

## Research on the Optimal Allocation of Assets Structure and Corporation Management Performance: A Case Study of China Textile Machinery Co., Ltd

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**Abstract:** This study argues that the research of assets structure has more practical value and universal significance than capital structure. They are the main source of creating corporate value and avoid risks. As a result, this study tries to evaluate the relationship between assets structure and business performance through the correlation of the demonstration about listed company. On this basis, the study separately and then curve fitting each variable, trying to fit in the established model based on the equation, find the optimal asset allocation values. This study will get the multivariate linear regression equation.

**Keywords:** Assets structure, curve fitting, the optimal allocation

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### INTRODUCTION

Assets structure means the ratio relationship between assets in the company and the proportion of total assets as well (HongXia and ZhengSheng, 2003). No matter what the different of industry, scale, management mechanism and management level, the companies should have their own assets structure proceed from the objective facts. From the specific point, it is static structure; from the specific period, it is dynamic structure (Gelles and Mitchell, 1999).

The significance of assets structure research is to grasp the investment ratio of each asset as a whole, through investing in the company by contribution to the firm's capital and the production and business operation process in the maintenance requirements, which is used to optimal resource allocation. It is important to control management risks, reduce operation costs and realize the objective of corporation value maximization (FullLing, 2004).

The significance of assets structure application value is to be an evaluation based on government macro-control policies, a scale of comparison investment efficiency between enterprise, also a evaluation criterion of how to grasp the ratio of assets in the investment process and how to maintain the appropriate assets structure in the production and business operation generally. Meanwhile, we can realize variety of the companies' resources allocation, observe all kinds of the companies' management level and evaluate several managerial performance results, use the trend analysis from macroscopic and microcosmic or more different sides simultaneously (Andreas, 2006).

### LITERATURE REVIEW

In 1951, the book named capital budget, which is written by American financial expert Joel Dean first showed that the company should change the view of financing management to assets management, in 1952, H. M. Markowitz published the related study about the portfolio selection, it mainly discussed how to rationally allocated financial assets by diversifying investment risks, in order to achieve the profit maximization. In 1958, Modigliani and Miller (1958) published the paper named 'capital cost, corporate finance and investment theory', which suggested the famous theory of Modigliani and Miller. However, after more than half a century, capital structure research is extremely popular; on the contrary assets structure research makes little headway. This study used capital structure to be a key word, which retrieved the related academic dissertations in the famous American literature ISI system (by August, 2010). The total number of related academic dissertations is 5475. Similarly there are only 1821 articles in ISI system as to the assets structure and 60% of them are appeared after 2004. Meanwhile, we used assets structure as a key word from 1980 to 2009 in CNKI; the titles followed with the key word capital structure are 9262 articles in precision inquiry. But used the same query builder, we realized only 1895 articles as changed the key word to assets structure.

However, Modigliani and Miller theory said, Enterprise value depended on the company's estimated future cash flow and the future cash flow was directly related to sales growth rate of the company (Shulian, 2004). Compared to financial structure, assets structure

made greater contribution to the business performance (Shuchuang, 2003). Therefore, this study draws on MM theory with reference to the capital structure, but different methods and technique. We identify, analyze and determine the optimal ratio of assets structure from normative and empirical research, even the relevant measure, through evaluating the relationship between assets structure of balance sheet and operating revenue as business performance.

This study illustrates that assets structure research has more application value and significant meanings of subject research, because they are the main resource of creating enterprise value and detecting all kinds of risks.

### THE LOGICAL RELATIONSHIP OF ASSETS, ASSETS STRUCTURE AND BUSINESS PERFORMANCE

An asset is an economic resource controlled by the specified entity (AAA, 1957). And assets structure is to allocate the resource diversely. The cost could be divided in 2 parts, the consumed costs which expresses expenses and the non-consumed costs which expresses assets (Peyton, 2004). Enterprise management is the use of all kinds of assets, also appear different forms of cost consumed, so different assets structures make the different effects on business operations and performance (Harris and Raviv, 1991). As above, this study impresses that assets could be divided into: Turnover assets, which is current assets; production assets, which is non-current assets and intangible assets; wasting assets, which is cost and expense. On one size, the use of assets generated revenue and generated the cost, which formed profits, also maximized enterprise value. In this cause and effect relationship, assets (including the consumed costs and expenses) are causes, revenues are effects. So in this study, the following equation expresses the cost/benefit function, in order to achieve the process of solving the enterprise value maximization.

**Hypothesis 1:** If profit = revenue - cost = 0, Then:

$$\text{revenue} = \text{cost} = \text{wasting assets} + \text{operating costs} + \text{operating expenses} \quad (1)$$

If profit<sub>1</sub> = revenue<sub>1</sub> - cost<sub>1</sub> = 0, then:

$$\text{revenue}_1 = \text{cost}_1 = \text{Turnover assets} + \text{production assets} + \text{Fixed assets and intangible assets} \quad (2)$$

**Among:** The left of the function indicates business performance (Dependent variable), the right indicates consumed and allocated assets. Profits are only affected by a shift between revenue and cost, so if we can prove the interrelationship between revenues and costs, it also can prove the interrelationship between business performances and consumed and allocated costs, the

proportion relationship of turnover assets and production assets as well. Finally we obtain the optimal asset allocation structure, that is, optimal assets structure, with maximizing company value.

Considering the above factors, this essay used formulas 1 and 2 as the optimal assets structure functions. It contained the measurement of risks from a formula and determined the optimal assets structure from 2 formula. If we considered about the limited factors for marketing demands, the scale of assets should have the limitation, which is the assets allocation scale under the optimal assets structure.

According to the above hypothesis, under the premise of going concern and expanding with the relationship between independent variables and dependent variables in 1 and 2 formulas, operating costs, business expenses and overheads, stocks and fixed assets have the positive relationship with operating revenues separately. Under the premise of scale effects and four independent variables with non-linear characteristics, the proper variation may lead to the greater degree change of operating revenues). If the empirical results support the assumption, it explains the enterprise scale effect. It is appropriate for the corporation expanding if the scale effects significantly. Conversely, it indicates the company cannot achieve the predicted scale effects, which should reduce the assets scales.

### POSITIVE ANALYSIS-CORRELATION ANALYSIS

The positive analysis used the listed company Aishi Co., Ltd. as the objective of study. Due to Aishi Co., Ltd. was one of the earliest listed companies, so the analyzed data is much more complete and the company has more neutral assets structure features in electronic industry.

This study has chosen the data from 1991 to 2010, totally about 20 years stocks, (Note that this study chooses the original price of the assets data, but not the net value. The reason is that we get rid of the human factors' affection), fixed assets (production costs are exclusive of intangible assets, because of the intangible assets' data extremely incomplete), operating revenues, operating costs and expenses (operating expenses+general and administrative expenses). The data are shown in Table 1.

In the same time, used operating revenues as dependent variable and others as independent variable, the empirical research establishes a linear multi-regression model. First, we analyze the relationship between operating revenues (Dependent Variable (y)) and all other factors (Independent Variable (x)) with Pearson analytical procedure. The results are shown as in Table 2.

As shown in Table 2, it indicated that operating revenues have a significant relevant relationship with all other factors.

Table 1: The totally 20 years' correlation factors about Aishi company during 1991 to 2010 sum: Yuan (CNY)

Year	Stock	Fixed assets	Operating revenue	Operating cost	Expenses
1991	360295.23	46032.11	2962118.53	2551864.91	0.00
1992	1931590.67	3689823.63	3665055.35	3235850.07	558848.70
1993	4364430.94	7698255.46	18188791.13	14421144.56	1801423.48
1994	7533090.00	24256210.00	61163420.00	60708470.00	0.00
1995	5663315.78	12276277.41	52241720.75	44388732.97	3678435.06
1996	8890036.26	15810017.50	52018969.03	45983385.56	6460921.20
1997	10755538.50	16159315.30	181124034.27	159413132.56	14895947.21
1998	56137652.54	109252262.68	156215529.61	108412255.34	30007853.25
1999	46390377.96	149801311.28	276022501.99	221977467.37	41988931.26
2000	66628534.68	153689233.28	317116221.64	240106417.96	37858952.15
2001	17517836.47	126739933.16	279372293.49	184219274.26	44458523.55
2002	29605914.85	179165451.53	479937167.99	330332888.86	54147078.72
2003	53505339.82	783293404.07	1524053635.74	1028069529.81	233360435.00
2004	33255286.99	976376047.52	1648482200.77	1102965072.48	250560445.70
2005	90599545.17	907397218.71	1494931357.16	933191116.23	323765784.50
2006	13939892.58	853116704.01	1527936492.63	1011221303.78	339703725.30
2007	11163127.74	2257701236.40	1551993846.65	1000388404.16	325059154.50
2008	12806700.15	858136312.62	2145076079.54	1127057812.62	551602835.80
2009	10337066.13	691830845.28	1871151326.31	1138824453.71	481041708.10
2010	14336120.14	587336734.87	1915533130.28	1059792826.74	597361715.60

SSE

Table 2: Correlation analysis of various factors

		Operating revenue	Stock	Fixed assets	Operating costs	Expenses
Operating revenue	Pearson correlation	1	0.168	0.774**	0.991**	0.959**
	Sig. (double-size)		0.479	0	0	0
	N	20	20	20	20	20
Stock	Pearson correlation	0.168	1	0.133	0.211	0.053
	Sig. (double-size)	0.479		0.577	0.373	0.824
	N	20	20	20	20	20
Fixed assets	Pearson correlation	0.774**	0.133	1	0.802**	0.675**
	Sig. (double-size)	0	0.577		0	0.001
	N	20	20	20	20	20
Operating costs	Pearson correlation	0.991**	0.211	0.802**	1	0.921**
	Sig. (double-size)	0	0.373	0		0
	N	20	20	20	20	20
Expenses	Pearson correlation	0.959**	0.053	0.675**	0.921**	1
	Sig. (double-size)	0	0.824	0.001	0	
	N	20	20	20	20	20

Dependent variable: Operating income; Independent variable: Stock, fixed assets, operating cost, expense; According to the Table 1

Table 3: Regression analysis of two factors

Model	R <sup>2</sup>	B	Sig.	Model	R <sup>2</sup>	B	Sig.
1	0.777			1	0.998		
(Constant)		252279191.631	0.196	(CONSTANT)		-9260109.977	0.572
Fixed assets		2.126	0.672	Operating costs		1.201	0.000
Stocks		1.086	0.000	Expense		1.185	0.000

Dependent variables: Operating revenue; Independent variable: Stock, fixed assets, operating cost, expense; According to the Table 1

Table 4: Regression analysis of four factors

Model		Non-standardized coefficient		Standardized coefficient		
		B	S.E.	Version	t	Sig.
1	(Constant)	-1.030E7	1.908E7		-0.540	0.597
	Stocks	0.034	0.525	0.001	0.065	0.949
	Fixed assets	-0.008	0.037	-0.006	-0.214	0.834
	Operating costs	1.210	0.090	0.720	13.468	0.000
	Expenses	1.180	0.168	0.299	7.016	0.000

Dependent variables: Operating revenues; Independent variable: Stock, fixed assets, operating cost, expense; According to the Table 1

According to the calculation of regression coefficient of assets (Stock and Fixed Assets), costs (Operating cost, Expenses) and revenues, we may get the regression degree inspection of the revenues and assets, as well as cost and expense of operating revenue. Finally, we may get the relatively regression

formula through the regression analysis between operating revenues and all four factors. The results are shown as follows Table 3 and 4.

In Table 3, the regression coefficient of assets, costs, expenses with revenues indicates that the creative ability of the fixed assets to operating revenue is 2

times more than stocks and the creative ability of the expenses to operating revenue is few lower than costs. It means that the contribution of fixed assets to operating revenue is greater than stocks, also the consumption of production costs to revenues makes greater effect on stocks costs.

Then according to Table 4, we get the equation that:

$$Y = -1.030 \cdot 10^7 + 0.034X_1 - 0.008X_2 + 1.210X_3 + 1.180X_4 \quad (3)$$

According to the function 3, operating revenues presents a significant correlation with stocks, operating costs and expenses separately. As for the unremarkable negative correlation between revenues and fixed assets, it just indicates the interaction between four factors, specially the interaction between expenses and fixed assets.

### EMPIRICAL ANALYSIS-MAXIMIZE VALUE ANALYSIS

This study used the listed company Aishi's 20 years financial reports data to function 3 as all maximize variables, which based on the correlation and regression analysis, with the maximum result of the multiple linear regression. The maximum value of operating revenue is RMB 2,057,583,188.04. This is actually similar with the maximum value in 2008 by RMB 2,145,076,079.54, which demonstrates that the market expanding ability had reached to the maximum one.

This study also makes curve fitting in process by using operating revenues with stocks, fixed assets, operating costs and expenses separately and establishes equation model with revenues as independent variable and other 4 factors as dependent variables. Finally, we can calculate the results of optimal allocation assets. The reason why we choose the operating income as independent variables is that we prefer to measure the relationship with others variables under a fixed results.

On the contrary to the dependent variables and independent variables, the relevant relationship will follow with the change. So the operating revenues and costs, overheads, stocks and assets have a significant positive relationship separately.

**Revenues and stocks:** We (According to the Table 1) used the company's 20 years operating revenues as independent variable, the stocks as dependent variables in Fig. 1.

The estimates of parameters are as follows in Table 5.

According to Table 5, this dissertation selects cubic function by the highest  $R^3$ , which the function is:

$$Y = 1866993.231 + 0.162x - 1.277 \cdot 10^{-10}x^2 + 2.486 \cdot 10^{-20}x^3 \quad (4)$$

Then, make the revenue generated into the formula, we solve the stocks  $Y = 11,116,098.13$ .

**Revenues and fixed assets:** We used the company's 20 years operating revenues as independent variable, the fixed assets as dependent variable in Fig. 2.

The estimates of parameters are as in Table 6.

According to Table 6, cubic function has no solution, so this dissertation selects quadratic function by the highest  $R^2$ , which the function is:

$$Y = -1.191 \cdot 10^8 + 1.469x - 4.833 \cdot 10^{-10}x^2 \quad (5)$$

Then, make the revenue generated into the formula, we solve the fixed assets  $Y = 2,698,877,467.57$ .

**Revenues and costs:** We used the company's 20 years operating revenues as independent variable, the operating costs as dependent variable in Fig. 3.

The estimates of Parameters are as in Table 7.

According to Table 7, we also select quadratic function by the highest  $R^2$  for simplified calculation:

$$Y = -1.465 \cdot 10^7 + 0.920x - 1.728 \cdot 10^{-10}x^2 \quad (6)$$

Table 5: Model summary and parameter estimates

	R <sup>2</sup>	F	df1	Equation	Model	Estimated of parameters	b1	b2	b3
Linear	0.028	0.522	1	18	0.479	2.071E7	0.005		
Quadratic	0.350	4.576	2	17	0.026	8030190.580	0.095	-4.716E-11	
Cubic	0.399	3.539	3	16	0.039	1866993.231	0.162	-1.277E-10	2.486E-20

Dependent variable: Stocks; Independent variable: Operating revenues; According to the Table 1

Table 6: Model summary and parameter estimates

Function	Model					Parameter estimation			
	R <sup>2</sup>	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0.600	26.965	1	18	0.000	1.083E7	0.546		
Quadratic	0.666	16.939	2	17	0.000	-1.191E8	1.469	-4.833E-10	
Cubic	0.699	12.411	3	16	0.000	-3736254.109	0.228	1.024E-9	-4.653E-19

Dependent variables: Fixed assets; Independent variables; Operating revenues; According to the Table 1

Table 7: Model summary and parameter estimates

Function	Model					Parameter estimation			
	R <sup>2</sup>	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0.983	1043.991	1	18	0.000	3.182E7	0.590		
Quadratic	0.995	1669.343	2	17	0.000	-1.465E7	0.920	-1.728E-10	
Cubic	0.997	1742.015	3	16	0.000	9198146.579	0.664	1.387E-10	-9.616E-20

Dependent variables: Operating costs; Independent variables; Operating revenues; According to the Table 1

Table 8: Model summary and parameter estimates

Function	Model					Parameter estimation			
	R <sup>2</sup>	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0.919	204.816	1	18	0.000	-2.232E7	0.243		
Quadratic	0.952	169.938	2	17	0.000	1.077E7	0.008	1.231E-10	
Cubic	0.954	109.927	3	16	0.000	2403551.390	0.098	1.377E-11	3.373E-20

Dependent variables: Expenses; Independent variables: Operating revenues; According to the Table 1

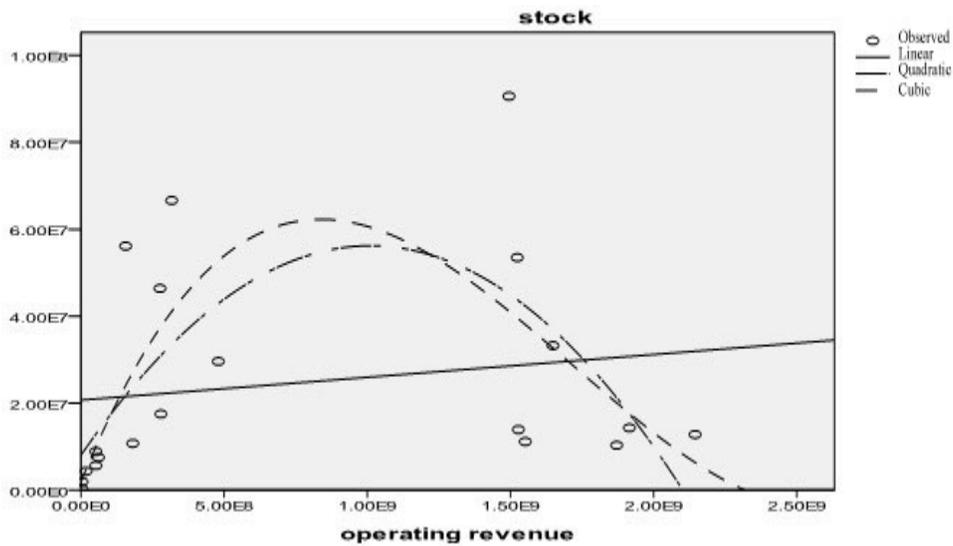


Fig. 1: Curve estimation graph, independent variables: operating revenue; dependent variables: stock; according to the Table 1

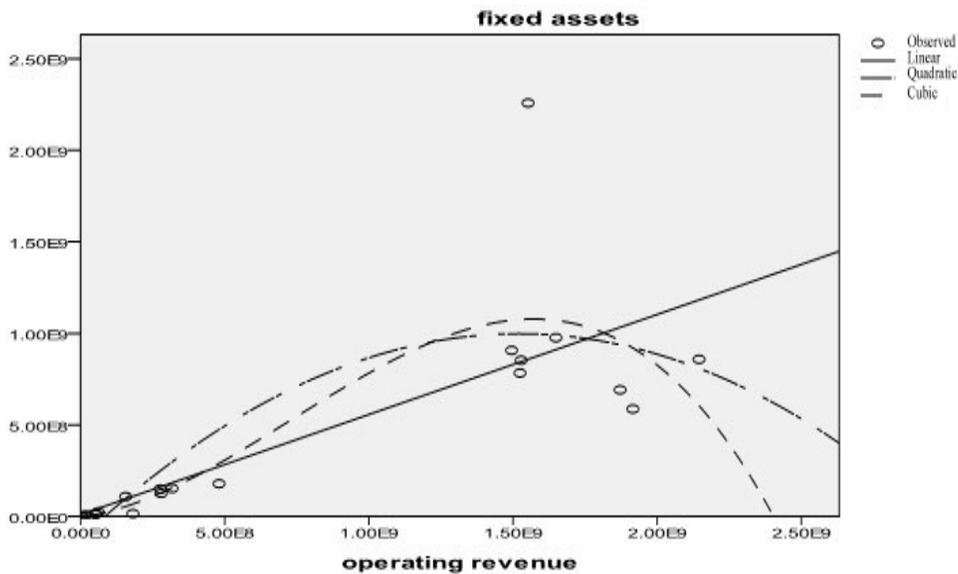


Fig. 2: Curve estimation graph, independent variable: operating revenue; dependent variable: fixed assets; according to the Table 1

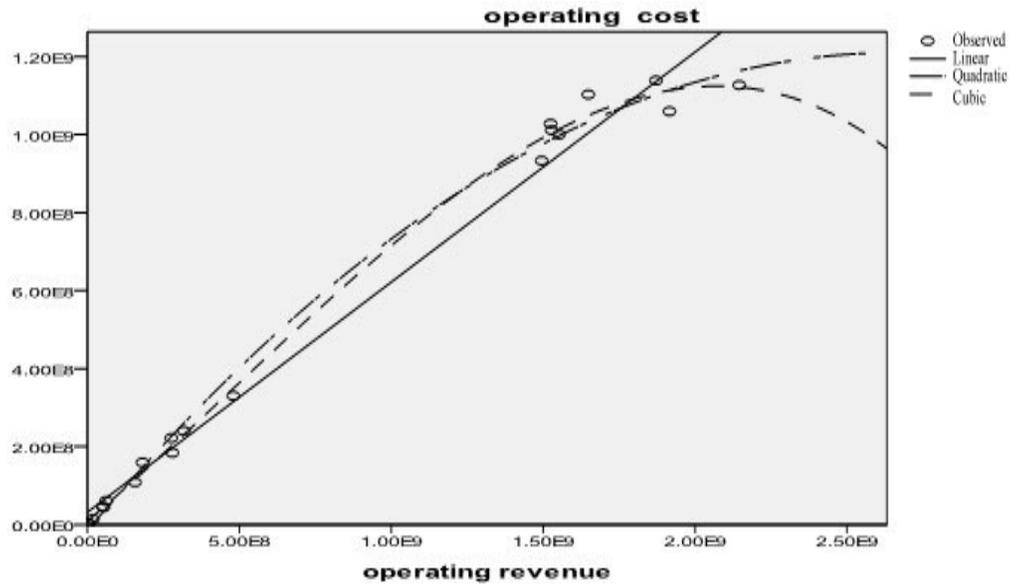


Fig. 3: Curve estimation graph, independent variable: operating revenue; dependent variable: operating cost; according to the Table 1

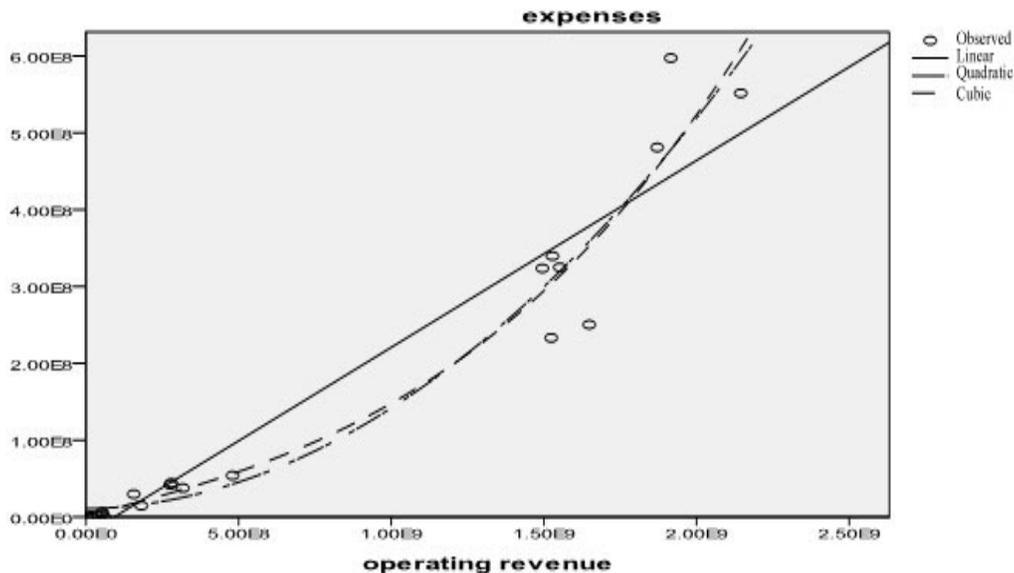


Fig. 4: Curve estimation graph, independent variable: operating revenue; dependent variable: expense; according to the Table 1

Then, make the revenue generated into the formula, we solve the operating costs  $Y = 1,805,169,085.61$ .

Then, make the revenue generated into the formula, we solve the expenses  $Y = 556,168,912.53$ .

**Revenue and expenses:** We used the company's 20 years operating revenues as independent variable, the expenses as dependent variable in Fig. 4. The estimates of parameters are as in Table 8.

**CONCLUSION**

According to Table 8, we select cubic function by the highest  $R^2$ , because the quadratic function solution is negative:

The fitting function and results showed as above-mentioned, the allocated assets should retain the stocks as RMB 11,116,098.13, fixed assets as RMB 2,698,877, 467.57, that is, the proper ratio of fixed assets and stocks is 242:1. The ratio can meet the requirement to maximize revenue and to minimize costs, in order to achieve the best return. Any form of optional expansion must lead to the relevant linear increase of the costs and

$$Y = 2403551.390 + 0.098x + 1.377 \cdot 10^{-11}x^2 + 3.373 \cdot 10^{-20}x^3 \quad (7)$$

expenses. Decreasing efficiency in using assets, it brings to operational risks for enterprises, which makes the company's difficult operation. However, the highest allocation of fixed assets as RMB 2,257,701,236.40, the stocks as RMB 90,599,545.17, indicates the lower efficiency of assets utilization (Table 1).

#### REFERENCES

- AAA (American Accounting Association), 1957. Accounting and reporting standards for corporate financial statements. *Account. Rev.*, 32(4): 536-546.
- Andreas, K., 2006. Risk, capital requirements and the asset structure of companies. *Manage. Financ.*, 2006(9): 774-785.
- Fulling, L., 2004. Asset structure, empirical research on the impact of capital structure on the corporate performance. *Market J.*, 2004(1): 24-25.
- Gelles, G.M. and D.W. Mitchell, 1999. On the robustness of factor structures to asset repackaging. *J. Math. Econ.*, 31: 309-320.
- Harris, M. and A. Raviv, 1991. The theory of capital structure. *J. Financ.*, 46: 297-355.
- HongXia, N. and X. ZhengSheng, 2003. 'ZiChanJiGou Yu QiYeJingYingYeJi NeiZaiGuanXi (The relationship between asset structure and business performance)'. *Tech. Econ. Manage. Res.*, 2003(6): 110-111.
- Modigliani, F. and M.H. Miller, 1958. The cost of capital, corporation finance and the theory of investment. *Am. Econ. Rev.*, 48(3): 261-297.
- Peyton, L., 2004. An Introduction to Corporate Accounting Standards. Xiamen University Translation Team, China Financial and Economic Publishing House, 5: 16.
- Shuchuang, W., 2003. The effect of financing structure and assets structure to business performance. *Stat. Decis.*, 2003(8): 60-96.
- Shulian, L., 2004. Enterprise value appraisal and value creation strategy research: Two value models and six driving factors. *Account. Res.*, 2004(9): 67-71.