

THE RESEARCH OF THE OPTIMAL ALLOCATION OF ASSETS STRUCTURE AND BUSINESS PERFORMANCE

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ABSTRACT

This paper 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 paper tries to evaluate the relationship between assets structure and business performance through the correlation of the demonstration about listed company. On this basis, the paper 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 paper will get the multivariate linear regression equation.

JEL CLASSIFICATION & KEYWORDS

■ G31 ■ G32 ■ ASSETS STRUCTURE ■ CURVE FITTING
■ THE OPTIMAL ALLOCATION

INTRODUCTION

Assets structure means the ratio relationship between assets in the company, and the proportion of total assets as well (Ni HongXia 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, 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 (Fulling Lu, 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).

Related work

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 paper about the portfolio selection, it mainly discussed how to rationally allocated financial assets by

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diversifying investment risks, in order to achieve the profit maximization. In 1958, Franco Modigliani and Merto H.Miller 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 paper 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 (Liu Shulian, 2004). Compared to financial structure, assets structure made greater contribution to the business performance (Wu Shuchang, 2003). Therefore, this paper 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 paper 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, Littleton, 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, 1991). As above, this paper 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 paper, the following equation expresses

the cost / benefit function, in order to achieve the process of solving the enterprise value maximization.

$Profit = revenue - cost$, means current profit, that is, the past events result in the current financial results.

$Profit + profit_1 = revenue + revenue_1 - (cost + cost_1)$, it supposes that the corporation should create total financial results in a closed and completed circumstance. $Revenue_1$ means that we used the existing assets to create current assets, and $Cost_1$ means the relevant costs in the future, that is, Consumption costs of turnover assets and production assets, $profit_1$ means the financial results in the future period.

The profit is the difference between revenue and cost, so we can assume the above function that:

1. Hypothesis 1: If $profit = revenue - cost = 0$, then:

$Revenue = cost = wastingassets = operating costs + operating expenses$ (A)

If $profit_1 = revenue_1 - cost_1 = 0$, then:

$revenue_1 = cost_1 = Turnoverassets + productionassets$ (fixed assets and intangible assets) (B)

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.

2. Hypothesis 2: The creations of sustainable income are mainly depended on operating activities, so we assume that there is non-operating items in the balance sheet, including the factors of monetary resource, capitalized assets and investment projects. Accordingly, there is non-investment of management items, non-operating income and expense, or tax and financing cost in the profit and loss statement.

3. Hypothesis 3: the operating costs equals to sales volume multiply by unit cost and the operating revenue is sales volume multiplied by sales price, meanwhile the cost volume is affected by cost capacity factors. This paper assumes that the market idealized, unit costs are linear with sales price, at the same time, production and marketing consistently. We also suppose that marketing demand and money recovery stably, which has no bad debts, depreciation or fixed way of the amortization.

Considering the above factors, this essay used formulas A and B as the optimal assets structure functions. It contained the measurement of risks from a formula, and determined the optimal assets structure from B 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 A and B 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 can not achieve the predicted scale effects, which should reduce the assets scales.

Positive analysis - Correlation analysis

The positive analysis used the listed company Feile Co., Ltd as the objective of study. Due to Feile 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 paper has chosen the data from 1991 to 2010, totally about 20 years stocks, (Note that this paper chooses the original price of the assets data, but not the net value. the

Year	Stock	Fixed assets	Operating revenue	Operating cost	Expenses
1991	60617242	26555995	54260018	50384540	10500000
1992	68149080	37182871	62740796	39114112	12784696
1993	117738155	46583707	153886483	119580776	19948496
1994	155366000	49002000	265742000	207278760	32436781
1995	241327634	108879004	303668539	240226605	44925066
1996	313790145	110282355	30160464	222778519	56320620
1997	417099185	106484569	419840569	316995673	77872864
1998	462727859	168203237	499159324	316581605	92835995
1999	446317538	218882331	532683982	309528988	121007571
2000	403045912	224043842	552288474	380397194	135943054
2001	370945901	343605178	450910083	377977755	93949400
2002	425399114	471395962	590333724	451876951	146260830
2003	376477916	454354443	905541814	767493155	167410078
2004	332808076	500620383	771479824	620415754	205052848
2005	410922846	542851001	1231982801	935512109	260084569
2006	435141251	491563621	1432097168	1149689246	284816126
2007	424 846 516	349 774 082	1491923213	1232221606	319352278
2008	399 719 290	350 744 211	1349389268	1082672863	236972956
2009	264995617	238836478	1218188208	987979794	258290318
2010	296542331	274540479	1155722162	980291537	223007041

Source: SSE and Juyuan Sirui Data-based Collection (2011)

Table 2: Correlation analysis of various factors

Pearson Correlation	Items	Operating Revenue	Stock	Fixed assets	Operating costs	Expenses
	Operating Revenue	1	0,578	0,738	0,995	0,981
	Stocks	0,578	1	0,662	0,525	0,603
	Fixed assets	0,738	0,662	1	0,727	0,79
	Operating costs	0,995	0,525	0,727	1	0,971
	Expenses	0,981	0,603	0,79	0,971	1
Sig. (one-size)	Operating Revenue	.	0,004	0	0	0
	Stocks	0,004	.	0,001	0,009	0,002
	Fixed assets	0	0,001	.	0	0
	Operating costs	0	0,009	0	.	0
	Expenses	0	0,002	0	0	.
Dependent Variable: Operating income. Independent Variable: Stock, Fixed Assets, Operating cost, Expense. Source: Calculated from Table 1						

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) and all other factors (Independent Variable) with Pearson analytical procedure. The results are shown in Table 2.

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

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 Table 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 3 times more than stocks, and the creative ability of the expenses to operating revenue is 1.5 times more 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:

$$y = -1.365 \times 10^7 + 0.247x_1 - 0.133x_2 + 0.941x_3 + 1.059x_4 \quad (1)$$

According to the function 1, 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 paper used the listed company Feile's 20 years financial reports data to function 1 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 1,517,780,192.55. This is actually similar with the maximum value in 2007 by RMB1, 491,923,213.13, which demonstrates that the market expanding ability had reached to the maximum one. This is also proved by declining of the operating revenues in 2007.

This paper 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

Table 3: Regression analysis of two factors

Model	R2	B	Sig	Model	R2	B	Sig
1	0,559			1	0,994		
(constant)		5,86E+07	0,778	(constant)		3,04E+07	0,068
Fixed assets		1,727	0,009	Operating costs		0,897	0
Stocks		0,582	0,469	Expense		1,238	0,005
Dependent variables: operating revenue. Independent Variable: Stock, Fixed Assets, Operating cost, Expense. Source: Calculated from Table 1							

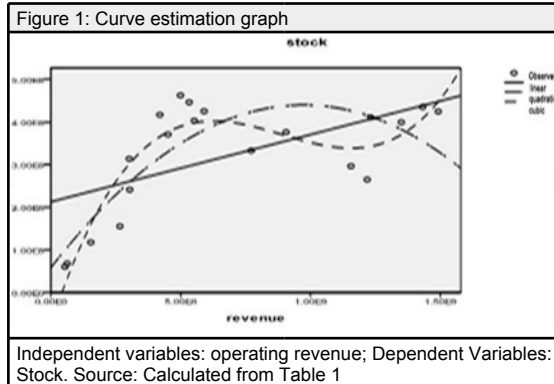
Table 4: Regression analysis of four factors

Model		Non-standardized coefficient		Standardized coefficient		
		B	Standard error	Version	t	Sig.
Coefficient"	(constant)	-1,36E+07	2,07E+07		-0,654	0,523
	Stocks	0,247	0,081	0,067	3,046	0,008
	Fixed assets	-0,133	0,078	-0,049	-1,718	0,106
	Operating costs	0,941	0,086	0,78	10,999	0
	expenses	1,059	0,384	0,222	2,755	0,015
Dependent variables: operating revenues. Independent Variable: Stock, Fixed Assets, Operating cost, Expense Source: Calculated from Table 1						

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 used the company's 20 years operating revenues as independent variable, the stocks as dependent variables in Figure 1:



The estimates of parameters are as follows in Table 5:

Table 5: Model summary and parameter estimates			
	linear	quadratic	cubic
R2	0,334	0,628	0,837
F	9,018	14,355	27,422
df1	1	2	3
equation	18	17	16
model	0,008	0	0
estimated of parameters	2,13E+08	5,82E+07	-7,53E+07
b1	0,158	0,785	1,861
b2		-4,04E-10	-2,29E-09
b3			8,57E-19
Dependent variable: Stocks; Independent variable: Operating revenues. Source: Calculated from Table 1			

According to Table 5, cubic function has no solution, so this dissertation selects quadratic function by the highest R², which the function is:

$$y = 5.816 \times 10^7 + 0.785x - 4.036 \times 10^{-10}x^2 \quad (2)$$

Then, make the revenue generated into the formula, we solve the stocks $y = 319,861,601.80$.

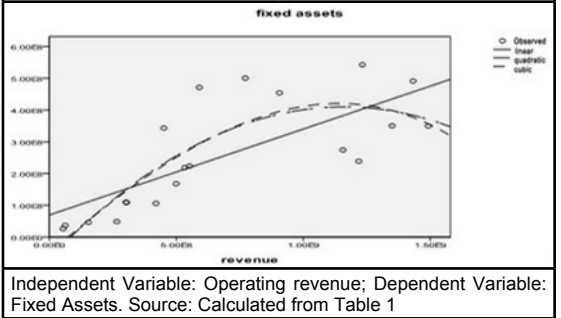
Revenues and fixed assets

We used the company's 20 years operating revenues as independent variable, the fixed assets as dependent variable in Figure 2.

The estimates of parameters are in Table 6.

Table 6: Model summary and parameter estimates									
function	Model					Parameter estimation			
	R 2	F	df1	df2	Sig.	constant	b1	b2	b3
linear	0,545	21,551	1	18	0	6,98E+07	0,271		
quadratic	0,671	17,31	2	17	0	-6,60E+07	0,822	-3,54E-10	
cubic	0,672	10,945	3	16	0	-4,99E+07	0,691	-1,26E-10	-1,04E-19
Dependent variables: Fixed assets; Independent variables: Operating revenues. Source: Calculated from Table 1									

Figure 2: Curve estimation graph



According to Table 6, we also select quadratic function by the highest R² for simplified calculation:

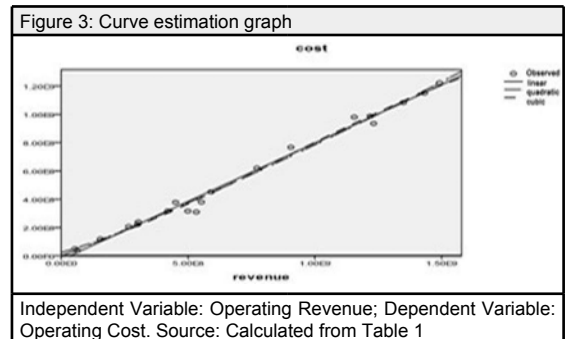
$$y = -6.604 \times 10^7 + 0.822x - 3.544 \times 10^{-10}x^2 \quad (3)$$

Then, make the revenue generated into the formula, we solve the fixed assets $y = 365,159,379.20$.

In addition, from Figure 1 and Figure 2, the stocks, fixed assets and revenues have the optimal tangent. Meanwhile Table 5 and Table 6 have verified the insignificant positive correlation relationship between dependent variables and independent variables, which illustrates the optimal assets allocation structure in the company.

Revenues and costs

We used the company's 20 years operating revenues as independent variable, the operating costs as dependent variable in Figure 3:



The estimates of Parameters are in Table 7.

According to Table 7, we select cubic function by the highest R², because the quadratic function solution is negative:

$$y = 2.325 \times 10^7 + 0.519x + 4.177 \times 10^{-10}x^2 - 1.588 \times 10^{-19}x^3 \quad (4)$$

Then, make the revenue generated into the formula, we solve the operating costs $y = 1,217,979,938$.

Revenue and expenses

We used the company's 20 years operating revenues as independent variable, the expenses as dependent variable in Figure 4.

Table 7: Model summary and parameter estimates

function	Model					Parameter estimation			
	R 2	F	df1	df2	Sig.	constant	b1	b2	b3
linear	0,99	1761,969	1	18	0	-2,76E+07	0,824		
quadratic	0,991	914,865	2	17	0	-1488182,908	0,719	6,80E-11	
Cubic	0,992	627,593	3	16	0	2,33E+07	0,519	4,18E-10	-1,59E-19

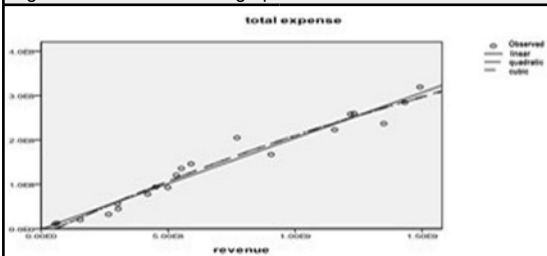
Dependent variables: Operating costs; Independent variables: Operating revenues. Source: Calculated from Table 1.

Table 8: Model summary and parameter estimates

function	Model					Parameter estimation			
	R 2	F	df1	df2	Sig.	constant	b1	b2	b3
linear	0,962	456,317	1	18	0	-1068142,952	0,205		
quadratic	0,966	239,114	2	17	0	-1,42E+07	0,259	-3,43E-11	
Cubic	0,966	150,193	3	16	0	-1,56E+07	0,269	-5,32E-11	8,57E-21

Dependent variables: Expenses; Independent variables: Operating revenues. Source: Calculated from Table 1.

Figure 4: Curve estimation graph



Independent Variable: Operating Revenue; Dependent Variable: Expense. Source: Calculated from Table 1

The estimates of parameters are in Table 8.

According to Table 8, we also select quadratic function by the highest R² for simplified calculation:

$$y = -1.422 \times 10^7 + 0.259x - 3.433 \times 10^{-11}x^2 \quad (5)$$

Then, make the revenue generated into the formula, we solve the expenses = 1,217,979,938.

From figure 3 and figure 4, the operating costs, expenses and operating revenue have the linear relationship, but not the optimal tangent. Simultaneously, R² in Table 7 and Table 8 have proved that the significant positive correlation relationship between dependent variables and independent variables. It is not identical with this paper's requirement of non-significant positive correlation relationship. It may exactly essential problems when the company starts to decline in the market saturation.

Conclusion

The fitting function and results showed as above-mentioned, the allocated assets should retain the stocks as RMB 319,861,601.80, fixed assets as RMB 365,159,379.20, that is, the proper ratio of stocks and fixed assets is 45:55. 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 expenses. Decreasing efficiency in using assets, it brings to operational risks for enterprises, which makes the company's difficult operation. This point also can prove by the revenue decreased from 2008, recombination from 2009, and the highest revenue occurred when the fact of the highest costs and expenses for RMB 1,223,221,606 and RMB 319,352,278.70 increased higher than growing rate separately. However, the highest allocation of fixed assets as RMB 542,851,001.10, the stocks as RMB 462,727,859.70, indicates the lower efficiency of assets utilization.

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