Regression Analysis of the Impact Factors of Steel Enterprise Net Profit Based on Ordinary Least Squares

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Abstract: In this study, in order to study the influence about the phenomenon of loss in steel enterprises, factors affecting net income are analyzed which can better control the net profit of steel enterprises and make the enterprise in a favorable position in the future competition. This study uses net profit to measure the operating results of an enterprise and the econometric analysis is carried on influencing factors of the net profit. By selecting the influence of net profit indexes, this study uses an empirical analysis of econometric software-EViews 6.0, a non-linear model is constructed by ordinary least squares method among fixed assets (X1), total profit (X5), income tax (X6), the rate of return on net assets (X7), the capital gains rate (X9) and the net profit, at the same time, the correlated inspections are being done. We can get some conclusions so that making the steel enterprises get a much better development.

Key words: Steel enterprises; net profit; regression analysis

INTRODUCTION

There has been the phenomenon of the loss in the steel enterprises during recent years, in order to analyze the loss causes of steel enterprises, Anshan steel company is selected as the research object. The regression analysis selects some quantifiable index and net profit. According to the regression results, steel enterprises select suitable investment decisions so that enterprises can make a profit.

In 1960s, foreign scholars began to study the problems of enterprise profit management, the main researches were Ball and Brown (1968) were the United States of accounting scientist and they found that the change of stock price and earnings were significantly correlated. Beaver (1968) proved that there was a positive relationship between the stock price and the financial report on the other hand. Then, this study began to form, until the 80's the theory gradually moved towards mature. Lev (1989) pointed out the main factors which affect the net profit and forming the basic structure of quality. Easton and Zmijewski (1989) found that there was a positive relationship between persistent profit and earnings coefficient at the same year. In the 80's, the scholars also studied on the enterprise profit (Porter, 2004) (Trueman and Titman, 1988). Finger (1994) used historical profit data and historical cash flow data to predict the future cash flow, he discovered that historical cash flow data predicted more accurately. Lorek and Willinger (1996) studied the cash forecast model among profits, the history of cash and short-term accruals. Graham and Knight (2000) conducted the empirical analysis with the actual data in a certain extent, he concluded that the obtained cash flow affected the profit quality. Ali et al. (2011) made a further analysis on the profit quality of enterprise.

China began to study corporate profits in the early 1990s, Wu (1991) proposed a target profit management in the public transportation industry applications after which they began to study the management method of corporate profits. Until the 21st century, the research of corporate profits has been relatively mature.

Wang (2013) pointed out in her article that there was the inventory problem in FAW Xiali Co. Ltd and there was a certain role to increase profit by putting forward some suggestions for management. Fang (2012) pointed out that investors and stakeholders increasingly concerned about the company’s financial information, there was also more and more fraud of financial information in enterprises at the same time, so we need discriminate the companies’ profit and financial information, this would help managers make better investment decisions. Guo (2011) pointed out in the article how to achieve scientifically and realistically the enterprise’s financial objectives and value. Wang et al. (2010) studied that in the financial crisis environment, it was necessary to analyze power grid...
enterprise’s cost system and characteristics, we should control the cost in a reasonable range and manage the whole process of the power grid enterprise, so that, we could realize the profit of the enterprise. Lan (2009) pointed out in his article in order to achieve stability profit, enterprise’s management work should introduce reasonable economic management system. Qi (2007) mentioned in the article that the new accounting standards began to implement in January 1, 2007, the new accounting policy would affect the enterprise profit and earnings per share and other financial indicators, if we wanted to manage corporate profits and we must thoroughly understand the new accounting standards. Jiang et al. (2006) pointed out that due to the particularity of Chinese market economy, through the empirical research found that the diversification had a positive effect on enterprise value. Chen (2005) discussed the main reasons of the automobile industry monopoly, in order to increase the profit of enterprise, we must continue to promote inter enterprise competition. Zhou (2004) who put the meager profit enterprises as the research object, he selected the indexes related to earnings management, it studied on the proportion of enterprises on the earnings management and means. Lu et al. (2003) researched on the basis of the inside and outside scholars, they found that the key factor of the enterprise profit growth was the brand loyalty of the conclusion.

Through the study of inside and outside enterprises net profit, it can be found that researchers studied on the influence of net profit enterprises in the domestic while researchers studied the cash flow of enterprise’s net profit abroad. This study studies the related problems of corporate profits, it chooses steel industry as an example and then we select indicators from the following three aspects. Impact profit formula, financial statements and the rate of exchange published data. The method of regression analyses the factors influencing the net profit, it concludes about the net profit model. From the model, we can provide useful advice for managers, causing the enterprise to be in the more advantageous competition position.

**ANALYSIS OF FACTORS INFLUENCING THE NET PROFIT**

According to the basic formula of net profit: Net profit = total profit-the income tax expenses, the total profit and the income tax expenses can be chosen as its two main factors affecting net profit, there is a positive relationship between total profit and net profit.

From the balance sheet, profit statement and cash flow statements, factors affecting net profit not only come from the income statement, but also come from the balance sheet and cash flow statement. We choose the fixed assets, liabilities, owner’s equity and ending cash and cash equivalents as the factors influencing the net profit.

According to Anshan Steel Company Securities Network releases data, indicators are selected include the rate of return on net assets, rate of return on total assets, the capital gains rate, operating profit ratio and cost profit rate.

**CONSTRUCTION AND SOLUTION OF THE MODEL**

**Choice of the sample and indicators:** Because the steel industry suffered serious losses in recent years and Anshan Steel Company has been Special Treatment (ST), it based on this background, this study studies the influence of Anshan Steel Company Limited by Share Ltd on net profit factors. This study selects time series data of Shenzhen stock exchange from 1997 to 2011 and its data comes from hexun.com-Angang Steel Company-stock-market center.

According to the above-mentioned reasons for selecting indicators, the study selected the following indicators: Fixed assets (X1), total liabilities (X2), the owner’s equity (X3), the final cash and cash equivalents (X4), total profit (X5), income tax (X6), the rate of return on net assets (X7), return on total assets rate (X8), the capital gains rate (X9), operating profit ratio (X10) and cost profit rate (X11). Through statistical testing, we preliminarily analyse the distribution of the total sample, as shown in Table 1.

**Construction and solution of the model:** By solving the model, we select a fixed assets (X1), total profit (X5), income tax (X6), the rate of return on net assets (X7), the capital gains rate (X9) as explaining variables of the model, Finally it is concluded that the output model as shown in Fig. 1.

By ordinary least squares estimation method and the output results of the above can obtain the net profit function of Anshan Steel Company.

\[
1/Y = -1.93967383533e-10 + 4.09421945657e-21 \times (1/X1 + X1) + 0.689121843221 \times X5 - 0.00733089957343 \times X6 - 1.5714794645e - 11 \times X7 + 2.65688519298e - 10 \times (X9 + 1/X9)
\]

\[(-3.94)(-3.60)(6.79)(-5.95)(-5.95)(-7.31)(7.37)\]

R² = 0.999  S.E. = 5.58E-11  F = 3901.903

**Dependent Variable:** Y
**Method:** Least Squares
**Date:** 06/28/13 **Time:** 17:18
**Sample:** 1997-2011
**Included observations:** 15

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
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<td>C</td>
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<td>4.92E-11</td>
<td>-3.844 4477</td>
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<td>1/X1 + X1</td>
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<td>1.14E-21</td>
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<tr>
<td>X</td>
<td>0.699122</td>
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<td>7.635 217</td>
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<tr>
<td>X</td>
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<td>0.002132</td>
<td>6.061 73</td>
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<td>X</td>
<td>-1.57E-11</td>
<td>2.15E-12</td>
<td>-7.306 326</td>
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<td>X + X</td>
<td>2.68E-10</td>
<td>3.61E-11</td>
<td>7.526 803</td>
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</table>

R-squared: 0.999939
Adjusted R-squared: 0.999220
S.E. of regression: 5.9E-11
Sum squared resid: 2.80E-20
Log likelihood: 336.6292
F-statistic: 3901.903
Durbin-Watson stat: 2.670434

**Fig. 1:** Output model

**Heteroscedasticity Test Glejser**

<table>
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<tr>
<th>F-statistic</th>
<th>Prob. (F(5,9))</th>
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<tr>
<td>Obs/R-squared</td>
<td>3.758197</td>
<td>0.5847</td>
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<td>Scaled explained SS</td>
<td>1.910721</td>
<td>0.814</td>
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**Fig. 2:** Heteroscedasticity test

**Breusch-Godfrey Serial Correlation LM Test:**

<table>
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<th>F-statistic</th>
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<tr>
<td>Obs/R-squared</td>
<td>2.708531</td>
<td>0.0986</td>
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</table>

**Fig. 3:** Autocorrelation test

**Table 1:** Statistical test

<table>
<thead>
<tr>
<th></th>
<th>MAX</th>
<th>MIN</th>
<th>AVERAGE</th>
<th>SD</th>
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<tbody>
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<td>2082194933</td>
<td>2197238206</td>
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<td>X2</td>
<td>5908300000</td>
<td>1210610000</td>
<td>1843801640</td>
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<td>X3</td>
<td>5534500000</td>
<td>5092173000</td>
<td>2442958840</td>
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<tr>
<td>X4</td>
<td>7733000000</td>
<td>5623390000</td>
<td>2397544000</td>
<td>1727681002</td>
</tr>
<tr>
<td>X5</td>
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<td>-3281000000</td>
<td>-2290221133</td>
<td>3454676727</td>
</tr>
<tr>
<td>X6</td>
<td>2848000000</td>
<td>9490000</td>
<td>463157400</td>
<td>131188994</td>
</tr>
<tr>
<td>X7</td>
<td>0.23</td>
<td>-0.04</td>
<td>0.08933333</td>
<td>0.07455048</td>
</tr>
<tr>
<td>X8</td>
<td>0.15</td>
<td>-0.02</td>
<td>0.06</td>
<td>0.04795881</td>
</tr>
<tr>
<td>X9</td>
<td>1.15</td>
<td>-0.3</td>
<td>0.35</td>
<td>0.38503498</td>
</tr>
<tr>
<td>X10</td>
<td>0.16</td>
<td>-0.04</td>
<td>0.05333333</td>
<td>0.06542898</td>
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The figures in brackets are the corresponding T-statistic values, S.E. is the standard error of regression function, R² is the determination coefficient. R² = 0.999, it means that the type of fitting is good. 99% of variable Y was explained by X1, X3, X6, X7, X9. The probability is less than 0.05, the equation’s F-statistic value is 3901.903 and the equation is significant as a whole. Because of t0.005/2 (9) = 2.26, the test results reject the null hypothesis there is nonlinear regression relationships among fixed assets, total profit, income tax, the rate of return on net assets, the capital gains rate and net profit. Variables pass under the 5% level of significance test, so you can think that the model can well reflect the research problem of quantitative relationship.

**MODEL TEST**

**Heteroscedasticity testing** The Glejser testing method is used to test heteroscedasticity, it can be seen T = 5 and R² = 0.25, we check the Chi-square distribution table (α = 0.05, the degrees of freedom is 20), so, TR² = 3.75 = 0.05 (20) = 31.410, the model shows no heteroscedasticity. Also a view from the probability distribution, all of the probability values are bigger than 0.05, it shows that the model does not have heteroscedasticity, as shown in Fig. 2.

**Autocorrelation testing** The LM testing method is used to test autocorrelation, it can be seen T = 15 and R² = 0.18, we check the Chi-square distribution table (α = 0.05, the degrees of freedom is 1), so TR² = 3.75 = 0.05 (1) = 3.841, the model shows no autocorrelation.

Also a view from the probability distribution, all of the probability values are bigger than 0.05 that the model does not have autocorrelation, as shown in Fig. 3.

In summary, the described model in this study has no heteroscedasticity and autocorrelation, the model has better stationarity.

**CONCLUSION**

According to the current market environment, in order to adapt to the pace of development of economy, it
is more important to invest in enterprise, to carry out a reasonable investment, we manage the net profit efficiently and it analyses business-related investments impact on net profit, it has become an important factor for faster and better development of enterprise. Due to Chinese national conditions and the traditional concept, enterprise in the field of Chinese industry has become relatively stable, but the steel enterprises in recent years has been a loss, this study analyses several important factors that affect the net profit of enterprises, so enterprises in the investment process defined the various factors that impact on net profit, we can better control net profit of such enterprises, it can make the enterprise in a favorable position in the future competition.

In this study, we use the relevant knowledge of econometrics, there is the regression analysis between the net profit and the related factors affecting the net profit and then we get a nonlinear regression equation about the net profit. But there are also some insufficiencies in this study when we select the explain variables, we oversight a lot of qualitative variables, such as the ability of employees, the quality of leadership, enterprise culture, so the explain variables cannot fully explained the net profit.

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