

## Appendix VI: Previous Bankruptcy/Distress Prediction Studies

Source	Methods	Results ( <i>Correct Accuracy %</i> )	Comments
[87]	Stepwise Discriminant Analysis	Yr1 - Type I: <u>86.49</u> - Type II: <u>83.78</u> Yr2 - Type I: <b><u>75.68</u></b> - Type II: <b><u>81.08</u></b> Yr3 - Type I: <u>83.78</u> - Type II: <u>62.16</u>	The methods were used to select the variables to use in the study and then the models were applied to test predictability. Which begs for the question, are the variables or methods making the differences here? This study was done over 3 year period with 35 failed Finnish companies (not-failed pairs too).
	Logit	Yr1 - Type I: <u>86.49</u> - Type II: <u>86.49</u> Yr2 - Type I: <u>72.97</u> - Type II: <u>70.27</u> Yr3 - Type I: <u>83.78</u> - Type II: <u>64.86</u>	
	ANN using Genetic Algorithm	Yr1 - Type I: <b><u>94.74</u></b> - Type II: <b><u>100.0</u></b> Yr2 - Type I: <u>73.68</u> - Type II: <u>72.22</u> Yr3 - Type I: <b><u>94.74</u></b> - Type II: <b><u>72.22</u></b>	
[14]	Univariate Model	Yr1 – 87 Yr2 – 79 Yr3 – 77  No hold-out sample	Univariate models still in use today prior to multivariate models to look for outliers and other patterns in the data. Cash flow to total-debt had the best prediction throughout the 5 years of prediction testing, however all had some predictive ability
[15]	MDA	1sta - Type I: 94 - Type II: 97 2yr - Type I: 72 - Type II: 94 3yr - 48	Extension of Beaver's models. For one financial statement prior to bankruptcy and 2 years.
[59]	MDA - Quadratic	Yr1: 57.14 to 88.09 Yr2: 64.28 to <b>85.71</b> Yr3: 73.80 to 88.09 Yr4: 54.75 to <b>83.33</b> Yr5: 57.13 to 83.33	21 Industrial companies in Australia and randomly paired companies from that period. Temporal and Atemporal each yr and various different model configurations.
	MDA - Linear	Yr1: 80.95 to <b>92.85</b> Yr2: 61.90 to 83.33 Yr3: 69.04 to <b>90.47</b> Yr4: 54.76 to 78.57 Yr5: 50.00 to <b>85.71</b>	
[22]	Logit	<i>With cut-off of 0.08:</i> Model 1: Type I: <u>90.7</u> - Type II: <u>74.3</u> Model 2: Type I: <u>79.8</u> - Type II: <u>91.4</u> <i>With cut-off of 0.10:</i> Model 1: Type I: <u>92.8</u> - Type II: <u>73.3</u> Model 2: Type I: <u>83.0</u> - Type II: <u>87.6</u>	Known best for pointing out how previous researches have overstated predictive accuracy because of proportions of firms in each category. 105 Bankrupt and 2,058 non, in study.
[25]	Multinomial Logit	Yr1 – 96 (original) 80 (hold-out) Yr2 – 92 (original) 79 (hold-out) Yr3 – 90 (original) 85 (hold-out)	350 healthy firms and nearly 70 firms in various states of distress. Models for 1,2, & 3yrs
[26]	Probit	92.4 93.0	74 Australian companies. Neither MDA or Probit models outperformed the naïve model
[27]	Recursive Partitioning	Model 1: Type I: <u>68.9</u> – Type II: <u>100</u> Model50: Type I: <u>91.4</u> - Type II: <u>89.4</u>	58 bankrupt firms 142 randomly selected non. Random years 1971-81. Models are created various costs for error differences (10-70 by 10s and 1)
	MDA	Model 1: Type I: <u>17.2</u> - Type II: <u>100</u> Model50: Type I: <u>84.5</u> - Type II: <u>88.0</u>	
[33]	Expert System	The system produced from recursive partitioning out performed DA,	Uses Recursive Partitioning algorithms and interviews to set-

		individuals, and groups of experts	up the expert system
[96]	ANN	Type I: 77.8 to 81.5 Type II: 78.6 to 85.7	Used Altman's financial ratios. Study used 128 firms and varied the proportions of distressed firms to non-distressed firms in the training set
	MDA	Type I: 59.3 to 70.4 Type II: 78.6 to 85.7	
[97]	ANN	69.5 to 73.7	Used principal component analysis and self-organizing maps to select inputs to use for UK companies
	MDA	65.6	
	Logit	66.0	
[98]	Decision Trees: C4.5 and CN2 ANN	C4.5 outperformed the others	For Brazilian companies
[99]	SVM	70.35 to 70.90	For Australian companies
	ANN	66.11 to 68.33	
	LVQ	62.50 to 63.33	
	MDA	59.79 to 63.68	
[83]	ANN	81.46 to 85.5	For US companies predicted at various points in a 3 year period, the better predictions use added credit risk factors
[89]	DA	Yr1 – 97 (original) 78 (hold-out) Yr2 – 95 (original) 94 (hold-out) Yr3 – 95 (original) 88 (hold-out)	Univariate DA model with US firms
[100]	MDA	Yr1 – 95 (original) 95 (hold-out) Yr2 – 90 (original) 80 (hold-out) Yr3 – 82 (original) 70 (hold-out)	Based on US firms, ratios from this study are still highly used today
[16]	MDA	Yr1 – 93 (original) 91 (hold-out) Yr2 – 89 (hold-out) Yr3 – 84 (hold-out)	Popular z-score model, based on US firms (Altman has applied his model to firms world-wide)