

$$w_1 + w_2 + K + w_m = 1 \quad (5)$$

Suppose $\hat{y}_t = w_1 y_{1t} + w_2 y_{2t} + K + w_m y_{mt}$ is combination forecast of y_t .

Suppose e_t is combination forecast error in term t , then

$$e_t = y_t - \hat{y}_t = \sum_{i=1}^m w_i e_{it} \quad (6)$$

Then quadratic sum of combination forecast is Formula 4.

$$W_1 = \sum_{t=1}^N e_t^2 = \sum_{t=1}^N \sum_{i=1}^m \sum_{j=1}^m w_i w_j e_{it} e_{jt} \quad (7)$$

In optimal combination forecasting, objective function is often presented in error, to make error minimum and closer to reality. Weight optimization model is constructed as formula 5.

Therein, X is objective function, to achieve minimum quadratic sum, weight coefficient w_i is the condition. So, optimal combination forecast model can be constructed as Formula 6.

$$\begin{cases} \min X = X(w_i) \\ s.t. \sum_{i=1}^m w_i = 1 \\ w_i \geq 0 \end{cases} \quad (8)$$

$$f(t) = w_1 y_1(t) + w_2 y_2(t) + L + w_z y_z(t) \quad (9)$$

B. Optimal Combination Forecasting Result

To increase the forecast accuracy, we use Ant Colony Algorithm to optimize weight of combination forecast model. And the model is experimented with y_1, y_2, y_3 as input.

Based on the previous financial classification, ST companies are taken as financial distressed. Non-ST companies are taken as financial normal. The forecast result is shown in Table 5. It can be seen that optimal combination model is better than other single forecasting model.

V. COMPARISON FORECAST RESULTS

It can be seen from Table 3 and Table 5 that financial risk forecast accuracy with combination forecasting model is obviously higher than with other single models.

A lot of empirical investigation indicated that Logit model's discrimination ability is stronger than Multiple Linear Regression Discriminant Model; artificial neural network can forecast better than Multiple Linear Regression Discriminant Model. While, comparison between Logit model and artificial neural network model will reach different conclusions under different research conditions. This experiment indicates that artificial neural network model is better for forecasting than Logit model, and combination forecasting model obviously

has more accurate forecasting than other single modes, with average accuracy of 100%. But this is too theoretical to achieve in real application.

TABLE V. THE FORECAST RESULTS

Sample class		Forecast result		Sum	Accuracy
		ST company	Normal company		
Training sample	ST company	35	0	35	100%
	Normal company	0	35	35	100%
Testing sample	ST company	15	0	15	100%
	Normal company	0	15	15	100%

VI. CONCLUSION

To solve the problem of financial risk warning for domestic listed enterprises, the paper presents optimal combination forecasting model to forecast financial risk, to provide effective direction for decision making. The author establishes mathematic model with a lot of financial data from 300 Shenzhen and Shanghai Stock Exchanges. It aims at enterprises' real existing financial problems.

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