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ACQUIRED VERSUS NON-ACQUIRED GREEK FIRMS: A Test of Two Limited - Dependent Models

By

Anastasia G. Maggina, Ph. D.

ABSTRACT

Merger activity in the decade of 1980's is known as the so-called merger fever or merger mania. The "incorrigible twins" of acquired and non-acquired firms, and, secondarily, of acquiring and acquired firms appear to be prevalent in the literature. Although the phenomenon is with no boundaries, it is mainly examined in US and UK. Greek evidence highlights the situation in a specific country, and adds empirical findings in the literature. Although the investigation is in a far different business environment, empirical findings are very close to their own counterparts in some respects. Current ratio, long-term debt, and inventory to sales prevail in the discrimination of acquired versus non-acquired Greek firms. (JEL: C32, C33, C35, G34, M2, M4).

1. Introduction

In the decade of 1980's, merger activity appeared as a merger mania and/or a merger fever, at least, in Europe. The phenomenon appeared first in the US around the beginning of the 19th century. Business enterprises have been used to consider merging as a means to achieve several business objectives (i.e. reorganization, elimination of inefficient target management, etc.). In addition, merging has been considered as a means for achieving several macroeconomic objectives (i.e. increased utilization of resources, increase of market power, etc.). In the decade of 1980's EEC mergers aimed at the implementation of supplementary business activities, their expansion, a more rational organization, and the strength of the market power. Greek companies used merging mainly with the purpose of making their firms healthy so that be able to avoid any business failure, expanding their business activities, making a capital restructure, strengthening market power, increasing economies of scale and, finally, for tax purposes. Worth noting that Company Law 2190/1920 has been adjusted to the

Third EEC Directive concerning mergers of S.A. Companies since 1978 in order to make the legal statute as much favourable to the enlargement to Greek Companies.

In the literature voluminous theories have explained the phenomenon to a great extent. Merger motives have been discussed both theoretically and empirically. Less research interest has been devoted to the study of acquired versus non-acquired firms. Matching these two groups is of utmost importance and has been infantly introduced in the literature (Harris, R., et al., 1982; Palepu, R., 1986; Jaggi, B. and J. Considine, 1990; McGuckin, R., S. et al., 1991). Empirical results provide insights into the characteristics of acquired firms in US and UK. Greek data may provide empirical results being equivalent or with some disre¬pancies from their counterparts.

This paper investigates factors that may differentiate the acquired from non-acquired firms. The intent is to highlight a widely observed business event in a specific country, and also to provide further empirical findings through an application of two models widely used in similar areas (firm failure, bankruptcy, reorganization, liquidation, and bond ratings, among others). The paper is organized as follows. Next Section reviews the literature with a concentration limited to the characteristics of acquired versus non-acquired firms. Section 3 discusses the research design, the sample selection, and the data used. Section 4 explains the statistical techniques used in the analysis. The empirical findings are discussed in Section 5. Section 6 concludes the paper and suggests directions for further future research.

2. Review of the Literature

A characteristic feature of both theoretical and empirical research is the high diversity of articles written on the subject. Various scholars with a concentration on various fields of business and economics have dealt with the subject. The following grouping of surveys justifies the diversity of studies. One could find articles with an emphasis placed on (i) the external growth of a business enterprise (Dewey, D. (1961); Jing, M. (1989)), (ii) the effects on the value of a business firm (Higgins, B. and Schall, L. (1975); Shrieves, R. and D. Stevens (1979)), (iii) the acquired and acquiring firms' characteristics (Harris, R. S. (1982); Stevens, D. (1973)), (iv) the effects on shareholders (Asquith, T. et al. (1981; 1983)), (v) the conflicts between bondholders and stockholders (Jensen, M. and W. Meckling (1976); Galai, D. and R. W. Masulis (1976); Lewellen, W. (1983)), (vi) the co-insurance effects (Kim, E. and J. Cornell (1977)), (vii) the

maximum price (Schwartz, S. (1966)), (via) tender-offers, take-overs bids, and medium of exchange (Smilley, R. (1976); Carleton, W. et al. (1983); Travlos, N. (1987); Jarrell, G.; J. Brickley; and J. Netter (1988)), (ix) the theory of conglomerate mergers and the type of control (Rubenstein, M. (1973); Scott, J. (1977)), (x) the market for corporate control (Manne, M. (1965)), (xii) the take-overs phenomenon and the theory of the firm (Jensen M. and R. Ruback (1983)), (xiii) the net present value (Malatesta, P. (1983)), (xiv) the lending theory (Lewellen, W. (1971)), (xv) the horizontal merger and market share theory (Tremblay, V. and C. Tremblay (1988)), (xvi) the industrial market structure and/or industrial organization (Stewart, J. F. et al. (1984); Stigler, G. L. (1950)), (xvii) the collusion theory and pooling of interests (Weis, W. (1965); Jacquemin, A. (1981); Eckbo, B. (1983; 1985); Waltham, K. (1988)), (xviii) the prediction of corporate failure, bankruptcies or acquisitions (Penrose, E. (1966); Reid, S. R. (1968)), (xix) the multinational acquisitions for expansion (Schnierderjans, M. and J. Hoffman (1992)), (xx) the economic growth (Melicher, M. et al. (1983)), e.t.c.

Harris R. et al. (1982) stated that a crude division of the schools of thought on merger activity is between a) theories and, hence, merger motives based on capital market valuations of corporations, and, b) theories based on the actions of managers (or promoters) not necessarily motivated by capital market values. Harris R., et al. (1982) has also criticized the literature. He states that there is a number of possible reasons for inconsistencies. Essentially, scholars aim at testing particular theories of merger motivation and thus either apply general models to specific sets of acquired firms (rather than the whole population of acquired firms), i.e. looking for one motive in a polulation where other motives could exist. Harris, R. et al. (1982) in their own work assume that the characteristics of any firm can be used to construct an unobservable index of the firm's attractiveness as a potential acquisition. In consistence with their criticism, they examined samples containing equal numbers of acquired and non-acquired firms in a ratio of acquired to non-acquired firms roughly in line with that of the population of major US corporations and, their results indicated that apart from the size of the only one ratio i.e. P/E ratio was important for differentiating the acquired firms from non-acquired firms. Authors concluded that other variables for differentiation purposes were not the same over the period of time. Palepu (1986) has found evidence that acquired and non-acquired firms exhibit significantly different financial characteristics. On the other hand, financial characteristics of acquired firms differed significantly from one study to another. Evidently, one explaining factor is that owner controlled firms behave differently compared to non-owner controlled firms (Bothwell, 1980; Jaggi and Considine, 1991). Palepu (1986) standpoint has been based upon the inefficient manage-

ment hypothesis* which implies that financially distressed and non-owner controlled firms are more likely to be the target for an acquisition. Jaggi and Considine (1990) matched non-owner controlled firms with owner-controlled acquired firms using a logit model and concluded that firms with financial characteristics indicative of financial distress are more likely to be acquired when they are non-owner controlled firms. Last, and in a further economic perspective, McGuckin, R. et al. (1991) found evidence that take-overs when measured by size of acquired line — of — business levels generally involve areas directly related to the activities of the acquiring firm.

3. Research Design, Sample Selection, and Data Used

Corporate acquisitions have been considered as an alternative to bankruptcies and liquidations. Hence, the business decision about a merger is the next step. The point is which company is acquired. In such a framework, one should examine whether some more (or some less) companies should be merged. This presumes an analysis capable of classifying factors that influence the acquisition of a distressed or non-distressed firm provided that both acquired and non-acquired firms can be characterized by such attributes. Therefore, two groups of companies have been selected: 1) acquired and, 1) non-acquired firms. The sample has been determined based upon the acquired firms' data availability in terms of the number of companies declared as partners in files of the Ministry of Commerce (Division of S.A. Companies). According to the records, thirty eight companies have been merged during this period. Thirty two of them are in manufacturing and six are in commerce. A matching sample of seventy six non-acquired firms — which are in two groups and double of acquired firms, was extracted randomly from Financial Directory of Greek Companies' Annual File where firms were matched by year of observation, branch of industry and size with size defined by number of employees. The final sample thus consists of thirty eight acquired and seventy six non-acquired firms yielding 104 data points (A list of firms is available upon request). Data have been gathered using both national data bases (National Statistical Service of Greece, Financial Directory of Greek Companies, Government Gazzette), and personal contacts.

* The inefficient management hypothesis considered by Palepu (1986), is viewed positively, that is, as a managerial welfare hypothesis whereas the management of target firms will respond positively to tender-offers if they can increase their utility although managers are hired to take care of the shareholders' interest. In opposite, the shareholders' hypothesis implies that managers react to tender-offers to further the shareholders' interest.

4. Model Structure and Statistical Techniques

Part One: Selection of Variables

Variables employed in the literature are at least some main liquidity, profitability, leverage and activity ratios. In this paper two more variables are used. Both these are growth measures (sales growth and employment growth). In a primary data set, the following variables have been selected.

LIQUIDITY RATIOS
Current Ratio (CURR)
Quick Ratio (QUIR)
PROFITABILITY RATIOS
Return on Assets (ROA)
Return on Fixed Assets (ROFA)
FINANCIAL LEVERAGE RATIOS
Long-term Debt to Assets (LTDA)
Debt to Assets Ratio (DAR)
ACTIVITY RATIOS
Inventory to Sales Ratio (ISR)
Net Sales to Total Operating Assets (NSAR)
GROWTH MEASURES
Sales Growth (SGR)
Employment Growth (EGR)
FIXED ASSETS TO TOTAL ASSETS
Fixed Assets to Total Assets (FATA)

The purpose that each ratio serves, is described below as in the order of the above listing.

*Ability to meet short-term debt obligations
*Measure of short-term liquidity
*Profitability of all assets employed in the business
*Return of firm's productive assets
•Greater than unit is highly unusual
*External financing of assets
•Management's ability to turn inventory into sales
•Sales generating ability of the firm's total assets
•Prosperous market opportunities
•Expansion prospects
•Proportion of fixed tangible assets to total assets

These eleven factors for each company two years prior to the merger were examined.

Part Two: Background on the Selected Statistical Techniques

A univariate analysis between groups is prioritized to provide an idea of the extent of the differences between groups and of which variables are responsible. Discriminant analysis is used, first. Discriminant analysis is principally concerned with the determination of Y_i which acts as an operator of discrimination or classification. A given observation on X_i denoted by X_i^* generated according to a density H_1 or H_2, is classified into the group characterized by either H_1 or H_2. The decision variable Y_i is defined by the rule $Y_i = 1$ if X_i^* is classified into H_1. In other words, Y_i represents the state of nature and $\hat{Y}_i$ the decision variable. Considering Y_i as a random variable (Bayesian rule), we have:

$\{ \hat{Y}_i = 1 \text{ if } P(Y_i = 0/X_i^*) L_{10} < P(Y_i = 1/X_i^*) L_{01} \}$

$\{ Y_i = 0 \text{ otherwise} \}$ where $P(Y_i = 1/X_i^*)$ as a posterior probability of $Y_i = 1$.

Discriminant analysis specifies a joint distribution of Y_i and X_i^*, not just the conditional distribution of Y_i and X_i^*. To identify the most significant discriminatory variables, step-wise discriminant analysis is used. Logistic regression which is used next is preferable not only because of theoretical reasons but due to the particularities of the sample selection. Theoretically, logistic regression is usually preferable to discriminant analysis when one wants to see the contribution of each variable to differentiating between groups. It is also effective even when the main objective is classification. Here, we have matched data. Instead of independent samples of non-acquired and acquired companies, the non-acquired companies have been selected to match the acquired companies in respect of certain characteristics.

A logit model specifies the conditional distribution on the binary dependent variable Y given the explanatory variables (covariates). Discriminant analysis begins with the conditional distribution of covariates (X) given Y. A logit model assumed that $g(x) = \text{logit } \{\Pi(\chi)\}$ is the linear function of covariates (x) with the logit as the dependent variables. Specifically, $g(x) = a + b' x$ with $\Pi(\chi)$ denoting the conditional probability that Y occurs conditional that it did not occur, that is, $\Pi(\chi) = P(Y = 1/Y = 0)$ with Y denoting the outcome variable. A probit analysis could also be used as it is widely used in the literature. Because for most problems there is relatively little difference between the normal (i.e. probit and logistic) specifications, it is not necessary to use a probit model*.

* Similar to logit, there is an underlying latent variable y^* and an observed variable y_i which is related to y_i^* through the relation:

$$y_i = 1 \text{ if } y_i^* > 0 \text{ and } y_i = 0 \text{ if } y_i^* < 0 \text{ (or } y_i^* = 0)$$

The model is defined by the regression $y_i^* = b' x_i + u_i$ where u_i as independent and identically distributed random variables with mean 0 has the normal distribution.

5. Empirical Findings

Univariate comparisons between groups indicate that at the 5% level of significance, only three variables differ between groups. Friedman test which is a suitable one for ordinal data highlights the variables. These are $CURR_{(t-2)}$, and $QUIR_{(t-2)}$, namely, current ratio and quick ratio two — years — before, the merger.

TABLE 1
Summary Statistics for Acquired and Non-Acquired Companies

Variable	Median Value in Group			Friedman Test	
	Acquired	Non-Acquired		Xz^2	p-value
		Group 1	Group 2		
Panel A: One-Year-Before					
CURR	1.42	1.17	1.35	6.53	0.038
QUIR	0.95	0.64	0.85	6.53	0.038
ROA	0.04	0.03	0.08	3.84	0.150
ROFA	0.15	0.10	0.35	1.89	0.390
LTDA	0.10	0.02	0.06	2.38	0.300
DAR	0.57	0.72	0.64	2.58	0.280
ISR	0.37	0.67	0.38	2.65	0.270
NSAR	0.74	0.50	0.76	4.79	0.090
SGR	4.44	18.20	23.33	1.20	0.550
EGR	0.00	0.00	0.00	1.63	0.440
FATA	0.30	0.22	0.22	1.63	0.440
Panel B: Two-Years-Before					
CURR	1.61	1.22	1.31	6.69	0.035
QUIR	0.88	0.66	0.81	4.17	0.120
ROA	0.06	0.04	0.07	2.46	0.290
ROFA	0.29	0.18	0.31	0.74	0.690
LTDA	0.11	0.03	0.03	3.66	0.160
DAR	0.60	0.69	0.65	2.46	0.290
ISR	0.38	0.50	0.34	0.76	0.680
NSAR	0.57	0.56	0.71	0.23	0.890
SGR	14.50	14.41	29.00	5.48	0.065
EGR	0.00	0.76	2.09	0.59	0.740
FATA	0.28	0.23	0.17	0.74	0.690

Even though differences appear to be small, this does not mean that discriminant analysis and other binary (dichotomous) models (which being multiv-

ariate methods depending on combinations of variables, not on single variables) will not be successful. The Friedman test as used above, is a non-parametric method. It uses the order of the measurements, not their actual numerical values. Friedman test was chosen because several variables have from one to three outliers. The trouble with outliers is that they have a very big influence on results in parametric analysis which includes all the multivariate analyses (discriminant, logistic, and so on).

TABLE 2
Classification Matrix, Correctly Classified (Summary of Results)

	Acquired	Non-Acquired	All Companies
Panel A: Not Omitted Outliers			
All Variables	52.0%	86.8%	76.3%
	(12/25)	(59/68)	(71/93)
One-Year-Before	45.7%	68.1%	60.8%
	(16/35)	(49/72)	(65/107)
Two-Years-Before	52.0%	79.4%	72.0%
	(13/25)	(54/68)	(67/93)
Panel B: Outliers Omitted			
All Variables	68.4%	68.8%	68.7%
	(13/19)	(44/64)	(57/83)
One-Year-Before	74.1%	51.5%	57.9%
	(20/27)	(35/68)	(55/95)
Two-Years-Before	57.9%	71.9%	68.7%
	(11/19)	(46/64)	(57/83)

It is often necessary to omit the cases with outliers. Also, in a multivariate analysis, we usually have to omit cases with missing data. This means that in most of the following analysis, the numbers of cases are less than the original number of companies. Thus far, in the above Table 2, numbers in parentheses indicating number of cases are herein. Note that classification using just the one-year-before data is hardly better than 50% correct. Things are a bit better with the two — years — before data, but not much. Step-wise discriminant analysis with all outliers included, provides evidence that four variables were marginally statistically significant. These are the following:

Current ratio in one-year-before, p-value = 0.057
Current ratio in two — years — before, p-value = 0.057
Long-term debt to assets in two — years — before, p-value = 0.037
Inventory to sales ratio, p-value = 0.094.

These all have positive coefficients. Higher values were associated with the group of acquired companies. Using these variables, the correct classification in percentage was as follows:

Acquired	55.9%	(15/34)
Non-Acquired	79.2%	(57/72)
All Companies	67.9%	(72/106)

With outliers excluded, the most significant variable is the long-term debt to assets with two — years — before data (p-value = 0.09), and the difference is not really statistically significant.

The discriminant function after the second step has as follows:

$$D_{i(t-1,\,t-2)} = 0.896877OE - 01 + 0.1923361E\text{-}05CURR_{(t-1)} + 0.8581346E - 07CURR_{(t-2)} - 1.259156ROA_{(t-1)}$$
$$+ 0.8887074ROA_{(t-2)} - 0.1778587E - 06ROFA_{(t-1)} - 2.854022LTDA_{(t-1)}$$
$$+ 5.973592LTDA_{(t-2)} - 0.7099630DAR_{(t-1)} + 0.7986361_{(t-2)} - 0.3188560ISR_{(t-1)}$$
$$+ 0.7479969E - 02ISR_{(t-2)} - 0.7321143NSAR_{(t-1)} + 0.4973969NSAR_{(t-2)} + 0.1963396E - 03SGR_{(t-1)}$$
$$- 0.1122497E - 02SGR_{(t-2)} - 0.5926022E - 03EGR_{(t-1)} + 0.2454141E - 02EGR_{(t-2)}$$
$$- 2.161163FATA_{(t-1)} + 1.646772FATA_{(t-2)}$$

In case of outliers omitted, discriminant function incorporates the $QUIR_{(t-1)}$ and the discriminant coefficients become tóo much different than before.

$$D_{i(t-1,\,t-2)}{}^{*} = -2.861038 - 0.1889965CURR_{(t-1)} + 0.2676183E - 01CURR_{(t-2)} + 0.6109430QUIR_{(t-1)}$$
$$+ 0.495303ROA_{(t-1)} - 2.188762ROA_{(t-2)} + 0.3155792E - 01ROFA_{(t-1)}$$
$$- 0.5702468E - 02ROFA_{(t-2)} + 5.435908LTDA_{(t-1)} - 11.62214LTDA_{(t-2)} + 0.6250509DAR_{(t-1)}$$
$$+ 1.755325DAR_{(t-2)} + 0.3614791ISR_{(t-1)} - 0.1549530E - 03_{(t-2)} + 0.2150413NSAR_{(t-1)}$$
$$+ 0.5234366NSAR_{(t-2)} + 0.4344779E - 02SGR_{(t-1)} + 0.6127029E - 04SGR_{(t-2)}$$
$$- 0.1867662E - 01EGR_{(t-1)} - 0.1182918E - 02EGR_{(t-2)} + 1.931275FATA_{(t-1)} + 0.3935024FATA_{(t-2)}$$

Classification findings using logit are shown in next Table 3. Results indicate that discriminant analysis is more efficient than logit. Classification accuracy is very poor using logit. Even theoretically it has been argued that if the explanatory variables are normally distributed, then one should use discriminant analysis.

TABLE 3
Classification Table for Group

Panel A: All Data

		1	3		Percent Correct
		Predicted			
Observed	1	1	65	3	95.59%
	3	3	22	3	12.00%
					73.12%

Panel B: One-Year-Before

		1	3		
		Predicted			
Observed	1	1	72	0	100.00%
	3	3	34	1	2.86%
					68.22%

Panel B: Two-Years-Before

		1	3		
		Predicted			
Observed	1	1	66	2	97.06%
	3	3	24	1	4.00%
				Overal	72.04%

Original value 1-3 encodes as 0-1 classification

As shown in next Table 4 which depicts the binary logistic regression statistics, the constant term plays the most significant role and the only significant variable that explains the model is the LTDA, namely, long-term debt to assets ratio. This has also been specified using the discriminant analysis.

Higher values of odds ratio relate only with LTDA, namely, the long-term debt to assets ratio and indicate that this factor appears so many times more frequent among the two main groups of companies (acquired versus non-acquired companies). Besides, using the Wald-test with a critical value of 2 which would lead to an approximate level of significance of 0.05, the above Table indicates that only LTDA is significant in the model.

In summary, all the above findings indicate that there is a homogeneity in the business sector in Greece. It is characterized by poor liquidity affected by its intrinsic component of inventories. The rate of return is generally low, and debt is the main source of financing. Acquired companies are prototyped in sales

TABLE 4
Binary Logistic Regression Statistics

Variables	Logistic Coefficient	Wald Test	Degrees of Freedom	Significance	Odds Ratio
Panel A: Two - Years - Before					
Constant	-1.3672	18.0127	1	0.0000	
	(0.3221)				
$CURR_{(t-2)}$	0.0668	0.1337	1	0.7146	1.0691
	(0.1827)				
$QUIR_{(t-2)}$	-0.1005	0.1337	1	0.7146	0.9044
	(0.2748)				
$LTDA_{(t-2)}$	2.9358	2.9269	1	0.0871	18.8361
	(1.7160)				
Panel B: One - Year - Before					
Constant	-0.7503	13.0012	1	0.0003	
	(0.2081)				
$QUIR_{(t-1)}$	2.24E-06	0.3608	1	0.5481	1.000
	(3.733E-06)				
Panel C: All Data					
Constant	-1.3961	16.3097	1	0.0001	
	(0.3457)				
$QUIR_{(t-1)}$	4.09E-06	0.0602	1	0.8062	1.000
	(1.666E-05)				
$SGR_{(t-1)}$	-0.0057	1.6553	1	0.1982	0.9944
	(0.0044)				
$SGR_{(t-2)}$	0.0513	0.1766	1	0.6743	1.0527
	(0.1222)				
$QUIR_{(t-2)}$	-0'0772	0.1766	1	0.6743	0.9257
	(0.1838)				
$LTDA_{(t-2)}$	3.8198	4.4248	1	0.0354	45.5934
	(1.8951)				
$ISR_{(t-2)}$	0.0112	0.4480	1	0.5033	1.0113
	(0.0167)				

difficulties, long-term debt, employment recession and with an organic interest on enlargement of the company in a belief of a dogma that competition is faced by large size. This is consistent with the constituted acts of the State aiming at the enlargement of Greek companies, (small and medium-sized enterprises represent 99.9% of all companies in Greece).

In conclusion, acquired firms in Greece seem to approximate Harris et al. findings although in a different business context. Capital market as in Harris et al. has not been involved in the merger activity. On the other hand, Greek findings are not strictly consistent with Palepu's findings that acquired and non-acquired firms exhibit significantly different characteristics. Greek evidence focuses the difference mainly on long-term debt that acquired companies bear, indeed. In all other respects, the corporate sector in Greece suffers from the same headache.

6. Conclusions and Suggestions for Further Future Research

Acquired companies are differentiated from non-acquired companies based on the following discriminatory variables: current ratio, long-term debt, and inventory to sales ratio. Classification accuracy is good enough using discriminant analysis. Percentages are almost the same as in UK (around 68.00%), and relatively close to US findings drawn from an application of discriminant analysis in non-bankrupt and bankrupt firms (80.00%). On the other hand, findings are consistent with national acts statuted in the beginning of 1980's aiming at an enlargement of the firms' size. Corporate acquisitions seem to be consistent with this direction in a belief that competition can be faced more easily by a large rather than a small-sized business enterprise. Nowadays, a query is concerned with the capital market since it has not been involved in the merger activity even though capital market-based studies are very emphatic in the literature. How the situation could be formed is of utmost importance and research toward this direction should be desirable.

APPENDIX I

Binary Logistic Regression Statistics per Company

Panel A: AH Data

ID Observed

	Group	Pred	PGroup	Resid	ZResid		Group	Pred	PGroup	Resid	ZResid
1	S1**	.	.	.	.	1	S1**	.	.	.	.
2	S1	.1552	1	-.1552	-.4286	2	S1	.1721	1	-.1721	-.4560
3	S1	.1626	1	-.1626	-.4407	3	S1	.0521	1	-.0521	-.2345
4	S1	.2146	1	-.2146	-.5227	4	S1	.2245	1	-.2245	-.5381
5	S1	.3653	1	-.3653	-.7586	5	S1	.2160	1	-.2160	-.5250
6	S1	.3847	1	-.3847	-.7907	6	S1	.2451	1	-.2451	-.5698
7	S1**	.5598	3	-.5598	-1.1276	7	S1	.3066	1	-.3066	-.6650
8	S1	.1872	1	-.1872	-.4799	8	S1	.1892	1	-.1892	-.4831
9	S1	.1722	1	-.1722	-.4562	9	S1	.1532	1	-.1532	-.4254
10	S1**	.	.	.	.	10	S1**	.	.	.	.
11	S1	.3053	1	-.3053	-.6629	11	S1	.2154	1	-.2154	-.5239
12	S1	.1892	1	-.1892	-.4830	12	S1	.2589	1	-.2589	-.5910
13	S1	.0096	1	-.0096	-.0986	13	S1	.3342	1	-.3342	-.7085
14	S1**	.7045	3	-.7045	-1.5442	14	S1	.3110	1	-.3310	-.6718
15	S1	.2277	1	-.2277	-.5430	15	S1	.3391	1	-.3391	-.7163
16	S1	.2367	1	-.2367	-.5569	16	S1	.3328	1	-.3328	-.7062
17	S1	.1906	1	-.1906	-.4853	17	S1	.0982	1	-.0982	-.3301
18	S1	.2021	1	-.2021	-.5032	18	S1	.2055	1	-.2055	-.5085
19	S1	.1958	1	-.1958	-.4935	19	S1	.2023	1	-.2023	-.5036
20	S1	.2084	1	-.2084	-.5132	20	S1	.2698	1	-.2698	-.6078
21	S1	.0000	1	.0000	-.0012	21	S1	.1641	1	-.1641	-.4430
22	S1	.1280	1	-.1280	-.3831	22	S1	.1999	1	-.1999	-.4998
23	S1	.0735	1	-.0735	-.2816	23	S1	.1460	1	-.1460	-.4135
24	S1	.1852	1	-.1852	-.4768	24	S1	.1798	1	-.1798	-.4681
25	S1	.3012	1	-.3012	-.6566	25	S1	.1580	1	-.1580	-.4333
26	S1**	.6553	3	-.6553	-1.3788	26	S1	.1907	1	-.1907	-.4855
27	S1	.4169	1	-.4169	-.8456	27	S1	.1890	1	-.1890	-.4828
28	S1	.2375	1	-.2375	-.5580	28	S1	.2167	1	-.2167	-.5260
29	S1	.2087	1	-.2087	-.5135	29	S1	.2454	1	-.2454	-5703
30	S1	.1970	1	-.1970	-.4954	30	S1	.2001	1	-.2001	-.5001
31	S1	.0051	1	-.0051	-.0718	31	S1	.2159	1	-.2159	-.5248
32	S1	.1859	1	-.1859	-.4779	32	S1	0.117	1	-.0117	-.1088
33	S1	.3813	1	-.3813	-.7851	33	S1	.1707	1	-.1707	-.4537
34	S1	.2031	1	-.2031	-.5049	34	S1	.0000	1	.0000	-.0016
35	S1	.1998	1	-.1998	-.4996	35	S1	.2258	1	-.2258	-.5400
36	S1	.1110	1	-.1110	-.3534	36	S1	.1793	1	-"1793	-.4675
37	S1	.3405	1	-.3405	-.7185	37	S1	.2836	1	-.2836	-.6292
38	S1	.3060	1	-.3060	-.6641	38	S1	.3278	1	-.3278	-.6983

	Group	Pred	PGroup	Resid	ZResid
1	SE**	.	.	.	.
2	S3**	.2717	1	.7283	1.6371
3	S3**	.2530	1	.7470	1.7185
4	S3**	.4595	1	.5405	1.0846
5	S3**	.1164	1	.8836	2.7557
6	S3	.9993	3	.0007	.0273
7	S3**	.3993	1	.6007	1.2264
8	S3**	.	.	.	.
9	S3**	.2346	1	.7654	1.8064
10	S3**	.	.	.	.
11	S3**	.2310	1	.7690	1.8244
12	S3	.5033	3	.4967	.9934
13	S3**	.4852	1	.5148	1.0300
14	S3	.9906	3	.0094	.0976
15	S3**	.2380	1	.7620	1.7893
16	S3**	.2771	1	.7229	1.6151
17	S3**	.2587	1	.7413	1.6927
18	S3**	.2088	1	.7912	1.9458
19	S3**	.2182	1	.7818	1.8928
20	S3**	.4938	1	.5062	1.0125
21	S3**	.1821	1	.8179	2.1190
22	S3**	.2011	1	.7989	1.9931
23	S3**	.4606	1	.5394	1.0822
24	S3**	.3984	1	.6016	1.2287
25	S3**	.2242	1	.7758	1.8600
26	S3	.6051	3	.3949	.8078
27	S3**	.3591	1	.6409	1.3360
28	S3**	.4218	1	.5782	1.1708
29	S3**	.2516	1	.7484	1.7245
30	S3**	.1057	1	.8943	2.9093
31	S3**	.	.	.	.
32	S3	.9993	3	.0007	.0273
33	S3**	.2856	1	.7144	1.5815
34	S3**	.3735	1	.6265	1.2952
35	S3**	.2033	1	.7967	1.9796
36	S3**	.1930	1	.8070	2.0449
37	S3**	.2928	1	.7072	1.5540
38	S3**	.2281	1	.7719	1.8398

Panel B: One-Year-Before

1	S1	.3208	1	-.3208	-.6872
2	S1	.3208	1	-.3208	-.6872
3	S1	.3208	1	-.3208	-.6872
4	S1	.3208	1	-.3208	-.6872
5	S1	.3208	1	-.3208	-.6872
6	S1	.3208	1	-.3208	-.6872
7	S1	.3208	1	-.3208	-.6872
8	S1	.3208	1	-.3208	-.6872
9	S1	.3208	1	-.3208	-.6872
10	S1	.3208	1	-.3208	-.6872
11	S1	.3208	1	-.3208	-.6872
12	S1	.3208	1	-.3208	-.6872
13	S1	.3208	1	-.3208	-.6872
14	S1	.3208	1	-.3208	-.6872
15	S1	.3208	1	-.3208	-.6872
16	S1	.3208	1	-.3208	-.6872
17	S1	.3208	1	-.3208	-.6872
18	S1	.3208	1	-.3208	-.6872
19	S1	.3208	1	-.3208	-.6872
20	S1	.3208	1	-.3208	-.6872
21	S1	.3208	1	-.3208	-.6872
22	S1	.3208	1	-.3208	-.6872
23	S1	.3208	1	-.3208	-.6872
24	S1	.3208	1	-.3208	-.6872
25	S1	.3208	1	-.3208	-.6872
26	S1	.3208	1	-.3208	-.6872
27	S1	.3208	1	-.3208	-.6872
28	S1	.3208	1	-.3208	-.6872
29	S1	.3208	1	-.3208	-.6872
30	S1	.3208	1	-.3208	-.6872
31	S1	.3208	1	-.3208	-.6872
32	S1	.3208	1	-.3208	-.6872
33	S1	.3208	1	-.3208	-.6872
34	S1	.3208	1	-.3208	-.6872
35	S1	.3208	1	-.3208	-.6872
36	S1	.3208	1	-.3208	-.6872
37	S1	.3208	1	-.3208	-.6872
38	S1	.3208	1	-.3208	-.6872

1	S1	.3208	1	-.3208	-.6872	1	S3**	.3208	1	.6972	1.4552
2	S1	.3208	1	-.3208	-.6872	2	S3**	.3208	1	.6972	1.4552
3	S1	.3208	1	-.3208	-.6872	3	S3**	.3208	1	.6972	1.4552
4	S1	.3208	1	-.3208	-.6872	4	S3**	.3208	1	.6972	1.4552
5	S1	.3208	1	-.3208	-.6872	5	S3**	.3208	1	.6972	1.4552
6	S1	.3208	1	-.3208	-.6872	6	S3	.9849	3	.0151	.1238
7	S1	.3208	1	-.3208	-.6872	7	S3**	.3208	1	.6972	1.4552
8	S1	.3208	1	-.3208	-.6872	8	S3**	.3208	1	.6972	1.4552
9	S1	.3208	1	-.3208	-.6872	9	S3**	.3208	1	.6972	1.4552
10	S1	.3208	1	-.3208	-.6872	10	S3**	.3208	1	.6972	1.4552
11	S1	.3208	1	-.3208	-.6872	11	S3**	.3208	1	.6972	1.4552
12	S1	.3208	1	-.3208	-.6872	12	S3**	.3208	1	.6972	1.4552
13	S1	.3208	1	-.3208	-.6872	13	S3**	.3208	1	.6972	1.4552
14	S1	.3208	1	-.3208	-.6872	14	S3**	.3208	1	.6972	1.4552
15	S1	.3208	1	-.3208	-.6872	15	S3**	.3208	1	.6972	1.4552
16	S1	.3208	1	-.3208	-.6872	16	S3**	.3208	1	.6972	1.4552
17	S1	.3208	1	-.3208	-.6872	17	S3**	.3208	1	.6972	1.4552
18	S1	.3208	1	-.3208	-.6872	18	S3**	.3208	1	.6972	1.4552
19	S1	.3208	1	-.3208	-.6872	19	S3**	.3208	1	.6972	1.4552
20	S1	.3208	1	-.3208	-.6872	20	S3**	.3208	1	.6972	1.4552
21	S1	.3208	1	-.3208	-.6872	21	S3**	.3208	1	.6972	1.4552
22	S1	.3208	1	-.3208	-.6872	22	S3**	.3208	1	.6972	1.4552
23	S1	.3208	1	-.3208	-.6872	23	S3**	.3208	1	.6972	1.4552
24	S1	.3208	1	-.3208	-.6872	24	S3**	.3208	1	.6972	1.4552
25	S1	.3208	1	-.3208	-.6872	25	S3**	.3208	1	.6972	1.4552
26	S1	.3208	1	-.3208	-.6872	26	S3**	.3208	1	.6972	1.4552
27	S1	.3208	1	-.3208	-.6872	27	S3**	.3208	1	.6972	1.4552
28	S1	.3208	1	-.3208	-.6872	28	S3**	.3208	1	.6972	1.4552
29	S1	.3208	1	-.3208	-.6872	29	S3**	.3208	1	.6972	1.4552
30	S1	.3208	1	-.3208	-.6872	30	S3**	.3208	1	.6972	1.4552
31	S1	.3208	1	-.3208	-.6872	31	S3**	.3208	1	.6972	1.4552
32	S1	.3208	1	-.3208	-.6872	32	S3**	.3208	1	.6972	1.4552
33	S1	.3208	1	-.3208	-.6872	33	S3**	.3208	1	.6972	1.4552
34	S1	.3208	1	-.3208	-.6872	34	S3**	.3208	1	.6972	1.4552
35	S1	.3208	1	-.3208	-.6872	35	S3**	.3208	1	.6972	1.4552
36	S1	.3208	1	-.3208	-.6872	36	S3**	.3208	1	.6972	1.4552
37	S1	.3208	1	-.3208	-.6872	37	S3**	.3208	1	.6972	1.4552
1	S1	.3208	1	-.3208	-.6872	38	S3**	.3208	1	.6972	1.4552

Panel C: Two-Years-Before

1	S1**	.	.	.	.	1	S1**	.	.	.	.
2	S1	.2162	1	-.2162	-.5251	1	S1	.2064	1	-.2064	-.5100
3	S1	.2003	1	-.2003	-.5004	3	S1	.1963	1	-.1963	-.4942
4	S1	.2206	1	-.2206	-.5320	4	S1	.2075	1	-.2075	-.5117
5	S1	.3642	1	-.3642	-.7568	5	S1	.1936	1	-.1936	-.4900
6	S1	.3697	1	-.3697	-.7659	6	S1	.2706	1	-.2706	-.6091
7	S1	.4703	1	-.4703	-.9423	7	S1	.3190	1	-.3190	-.6844
8	S1	.2086	1	-.2086	-.5134	8	S1	.2067	1	-.2067	-.5105
9	S1	.2079	1	-.2079	-.5124	9	S1	.1996	1	-.1966	-.4994
10	S1**	.	.	.	-.	10	S1**	.	.	.	.
11	S1	.3161	1	-.3161	-.6799	11	S1	.2779	1	-.2779	-.6204
12	S1	.2133	1	-.2133	-.5207	12	S1	.2708	1	-.2708	-.6094
13	S1	.3263	1	-.3263	-.6959	13	S1	.3137	1	-.3137	-.6761
14	S1**	.6271	3	-.6271	-1.2967	14	S1	.2953	1	-.2953	-.6473
15	S1	.2154	1	-.2154	-.5240	15	S1	.3200	1	-.3200	-.6861
16	S1	.2357	1	-.2357	-.5553	16	S1	.3097	1	-.3097	-.6698
17	S1	.2078	1	-.2078	-.5121	17	S1	.2124	1	-.2124	-.5193
18	S1	.2092	1	-.2092	-.5144	18	S1	.2119	1	-.2119	-.5185
19	S1	.2074	1	-.2074	-.5116	19	S1	.2463	1	-.2463	-.5717
20	S1	.2124	1	-.2124	-.5193	20	S1	.2703	1	-.2703	-.6087
21	S1	.2600	1	-.2600	-.5927	21	S1	.1973	1	-.1973	-.4958
22	S1	.2508	1	-.2508	-.5786	22	S1	.1822	1	-.1822	-.4720
23	S1	.4211	1	-.4211	-.8529	23	S1	.2115	1	-.2115	-.5179
24	S1	.1970	1	-.1970	-.4952	24	S1	.2169	1	-.2169	-.5263
25	S1	.2526	1	-.2526	-.5814	25	S1	.2047	1	-.2047	-.5074
26	S1**	.5226	3	-.5226	-1.0463	26	S1	.2141	1	-.2141	-.5219
27	S1	.3346	1	-.3346	-.7091	27	S1	.2010	1	-.2010	-.5015
28	S1	.2060	1	-.2060	-.5094	28	S1	.2290	1	-.2290	-.5450
29	S1	.2100	1	-.2100	-.5156	29	S1	.2618	1	-.2618	-.5955
30	S1	.2030	1	-.2030	-.5046	30	S1	.2309	1	-.2309	-.5479
31	S1	.2182	1	-.2182	-.5283	31	S1	.2197	1	-.2197	-.5306
32	S1	.2145	1	-.2145	-.5226	32	S1	.0031	1	-.0031	-.0553
33	S1	.2972	1	-.2972	-.6503	33	S1	.2086	1	-.2086	-.5134
34	S1	.2066	1	-.2066	-.5102	34	S1	.2078	1	-.2078	-.5121
35	S1	.2028	1	-.2028	-.5044	35	S1	.2594	1	-.2594	-.5918
36	S1	.2133	1	-.2133	-.5208	36	S1	.2278	1	-.2278	-.5431
37	S1	.2548	1	-.2548	-.5847	37	S1	.1971	1	-.1971	-.4955
38	S1	.3071	1	-.3071	-.6657	38	S1	.3177	1	-.3177	-.6823

1	S3**	.	.	.	.	20	S3**	.4030	1	.5970	1.2172
2	S3**	.3063	.6937	1.5050		21	S3**	.2058	1	.7942	1.9645
3	S3**	.2536	.7464	1.7157		22	S3**	.2015	1	.7985	1.9904
4	S3**	.4017	.5983	1.2203		23	S3**	.4988	1	.5012	1.0024
5	S3**	.2086	.7914	1.9479		24	S3**	.3292	1	.6708	1.4274
6	S3**	.2030	.7970	1.9812		25	S3**	.2601	1	.7399	1.6866
7	S3**	.3573	.6427	1.3413		26	S3**	.4329	1	.5671	1.1446
8	S3**	.000	1.000	3.34E+96		27	S3**	.3146	1	.6854	1.4762
9	S3**	.2796	1	.7204	1.6050	28	S3**	.3435	1	.6565	1.3824
10	S3**	.	.	.	.	29	S3**	.3206	1	.6794	1.4558
11	S3**	.2025	1	.7975	1.9843	30	S3**	.2061	1	.7939	1.9627
12	S3**	.3382	1	.6618	1.3988	31	S3**	.	.	.	.
13	S3**	.3454	1	.6546	1.3765	32	S3	.9980	3	.0020	.0451
14	S3**	.2077	1	.7923	1.9529	33	S3**	.3180	1	.6820	1.4643
15	S3**	.2402	1	.7598	1.7783	34	S3**	.2638	1	.7362	1.6706
16	S3**	.2042	1	.7958	1.9740	35	S3**	.2086	1	.7914	1.9475
17	S3**	.3418	1	.6582'	1.3875	36	S3**	.2982	1	.7018	1.5341
18	S3**	.2045	1	.7955	1.9723	37	S3**	.2567	1	.7433	1.7015
19	S3**	.2075	1	.7925	1.9541	38	S3**	.2204	1	.7796	1.8808

APPENDIX II

Firm Specific Probabilities and Discriminating Scores (Training Sample)

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
Panel A.a.: All Data, Both Years				
2	1	1	0.7646	-0.6615
3	1	1	0.6314	-0.1463
4	1	1	0.6581	-0.2402
5	1	2	0.5198	0.3511
6	1	1	0.5396	0.1592
7	1	2	0.8019	1.4129
8	1	1	0.6182	-0.1009
9	1	1	0.7072	-0.4227
11	1	2	0.7180	1.0394
12	1	1	0.8014	-0.8362
13	1	1	5870	0.0041
14	1	2	0.7541	1.1891
15	1	1	0.5990	-0.0359
16	1	1	0.6763	-0.3059
17	1	1	0.7332	-0.5269
18	1	1	0.6754	-0.3029
19	1	1	0.8971	-1.4565
20	1	1	0.8604	-1.1773
21	1	1	0.9062	-1.5386
23	1	2	0.7940	1.3735
24	1	1	0.6932	-0.3691
25	1	1	0.6416	-0.1817
26	1	1	0.5584	0.0982
27	1	1	0.7974	-0.8158
28	1	1	0.5074	0.2635
29	1	1	0.7311	-0.5179
31	1	1	0.9203	-1.6821
33	1	2	0.5619	0.4874
34	1	1	0.6734	-0.2956
35	1	2	0.5706	0.5160
36	1	1	0.8192	-0.9293
38	1	1	0.6139	-0.0861
40	1	1	0.7839	-0.7503
41	1	1	0.8818	-1.3311
42	1	1	0.6266	-0.1295
32	1	1	0.8918	-1.4113

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
43	1	1	0.7009	-0.3985
44	1	1	0.8177	-0.9210
45	1	1	0.5311	0.1869
46	1	1	0.7281	-0.5057
47	1	1	0.7598	-0.6400
49	1	1	0.5443	0.1441
50	1	1	0.7223	-0.4825
51	1	1	0.7251	-0.4939
53	1	1	0.6376	-0.1677
54	1	2	0.5581	0.4750
55	1	1	0.7385	-0.5485
56	1	1	0.6252	-0.1247
57	1	1	0.7025	-0.4047
58	1	2	0.6513	0.7902
59	1	1	0.7655	-0.6743
60	1	1	0.7728	-0.6982
61	1	1	0.8817	-1.3300
62	1	1	0.6084	-0.0676
63	1	1	0.6730	-0.2941
64	1	1	0.7598	-0.6401
65	1	1	0.7356	-0.5367
66	1	1	0.8203	-0.9352
67	1	1	0.6344	-0.1565
68	1	1	0.7286	-0.5080
69	1	1	0.6261	-0.1278
70	1	1	0.5421	0.1513
71	1	1	0.7297	-0.5125
72	1	1	0.9586	-2.2430
73	1	1	0.6816	-0.3258
74	1	1	0.6858	-0.3413
75	1	1	0.6823	-0.3282
76	1	1	0.7706	-0.6884
78	2	1	0.6035	-0.0509
79	2	1	0.5032	0.2769
80	2	2	0.7089	1.0036
81	2	1	0.8007	-0.8323
82	2	2	0.9880	3.8387
83	2	2	0.9833	3.5689
85	2	1	0.6224	-0.1151
87	2	1	0.5991	-0.0363

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
89	2	2	0.6464	0.7728
90	2	2	0.9882	3.8526
91	2	2	0.9739	3.2022
92	2	1	0.6877	-0.3484
93	2	1	0.5429	0.1486
95	2	1	0.8654	-1.2107
96	2	2	0.8564	1.7251
97	2	1	0.6619	-0.2539
99	2	2	0.8430	1.6405
100	2	2	0.7908	1.3576
104	2	2	0.6359	0.7363
108	2	2	0.9880	3.8388
109	2	1	0.7507	-0.6005
110	2	1	0.5605	0.0915
111	2	1	0.7616	-0.6478
112	2	2	0.6367	0.7389
113	2	1	0.5859	0.0076
Panel A.b.: Outliers Omitted				
2	1	2	0.5125	-0.3148
3	1	1	0.6396	0.3263
4	1	1	0.6277	0.2738
5	1	2	0.6480	-0.8911
6	1	2	0.6523	-0.9108
7	1	2	0.9040	-2.5701
8	1	2	0.6730	-1.0059
9	1	1	0.5274	-0.1507
11	1	2	0.8057	-1.7263
12	1	1	0.5952	0.1331
13	1	1	0.9111	2.1297
14	1	1	0.6571	0.4056
15	1	1	0.6241	0.2581
16	1	1	0.7155	0.6852
17	1	2	0.5009	-0.2672
18	1	1	0.5401	-0.0982
19	1	1	0.8818	1.8029
21	1	2	0.6621	-0.9556
22	1	1	0.7216	0.7161
23	1	1	0.9052	2.0568

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
24	1	1	0.6128	0.2088
25	1	1	0.6740	0.4834
26	1	1	0.6278	0.2740
27	1	2	0.5514	-0.4757
29	1	1	0.9547	2.873
30	1	2	0.6399	-0.8549
31	1	1	0.5729	0.0385
32	1	1	0.6400	0.3284
33	1	2	0.6019	-0.6887
35	1	1	0.6032	0.1671
37	1	2	0.5347	-0.4064
38	1	1	0.8975	1.9681
39	1	2	0.5439	-0.4445
40	1	1	0.6247	0.2606
41	1	1	0.7890	1.0927
42	1	1	0.5081	-0.2301
43	1	1	0.7201	0.7086
44	1	2	0.5301	-0.3874
46	1	1	0.5661	0.0098
47	1	2	0.5207	-0.3489
48	1	1	0.5539	-0.0407
50	1	1	0.6135	0.2115
51	1	2	0.5199	-0.3453
52	1	1	0.6185	0.2336
53	1	1	0.5519	-0.0494
54	1	1	0.7654	0.9525
55	1	2	0.7386	-1.3319
56	1	1	0.8574	1.5818
57	1	1	0.6625	0.4302
58	1	1	0.7300	0.7592
59	1	1	0.7538	0.8871
60	1	1	0.6302	0.2847
61	1	1	0.8037	1.1860
62	1	1	0.7979	1.1491
63	1	1	0.6619	0.4273
64	1	2	0.6634	-0.9615
65	1	1	0.8686	1.6790
66	1	1	0.6392	0.3248
67	1	1	0.8402	1.4437

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
68	1	1	0.8494	1.5154
69	1	1	0.6703	0.4662
70	1	2	0.5497	-0.4687
71	1	1	0.5601	-0.0153
72	1	2	0.5685	-0.5473
74	3	2	0.7777	-1.5517
75	3	2	0.7317	-1.2953
76	3	2	0.8575	-2.1091
77	3	1	0.8096	1.2250
78	3	2	0.5818	-0.6033
80	3	1	0.5548	-0.0373
81	3	2	0.8324	-1.9122
82	3	2	0.5211	-0.3505
83	3	2	0.8436	-1.9970
85	3	1	0.8547	1.5590
86	3	1	0.5498	-0.0580
88	3	2	0.9031	-2.5593
89	3	2	0.7401	-1.3398
93	3	2	0.7764	-1.5441
97	3	2	0.6509	-0.9041
98	3	2	0.5609	-05155
99	3	1	0.5923	0.1206
100	3	2	0.5534	-0.4841
101	3	1	0.5904	0.1123
Panel B.a.: All Data, One-Year-Before				
2	1	1	0.5898	-0.6664
3	1	1	0.6090	-0.8315
4	1	1	0.5252	-0.1250
5	1	2	0.5309	0.3394
6	1	2	0.5971	0.8959
7	1	2	0.5339	0.3643
8	1	1	0.5731	-0.5250
9	1	1	0.5763	-0.5513
11	1	1	0.5164	-0.0521
12	1	1	0.5334	-0.1929
13	1	1	0.6166	-0.8974
14	1	2	0.6752	1.5955
15	1	1	0.5856	-0.6305

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
16	1	1	0.5068	0.0274
17	1	1	0.5743	-0.5348
18	1	1	0.5627	-0.4371
19	1	1	0.5285	-0.1524
20	1	1	0.8335	-3.2427
21	1	2	0.5772	0.7266
22	1	2	0.5101	0.1676
23	1	2	0.5155	0.2122
24	1	1	0.5074	0.0225
25	1	1	0.5428	-0.2705
26	1	2	0.6549	1.4072
27	1	2	0.5820	0.7675
28	1	1	0.5867	-0.6401
29	1	1	0.5663	-0.4673
30	1	1	0.5334	-0.1925
31	1	1	0.5302	-0.1661
32	1	1	0.8286	-3.1706
33	1	1	0.5007	0.0781
34	1	1	0.5435	-0.2766
35	1	1	0.5746	-0.5369
36	1	1	0.5427	-0.2700
37	1	1	0.5448	-0.2876
38	1	2	0.5395	0.4106
40	1	1	0.5770	-0.5572
41	1	2	0.5105	0.1708
42	1	1	0.5844	-0.6207
43	1	1	0.5600	-0.4147
44	1	2	0.5275	0.3109
45	1	2	0.5087	0.1556
46	1	2	0.5926	-0.6900
47	1	1	0.5579	-0.3968
49	1	1	0.5098	0.0024
50	1	2	0.5182	0.2343
51	1	2	0.5476	0.4778
52	1	1	0.5292	-0.1582
53	1	2	0.5705	0.6703
54	1	1	0.5079	-0.0181
55	1	1	0.5661	-0.4658
56	1	1	0.5729	-0.5232

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
57	1	2	0.5029	0.1077
58	1	1	0.5666	-0.4699
59	1	2	0.5533	0.5260
60	1	2	0.5090	0.1578
61	1	1	0.5903	-0.6704
62	1	1	0.5225	-0.1021
63	1	1	0.6005	-0.7578
64	1	2	0.5383	0.4004
65	1	1	0.5427	-0.2698
66	1	1	0.5827	-0.6059
67	1	2	0.5225	0.2697
68	1	1	0.5142	-0.0334
69	1	1	0.5846	-0.6221
70	1	1	0.5298	-0.1624
71	1	1	0.5067	0.0286
72	1	2	0.6184	1.0812
73	1	2	0.5358	0.3799
74	1	1	0.5456	-0.2944
75	1	1	0.5497	-0.3281
76	1	1	0.5281	-0.1488
78	2	2	0.5089	0.1574
79	2	1	0.5592	-0.4078
80	2	2	0.5439	0.4474
81	2	1	0.5114	-0.0103
82	2	2	0.9576	6.5222
83	2	2	0.5187	0.2384
84	2	2	0.7660	2.5331
85	2	2	0.5122	0.1844
87	2	1	0.6109	-0.8479
88	2	2	0.8138	3.1295
89	2	1	0.7368	-2.0430
90	2	1	0.5303	-0.1671
91	2	2	0.6988	1.8220
92	2	1	0.5665	-0.4686
93	2	2	0.5347	0.3707
94	2	1	0.5241	-0.1159
95	2	2	0.5246	0.2873
96	2	1	0.5230	-0.1068
97	2	1	0.5917	-0.6822

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
98	2	1	0.5414	-0.2591
99	2	2	0.6521	1.3817
100	2	1	0.5319	-0.1806
101	2	1	0.5333	-0.1918
102	2	1	0.5548	-0.3713
103	2	2	0.5006	0.0891
104	2	2	0.5108	0.1730
105	2	2	0.5026	0.1054
106	2	1	0.5314	-0.1764
108	2	1	0.5332	-0.1910
109	2	2	0.5491	0.4906
110	2	1	0.5525	-0.3516
111	2	1	0.5129	-0.0228
112	2	2	0.5158	0.2141
113	2	1	0.5019	0.0677
114	2	1	0.5364	-0.2175
Panel B.b: Outliers Omitted				
2	1	1	0.5050	-0.0861
3	1	1	0.5277	0.0754
4	1	2	0.5466	-0.4536
5	1	2	0.5313	-0.3440
6	1	2	0.5356	-0.3750
7	1	1	0.5255	0.0593
8	1	2	0.6663	-1.3489
9	1	1	0.5348	0.1255
11	1	2	0.5432	-0.4292
12	1	1	0.5652	0.3439
13	1	1	0.8788	3.3935
14	1	1	0.6480	0.9617
15	1	2	0.5188	-0.2553
16	1	2	0.5226	-0.2820
17	1	2	0.5071	-0.1718
18	1	2	0.5808	-0.7005
19	1	1	0.8432	2.8639
20	1	1	0.6179	0.7315
21	1	1	0.6828	1.2389
22	1	1	0.7989	2.3267
23	1	1	0.8415	2.8404

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
24	1	2	0.6867	-1.5141
25	1	1	0.7461	1.7909
26	1	2	0.6029	-0.8622
27	1	2	0.6513	-1.2301
28	1	1	0.5688	0.3701
29	1	1	0.8309	2.7035
30	1	2	0.5917	-0.7801
31	1	2	0.5972	-0.8206
32	1	1	0.5588	0.2978
33	1	2	0.5870	-0.7458
34	1	2	0.6228	-1.0112
35	1	1	0.5008	-0.1162
37	1	1	0.5466	0.2102
38	1	1	0.7876	2.2039
39	1	2	0.6299	-1.0652
40	1	2	0.5822	-0.7105
41	1	1	0.6864	1.2689
42	1	1	0.6083	0.6598
43	1	1	0.5282	0.0787
44	1	2	0.5063	-0.1661
46	1	1	0.5536	0.2605
47	1	2	0.5161	-0.2362
48	1	2	0.5221	-0.2787
49	1	2	0.5046	-0.1546
50	1	1	0.5298	0.0903
51	1	2	0.5033	-0.1449
52	1	1	0.5484	0.2230
53	1	2	0.6330	-1.0891
54	1	2	0.5284	-0.0800
55	1	2	0.5668	-0.5983
56	1	1	0.6917	1.3123
57	1	2	0.5166	-0.2396
58	1	1	0.5384	0.1515
59	1	1	0.5625	0.3245
60	1	2	0.5120	-0.2067
61	1	1	0.5643	0.3372
62	1	2	0.5839	-0.7228
63	1	1	0.7425	1.7580
64	1	2	0.7449	-2.0231

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
65	1	1	0.8192	2.5591
66	1	2	0.253	-0.3015
67	1	1	0.5900	0.5242
68	1	1	0.5444	0.1942
69	1	1	0.5065	-0.0755
70	1	2	0.6021	-0.8568
71	1	2	0.5439	-0.4338
72	1	2	0.5723	-0.6383
74	1	1	0.5404	0.1657
75	2	2	0.5496	-0.4751
76	2	2	0.5698	-0.6201
77	2	1	0.5150	-0.0153
78	2	2	0.5617	-0.5620
80	2	2	0.5950	-0.8045
81	2	1	0.6237	0.7752
82	2	1	0.6369	0.8756
83	2	2	0.6851	-1.5013
84	2	1	0.5093	-0.0558
85	2	2	0.5167	-0.2399
86	2	2	0.5281	-0.3214
87	2	2	0.5922	-0.7836
88	2	2	0.6125	-0.9338
89	2	2	0.5566	-0.5249
90	2	2	0.5164	-0.2594
91	2	2	0.6022	-0.8577
92	2	2	0.5924	-0.7848
93	2	2	0.6544	-1.2625
94	2	2	0.6019	-0.8554
95	2	1	0.6255	0.7886
97	2	2	0.5538	-0.5052
98	2	2	0.5674	-0.6030
99	2	2	0.5863	-0.7400
100	2	2	0.5477	-0.4615
101	2	2	0.5177	-0.2473
102	2	1	0.5057	-0.0814
Panel C.a.: Two-Years-Before				
2	1	1	0.7412	-0.8600
3	1	1	0.7383	-0.8446
4	1	1	0.6139	-0.2539

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
5	1	2	0.5743	0.5330
6	1	2	0.5189	0.3024
7	1	2	0.7316	1.2577
8	1	1	0.7064	-0.6806
9	1	1	0.7240	-0.7697
11	1	2	0.5557	0.4549
12	1	1	0.6839	-0.5710
13	1	1	0.7961	-1.1797
14	1	2	0.8003	1.6552
15	1	1	0.6524	-0.4246
16	1	1	0.5590	-0.0201
17	1	1	0.7260	-0.7802
18	1	1	0.6559	-0.4404
19	1	1	0.7144	-0.7205
20	1	1	0.6583	0.4515
21	1	1	0.327	-1.4298
23	1	2	0.7523	1.3694
24	1	1	0.6582	-0.4509
25	1	1	0.6188	-0.2750
26	1	2	0.7558	1.3890
27	1	1	0.5111	0.1784
28	1	1	0.6092	-0.2335
29	1	1	0.6721	-0.5154
31	1	1	0.7488	-0.9016
32	1	1	0.8592	-1.6402
33	1	2	0.5401	0.3900
34	1	1	0.6157	-0.2614
35	1	1	0.5780	-0.1000
36	1	1	0.6751	-0.5295
38	1	2	0.5677	0.5051
40	1	1	0.7088	-0.6927
41	1	1	0.8388	-1.4757
42	1	1	0.7106	-0.7017
43	1	1	0.5706	-0.0688
44	1	2	0.5135	0.2799
45	1	1	0.5430	0.0464
46	1	1	0.7330	-0.169
47	1	1	0.7496	-0.9058
49	1	2	0.5658	0.4973

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
50	1	1	0.5570	-0.0118
51	1	1	0.5321	0.0918
53	1	2	0.5804	0.5586
54	1	2	0.5694	0.5122
55	1	1	0.7207	-0.7525
56	1	1	0.6618	-0.4678
57	1	1	0.6068	-0.2229
58	1	1	0.5666	-0.0520
59	1	1	0.5661	-0.0499
60	1	1	0.7120	-0.7088
61	1	1	0.8357	-1.4520
62	1	1	0.5253	0.1198
63	1	1	0.7012	-0.6549
64	1	1	0.5875	-0.1402
65	1	1	0.7069	-0.6829
66	1	1	0.5496	0.0190
67	1	1	0.5314	0.0947
68	1	1	0.6309	-0.3281
69	1	1	0.6497	-0.4126
70	1	1	0.6193	-0.2771
71	1	1	0.6468	-0.3994
72	1	1	0.6669	-0.4913
73	2	2	0.5082	0.2580
74	2	1	0.6297	-0.3231
75	2	1	0.6132	-0.2507
76	2	1	0.8513	-1.5742
78	2	2	0.5698	0.5140
79	2	1	0.6302	-0.3252
80	2	2	0.5955	0.6229
81	2	1	0.7231	-0.7650
82	2	1	0.5600	-0.0243
83	2	2	0.9718	3.8729
85	2	1	0.6158	-0.2620
87	2	1	0.7220	-0.7594
89	2	2	0.5249	0.3272
90	2	2	0.9821	4.3548
91	2	2	0.9505	3.2693
92	2	1	0.7003	-0.6503
93	2	1	0.5271	0.1127

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
95	2	1	0.6575	-0.4479
96	2	2	0.5529	0.4432
97	2	1	0.7167	-0.7323
99	2	2	0.8357	1.9005
100	2	2	0.5915	0.6056
104	2	2	0.6190	0.7245
108	2	2	0.9839	4.4612
109	2	2	0.5026	0.2349
110	2	1	0.6434	-0.3842
111	2	1	0.5704	-0.0678
112	2	2	0.6001	0.6425
113	2	1	0.5380	0.0674
Panel C.b: Outliers Omitted				
2	1	1	0.6325	0.7504
3	1	1	0.5058	-0.1226
4	1	1	0.5690	0.3052
5	1	2	0.6681	-1.3364
6	1	2	0.7087	-1.6547
7	1	2	0.8020	-2.5103
8	1	1	0.5334	0.0632
9	1	1	0.5590	0.2368
11	1	2	0.6312	-1.0640
12	1	1	0.5831	0.4020
13	1	1	0.7715	1.8818
14	1	2	0.6711	-1.3592
15	1	1	0.5914	0.4593
16	1	1	0.5702	0.3135
17	1	1	0.5748	0.3450
18	1	1	0.5782	0.3683
19	1	1	0.7567	1.7441
21	1	2	0.7665	-2.1578
22	1	1	0.5624	0.2600
23	1	1	0.5590	0.2365
24	1	2	0.7515	-2.0201
25	1	2	0.5501	-0.4989
26	1	1	0.6469	0.8552
27	1	1	0.6235	0.6855
29	1	1	0.5258	0.0122

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
30	1	2	0.6151	-0.9487
31	1	1	0.5576	0.2269
32	1	1	0.5648	0.2763
33	1	1	0.5961	0.4925
35	1	1	0.5288	0.0321
37	1	1	0.6121	0.6046
38	1	1	0.6161	0.6330
39	1	1	0.5720	0.3256
40	1	1	0.5505	0.1790
41	1	1	0.6982	1.2471
42	1	2	0.6288	-1.0466
43	1	1	0.6239	-0.6887
44	1	1	0.5726	0.3299
46	1	2	0.5709	-0.6411
47	1	2	0.5010	-0.1681
48	1	2	0.6570	-1.2528
50	1	2	0.5351	-0.3978
51	1	2	0.5039	-0.1876
52	1	1	0.5254	0.0095
53	1	1	0.6208	0.6661
54	1	1	0.5954	0.4873
55	1	2	0.5454	-0.4673
56	1	1	0.6332	0.7555
57	1	2	0.5535	-0.5223
58	1	1	0.7592	1.7672
59	1	1	0.5443	0.1373
60	1	1	0.5542	0.2042
61	1	1	0.5594	0.2394
62	1	1	0.5566	0.2201
63	1	1	0.5601	0.2441
64	1	1	0.6308	0.7382
65	1	1	0.8239	2.4302
66	1	1	0.5745	0.3430
67	1	1	0.8179	2.3616
68	1	1	0.6190	0.6539
69	1	1	0.5529	0.1949
70	1	1	0.5613	0.2524
71	1	2	0.5048	-0.1935
72	1	1	0.7422	1.6145

Case Number	Actual Group	Highest Group	Probability P(Group/Data)	Discriminating Scores
74	2	2	0.5818	-0.7160
75	2	2	0.5947	-0.8052
76	2	2	0.7208	-1.7541
77	2	1	0.6443	0.8362
78	2	2	0.5028	-0.1805
80	2	1	0.5614	0.2531
81	2	2	0.6269	-1.0328
82	2	1	0.5294	0.0365
83	2	2	0.5943	-0.8025
85	2	1	0.5416	0.1185
86	2	1	0.5369	0.0867
88	2	2	0.8972	-3.7988
89	2	2	0.6204	-0.9862
93	2	2	0.5269	-0.3423
97	2	2	0.5493	-0.4934
98	2	1	0.5584	0.2325
99	2	1	0.7059	1.3091
100	2	2	0.6503	-1.2035
101	2	1	0.5998	0.5184

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