different samples and devising appropriate policy to deal with them. About four packages of analysis will be utilized, i.e. the same MDA but coupled with correlation matrix, ordinary least square regression, Logit and Probit regression for sophistication and effectiveness.

Briefs on banks:- The Six Nigerian banks for their frailty are utilized with secondary data pulled between 2003 and 2007 ------ UBA, Union, Fin., Wema, Unity and Skye.

Old UBA, of British and French since 1948 but lately acquired Standard Trust Bank and Continental Trust Bank. With about 7.2 million customers across 750 branches in 18 African countries and assets over $19 billion, it's confidence is shaky. Barclay's Bank of 1917 acquired Colonial Bank and became Barclay's Bank DCO incorporated in Nigeria in 1969 and changed it's name to Union Bank (Nigeria) Plc with privatization in 1979. The Nigerian government divested from it in 1993, the Bank acquired Universal Trust Bank, Broad Bank and absorbed Union Merchant Bank, with a vast networking 0f branches in Nigeria, owning bank subsidiaries in Benin, London and a representative office in Johannes burg. The Bank's confidence is shaky.

Fin bank in 2006, was First Inland Bank that merged with First Atlantic Bank, NUB International Bank and IMB International Bank. Under-capitalized from 2009, has subsidiaries like Fin Bank registrars, Fin Bank

securities and asset management, Fin capital, Fin bank insurance, Fin Homes, etc. The Bank's confidence is shaky. The oldest, private and Indigenous Bank of 1945 became Wema Bank Plc in 1987 and has subsidiaries like Wema asset managerment and Wema Registrars, Wema Insurance, Wema Homes, etc. Its confidence is shaky. Unity Bank from New Nigeria Bank merged with 9 financial institutions in 2006. It's financial services group include Unity Capital and trust Caranda management services, Unity registrars, Northletic Insurance and Newdevco Investment and Securities. By 2009, the network of branches was 221, but the Bank's confidence is shaky. Finally, Skye Bank from 1989 Prudent Bank Plc, became a Merchant Bank in 1990, Skye Bank in 2005 after merging with EIB International Bank, Bond Bank, Reliance Bank. It introduced master card in 2011, the Bank is present in West Africa, Central Africa, and subsidiaries in Sierra Leone, Gambia, Guinea, Liberia, Angola and Equatorial Guinea. The assets are over $83.9 billion (₦611.5 billion), equity of about $630   million (₦98.4 billion) and networked branches of about 260 in Nigeria.

The rest of the study is divided into literature review, methodology, data presentation and analysis and finally, the concluding part.

Literature Review

Banking failure means financial ill health namely: liquidity problems, non-performing loans, distress, risky speculative activities and even unethical practices. The inadequate insolvency calculation or test robs banks or corporations of timely, corrective action. Even, such may be subjective or on book values and market values, window dressed or under unfavourable economic conditions, respectively. The market value proxy or NPV and meeting long-run obligations may not be reliable (Theodossior, 1993 ; Amadasu, 1997, 2002; Okereke, 2008). Therefore, measures to stop these like those of Central Bank of Nigeria and Nigeria Deposit Insurance Corporation classification, rating system of the CAMEL (Capital Adequacy and Asset Quality, Management Competence, Earning Strength and Liquidity) and even the placement of a bank on strict supervision when necessary and later rating as sound becomes something distressed, sooner or later (the prediction of failure probability not withstanding). All these can jump-start the bank's deteriorating conditions (CBN, 1994; Theodossior, 1993).

Bank failure or distress intractability is evidenced by the Nigerian banking past as well as that of some countries like the US, the Continents of Europe, Asia, etc; the recent global financial melt- down notwithstanding. The non-performing loans mismanagement or impairment of bank's portfolio quality and bad corporate governance has reduced if not completely eradicated bank's confidence (Olaniyi, 2007; Amadasu, 2011). Low performance is negative on the company or bank and therefore bankruptcy agent (Sinkel, 1980; Ebhodaghe, 1993; Olaniyi, 2007). Also, inimical factors in bank's failure include:- insider abuse, economic downturn capital market crisis, government deficits, paying higher deposit rate, over- regulation, under-regulation, manager taking corrupt and higher risk, societal/ political corruption, mis-matching of assets and liabilities, contagion effect of one bank failing, high overhead cost of banks, incompetent personnel , bad corporate governance, dethroned ethics agency problems, inability to meet obligations and shrinkage of assets or capital (Hendrick, 2000 ; Wheelock, 1995; Gashinbaki, 2000; Ahmed, 1995; Ojo,1995;Olaniyi, 2007; Amadasu,2011; Imala, 2004; Akin, 2008; Estrella, 1995)

Bankruptcy palliative measures, as it were, of ratios, ratings and calculations have been tried. Altman (1968) identifies financial ratios like X_2 (Retained Earnings /Total Assets), X_5 (Sales/ Total Assets or Capital-Turnover Ratio) in terms of bankrupt group of firms and X_3 (EBIT/Total Assets) and X_4 (Market Value of equity/ Book value of Total Debts) in terms of non-bankrupt group of firms. In the bankrupt group, X_2 is negative, most significant and most contributory when adding new information to the function. When the ratio is low there is an increase in bankruptcy probability. The X_5 is most contributory in competitive capability and of a high discriminant value, though least significant. But in the non-bankrupt group the X_3 is positive and not of very high ratio and X_4 is also positive and of greater value. However, Osaze (1981) identifies X_2 as crucial if firms are to grow rather than go bankrupt or fail. Regulators and researchers have their bankruptcy or failure determinant like the U.S (comptroller of currency) CAMEL rating system in 1988, Nigeria's close monitoring and supervision ,risk -based deposit insurance premiums and risk- based capital standards, capital ratios (capital /asset or capital/deposit), Basel accord of 1988 introducing credit risk weights and off- balance sheet risk exposure in base for capital ratio, leverage ratio holding a certain buffer above adequate capital level. Beaver's (1966) financial ratio using univarate approach for cash -flow

to total debt predicting bank and corporate failure and the firm's price dropping prior to bankruptcy.

Methodology

The Nigerian six Banks – UBA, Union, Wema, Unity, Skye and Fin and their secondary data of annual accounts and report ,2003-2007 (Appendix A) will be utilized in a pooled data form to predict which bank is failing and not and by extension may be used for others.

Model specification:-

(1) The Altman 'z' score (1968) is utilized----- $z = .012X_1 + .014X_2 + .0133X_3 + .006X_4 + .0999X_5$.

$X_1 =$ (WCTA) working capital /total asset

$X_2 =$ (RETA) Retained earnings/total asset

$X_3 =$ (GETA) Earnings before interest and taxes/total assets

$X_4 =$ (SHLIB) market value of equity/book value of total debt

$X_5 =$ (CFTA) sales/total asset

$Z =$ overall index

* The quantities as prefices to X's and coefficients too.

(2) In OLS regression:
$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6x_4 + 1 X_5 + e$
(See above for explanations of the letters).

(3) The correlation matrix of the variables.

(4) The LPM or logit and probit model (Kramer, 1991; Gujarati, 1999)---- Regression to predict the probability of failure:

The $X_1 = X_2 + X_3 + X_4 + X_5 + X_6$

Where, $X_1 =$ dependent variable (bankruptcy or non bankruptcy), X_2 to $X_6 =$ independent variables---- $X_2 =$ WCTA, $X_3 =$ RETA, $X_4 =$ GETA, $X_5 =$ SHLIB, $X_6 =$ CFTA, for 2003 to 2007 for each of the six Banks in a pooled data.

The packages/ methods of analysis are for sophistication, effectiveness and a change from some earlier studies remarked as rule of the thumbs. Also, it is to make for financial ratio not being a fool-proof, being window- dressed and not considering overtrading, under-trading, excessive creditors figures', excessive discounts even if some profits are made (see Appendix 'A' for data).

Decision Rule:-

1. Z-score: - A benchmark of less than 1.81 is bankruptcy while 2.99 is non-bankruptcy. Falling between them can be miss-classification, miss-grouping or miss-calculation.

2. OLS regression is testing for significance of the ratios for bankruptcy or non-bankruptcy, particularly the 'F'-ratio.

3. Correlation matrix /descriptive statistics to identify relationship between each variable or ratio.

4. Logit and probit regression explicitly show on parsimonious ground what is most related to be bankruptcy or non bankruptcy.

Data Presentation and Analysis

Altman 'Z'- score: (Appendix B):-

All the six banks failed to attain the benchmark of 1.81 or 2.99 for non-bankruptcy. These banks are UBA, Union, Wema, Unity, Skye and Fin.

OLS regression result (Appendices 'C', 'D' and 'E') had 'F' ratio significant for the overall. This means that the ratios or independent variables can determine the 'Z'-score of bankruptcy or non bankruptcy. For bankruptcy, the most significant of the ratio is WCTA (X_1). That is, working capital for salary, raw materials purchase, production, daily operations, etc generated by assets work together to continue the business and a lower level of this ratio is undesirable since operating losses means shrinking assets and expresses liquidity versus size. The least significant is RETA (X_2) probably because a low ratio means no retained earnings to invest for growth which increases the probability for young firms to go bankrupt. But the six Banks analyzed are old firms and they most have been investing for growth. Therefore, for X_1 and X_2 it is the X_1 that should be more crucial for survival;

the X_5 (CFTA), second most significant among the variables, mainly standing for competitiveness. The rest ratios need higher performance to be good. Therefore, the six banks are bankrupt as none can meet 1.81 bench mark.

But Altman (1968) had X_2(RETA) as the most significant for bankruptcy. Therefore, for survival a high ratio of X_2 is taken for non-bankruptcy meaning less dependence on external financing with attendant risk and highest 'Z'-score. The Altman's X_5 (capital turnover or cash -flow to the total assets, CFTA) for a low ratio is least significant for bankruptcy. It is seriously discriminating among variables (second in contribution) and stands for competitive ability. The Altman's X_1 (WCTA) is fifth in contribution to variable but third in significance.

However, the present study of X_1 agrees with that of the Altman both being of high significance in bankruptcy because of low ratio. It is more significant in the present study because of the developing environment (inadequate materials, product and operations) or inadequate infrastructure in developing country like Nigeria, unlike Altman's developed country. The X_2, RETA also agrees with that of Altman since that is significant in bankruptcy. But that of the present study is least significant because the six banks are old banks and may not be considering much retained earnings for growth as borrowing, debt and deficit are not serious deterrent in developing countries. Now, the X_5 for both is high in contribution to variables or discriminating ability either first or second position but least in significance unde Altman and second in significance under the present study. That is, it stands for more competition yet to be tested in Nigeria that is almost monopolized corporate business. A low ratio is not desirable and would go for bankruptcy; the X_3; X_4 for both, a low ratio for bankruptcy. Finally, the present study can specifically depict X1 (WCTA) as the most default compared with that of Altman's X_2 (RETA). The disagreement is probably the fact that Altman is in developed country US, as retained earnings for internal financing is crucial. It is unlike government bonanza and frivolous borrowing with impunity in a developing country like Nigeria. X_1 (WCTA) may be uppermost for bankruptcy consideration in Nigeria because of the inadequate raw materials, products, working capital and inefficiency.

Correlation matrix contribution (Appendix E):

This brings out the relationship and impact between each other in the ratios and the Z-score. The purpose is to focus on the one ratio with the greatest

impact on bankruptcy. For the study the WCTA (working capital / assets, X_1) has the greatest impact of 0.98 or 9.8% with Z-score. It is crucial in corporate failure. Then an increase or an improvement in the ratio will increase Z-score to meet the target or index of non-bankruptcy. It is understandable in developing countries of poor corporate operations, shrinking assets and even stoppage of work. The rest ratios and relationship are either negative or positive but for attention too.

The Logit and Probit model (LPM) (Appendix F):

This is the parsimonious version of the exercise. That is, failure which is the dependent variable arising from the ratios and Z-score, the independent variables. The most significant ratio is WCTA which is X_2 according to the specification here, X_1, bankrupt or non bankrupt (dependent variable)., the independent variables : X_2, WCTA. X_3 RETA, X_4 GETA, X_5 SHLIB, and X_6, CFTA. The WCTA here further confirms earlier result for special treatment to move out of bankruptcy among other ratios

Findings and Policy Implications

The prediction of corporate failure carried out with the four packages of investments resolve the six banks as failing since the Z-score was less than 1.81 index. The X_1(WCTA) was the most significant with greatest impact on the bankruptcy, among other ratios. Because of inadequacies and much corruption, working capital problems in a developing country can lead to shrinkage of assets and discontinuance. This is not different from the obvious and popular view that the non- performing loans are the cause of the wreckage in the banks because loans not repaid could shrink working capital meant for daily activities. This is against RETA (X_2) as the most significant to watch .Corporate firms should ensure that adequate supervision and treatment are given to working capital efficiency to make firms to survive. The concluding part follows.

Conclusion

The study is to predict corporate bankruptcy, for the six banks UBA, Union, WEMA, Unity, Skye and Fin, using the four packages of instruments (Z-score, OLS regression, Correlation matrix and Logit, Probit regression). The prediction is failure as their Z-score is not up to 1.81 index. But WCTA (X_1) ratio (default ratio) is to be most watched in order to survive. It is RETA (X_2) among others that was more significant and on bankruptcy in Altman's US study, because of more opportunities for externa l financing with

attendant risk. However, the Nigerian six banks failing conditions are in line with what is happening to them presently, merging /liquidation or restructuring. It is therefore recommended that:

i.   WCTA (default ratio) among others should be closely watched and taking care of.

ii.   There should be more supervision from the Central bank of Nigeria and Nigeria Deposit Insurance Corporation.

iii. Bank officials or management whose firms fail should not be with impurity.

Appendix A

Bank	DATA POINT	YEAR	Cash & Short Term Funds CASHST	Fixed Assets FIXASSET	Total Assets TASSET	Total Liabilities TLIABITY	Share Capital SHARE	Gross Earnings GEARNING	Retained Earnings REARNING	WORKING CAPITAL WORKCAPT
UBA	1	2005	92,999	5,596	1,191,042	188,970	14,901	24,154	3,280	996,476
	2	2004	90,209	6,379	884,137	189,106	19,533	24,516	4,525	688,652
	3	2005	110,517	6,176	250,783	229,664	19,443	26,089	4,921	14,943
	4	2006	79,825	33,191	212,024	835,302	37,304	90,477	11,550	-656,469
	5	2007	129,897	49,747	203,871	1,022,954	156,488	109,512	21,441	-868,840
UNIONBANK	6	2005	275,267	27,836	366,677	591,927	34,398	88,095	7,762	-253,086
	7	2004	287,940	23,435	418,728	566,575	38,293	66,576	8,341	-171,282
	8	2005	399,411	17,665	550,983	506,049	41,722	58,893	9,783	27,269
	9	2006	357,248	14,259	667,766	377,106	99,007	48,166	10,802	276,401
	10	2007	408,893	12,496	699,247	329,192	101,049	44,013	13,223	357,559
WEMA BANK	11	2005	31,451,561	2,995,530	61,323,432	54,108,039	1,527,811	9,716,374	1,477,775	4,219,863
	12	2004	19,049,247	4,067,049	71,423,836	63,383,488	1,555,460	12,856,096	967,148	20,095,238
	13	2005	19,353,718	4,163,622	97,909,060	73,650,200	4,451,625	15,287,856	844,285	13,393,258
	14	2006	28,964,381	7,146,743	120,109,067	99,569,066	4,961,508	14,836,653	6,601,961	13,466,478
	15	2007	35,174,375	11,716,227	165,081,532	139,898,827	5,034,971	26,430,982	2,554,098	-747
UNITY BANK	16	2002	12,463	747	19,738	19,738	613	3,554	352	-798
	17	2003	15,364	798	22,397	22,397	1,199	4,448	475	-824
	18	2004	15,211	824	23,185	23,185	1,516	3,888	488	-951
	19	2005	18,583	951	30,420	30,420	1,668	5,050	410	-12,838
	20	2006	43,075	12,838	100,264	100,264	21,753	11,989	1,370	1,439,990
SKYE BANK	21	2002	1,794,318	612,541	12,631,958	10,579,427	1,523,937	2,665,575	355,821	1,598,390
	22	2003	2,808,181	743,996	20,934,490	18,592,110	1,523,937	4,333,890	576,004	2,126,173
	22	2004	2,814,319	826,525	25,997,586	23,044,888	1,523,937	5,251,782	610,318	3,254,976
	24	2005	3,697,221	1,192,293	31,990,861	27,543,592	2,264,053	6,158,859	492,719	15,907,494
	25	2006	12,164,132	9,672,297	173,690,446	148,110,655	3,751,522	21,055,904	1,961,371	690,176
FINBANK	21	2003	8,954,548	1,754,068	24,579,922	22,135,688	1,125,000	4,086,201	293,065	1,932,793
	22	2004	7,918,453	1,699,112	26,403,831	22,771,906	1,500,000	4,131,390	511,744	-5,848,453
	23	2005	9,611,478	2,384,902	25,491,355	28,954,906	2,000,000	3,751,546	1,073,122	12,955,330
	24	2006	20,085,859	5,324,086	106,251,989	87,972,573	4,844,315	2,980,495	10,346,832	
	25	2007	21,752,108	6,989,936	181,308,208	159,171,168	4,844,315	27,471,801	2,649,120	15,147,104

Source: Financial Statement of the six banks (2008)

Appendix B

Altman Weight	1.2	1.4	3.3	0.6	1	
DATAPOINT	WCTA	RETA	GETA	SHLIB	CFTA	z score
1	0.84	0.00	0.02	0.08	0.08	1.2
2	0.78	0.01	0.03	0.10	0.10	1.2
3	0.06	0.02	0.10	0.08	0.44	0.93
4	-3.10	0.05	0.43	0.04	0.38	-1.83
5	-4.26	0.11	0.54	0.15	0.64	-2.47
6	-0.69	0.02	0.24	0.06	0.75	0.78
7	-0.41	0.02	0.16	0.07	0.69	0.79
8	0.05	0.02	0.11	0.08	0.72	1.21
9	0.41	0.02	0.07	0.26	0.53	1.45
10	0.51	0.02	0.06	0.31	0.58	1.62
11	0.07	0.02	0.16	0.03	0.51	1.17
12	0.06	0.01	0.18	0.02	0.27	0.96
13	0.21	0.01	0.16	0.06	0.20	1.01
14	0.11	0.05	0.12	0.05	0.24	0.89
15	0.08	0.02	0.16	0.04	0.21	0.88
16	-0.04	0.02	0.18	0.03	0.63	1.22
17	-0.04	0.02	0.20	0.05	0.69	1.36
18	-0.04	0.02	0.17	0.07	0.66	1.24
19	-0.03	0.01	0.17	0.05	0.61	1.17
20	-0.13	0.01	0.12	0.22	0.43	0.82
21	0.11	0.03	0.21	0.14	0.14	1.1
22	0.08	0.03	0.21	0.08	0.13	1
23	0.08	0.02	0.20	0.07	0.11	0.95
24	0.10	0.02	0.19	0.08	0.12	0.94
25	0.09	0.01	0.12	0.03	0.07	0.61
21	0.03	0.01	0.17	0.05	0.36	0.99
22	0.07	0.01	0.16	0.07	0.30	0.96
23	-0.23	0.28	0.15	0.07	0.38	1.02
24	0.12	0.10	0.03	0.06	0.19	0.6
25	0.08	0.01	0.15	0.03	0.12	0.76

Source: Financial Statement of the Six Banks (2008)
(UBA, UNION, WEMA, UNITY, SKYE AND FIN BANKS)

Appendix C

POOLED DATA REGRESSION TECHNIQUE

By Henry Machame

Dependent Variable: ZSCORE
Method: Least Squares
Date: 06/22/11 Time: 23:00
Sample(adjusted): 2 25
Included observations: 24 after adjusting endpoints
Convergence achieved after 7 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	-0.004601	0.002265	-2.031359	0.0582
WCTA	1.203596	0.001225	982.3025	0.0000
RETA	1.455103	0.051961	28.00399	0.0000
GETA	3.317003	0.011048	300.2416	0.0000
SHLIB	0.605558	0.006075	99.68830	0.0000
CFTA	1.001169	0.001650	606.6587	0.0000
AR(1)	-0.492055	0.226379	-2.173587	0.0442

R-squared	0.999996	Mean dependent var	0.791667
Adjusted R-squared	0.999994	S.D. dependent var	0.939943
S.E. of regression	0.002306	Akaike info criterion	-9.068200
Sum squared resid	9.04E-05	Schwarz criterion	-8.724601
Log likelihood	115.8184	F-statistic	636261.3
Durbin-Watson stat	2.163951	Prob(F-statistic)	0.000000

Inverted AR Roots | -.49

Appendix ?

Dependent Variable: ZSCORE
Method: Least Squares
Date: 06/22/11 Time: 22:59
Sample: 1 25
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002658	0.002818	-0.943228	0.3574
WCTA	1.202412	0.001556	772.8739	0.0000
RETA	1.422335	0.049956	28.47203	0.0000
GETA	3.310746	0.014217	232.8665	0.0000
SHLIB	0.605730	0.007679	78.88482	0.0000
CFTA	1.000324	0.002242	446.1483	0.0000

R-squared	0.999994	Mean dependent var	0.808000
Adjusted R-squared	0.999993	S.D. dependent var	0.923282
S.E. of regression	0.002457	Akaike info criterion	-8.974223
Sum squared resid	0.000115	Schwarz criterion	-8.681693
Log likelihood	118.1778	F-statistic	677817.2
Durbin-Watson stat	2.819160	Prob(F-statistic)	0.000000

Correlation Matrix

	WCTA	RETA	GETA	SHLIB	CFTA	ZSCORE
WCTA	1.000000	-0.865899	-0.935434	0.026648	-0.294817	0.964417
RETA	-0.865899	1.000000	0.822511	0.069980	0.207388	-0.830198
GETA	-0.935434	0.822511	1.000000	-0.159242	0.209253	-0.876313
SHLIB	0.026648	0.069980	-0.159242	1.000000	0.159012	0.067435
CFTA	-0.294817	0.207388	0.209253	0.159012	1.000000	-0.064798
ZSCORE	0.964417	-0.830198	-0.876313	0.067435	-0.064798	1.000000

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Logit Maximum Likelihood Estimation
The estimation method converged after 8 iterations
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Dependent variable is X1
25 observations used for estimation from 1 to 25
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Regressor	Coefficient	Standard Error	T-Ratio[Prob]
X2	5.2604	2.6918	1.9543[.065]
X3	-19.1136	26.3011	-.72672[.476]
X4	-1.8811	5.8745	-.32021[.752]
X5	-4.0101	7.4932	-.53481[.599]
X6	3.1770	2.3919	1.3244[.197]

****
Factor for the calculation of marginal effects = .20555
Maximized value of the log-likelihood function = -11.8008
Akaike Information Criterion = -16.8008
Schwarz Bayesian Criterion = -19.8480
Hannan-Quinn Criterion = -17.6460
Mean of X1 = .52000
Mean of fitted X1 = .56000
Goodness of fit = .72000
Pesaran-Timmermann test statistic = 2.2388[.025]
Pseudo-R-Squared = .31900
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