CSCanada
**Management Science and Engineering**
Vol. 5, No. 3, 2011, pp. 102-106
**DOI:**10.3968/j.mse.1913035X20110503.1z052

ISSN 1913-0341[Print]
ISSN 1913-035X[Online]
www.cscanada.net
www.cscanada.org

# An Empirical Study of Performance Evaluation Method EVA-Based for Telecom Operators

FAN Zifu[1,*]; HU Jiating[1]; WAN Xiaoyu[1]

[1]Chongqing University of Posts and Telecommunications, Chongqing, 400065, China
[*]Corresponding author.
Address: Chongqing University of Posts and Telecommunications, Chongqing, 400065, China
Associate Professor, mainly engaged in Next Generation Network Technology and Communications Operations Management.
Email: fzfboy@163.com

**Supported by** "Chongqing Education Commission Foundation of China" (No. KJ080512; No. KJ090508).

Received 23 June 2011; accepted 17 July 2011

## Abstract
Combining with EVA-based operation value chain of telecom operators, this paper researches the EVA evaluation scheme introduced by SASAC for central enterprises. In this paper, we design the model of EVA and OPE, ROI, ROE by using the regression analysis method firstly, then find out the relationship between EVA and traditional performance evaluation indexes by combining with the annual report three of telecom operators published in recent years. From the empirical study of Performance Evaluation Method EVA-based, we can find that EVA evaluation scheme is propitious to enhance the management and incentive effect of telecom operators, and promote the development of telecom industry healthily and stably.

**Key words:** EVA; Operation value chain; Performance evaluation; Regression analysis

FAN Zifu, HU Jiating, & WAN Xiaoyu (2011). An Empirical Study of Performance Evaluation Method Eva-Based for Telecom Operators. *Management Science and Engineering, 5*(3), 102-106. Available from: URL: http://www.cscanada.net/index.php/mse/article/view/j.mse.1913035X20110503.1z052 DOI: http://dx.doi.org/10.3968/j.mse.1913035X20110503.1z052

## INTRODUCTION
SASAC introduces the performance evaluation scheme EVA-based since 2010 for the central enterprises in order to lead the Central Enterprises to pay more attention to value creation, change the mode of economic growth effectively and enhance sustainable development ability. At the same time, EVA (Economic Value Added) plays a practical role in performance evaluation of telecom operators, and can optimize resources collocation, reduce repeated construction and improve resource utilization rate for the construction of 3G.

This paper is organized as follows: section 2 analyses the performance evaluation system and EVA operation value chain of telecom operators, section 3 is the hypothesis and modeling, section 4 is the empirical research and result analysis.

## 1. PERFORMANCE EVALUATION OF TELECOM OPERATORS AND EVA OPERATION VALUE CHAIN

### 1.1 The Performance Evaluation Management System of Telecom Operators
Generally, the performance management indicator system of telecom operator consists of the following five aspects: the financial evaluation indexes, the customer evaluation indexes, the business process evaluation indexes, the innovation evaluation indexes and the staff evaluation indexes. According to EVA evaluation program, EVA belongs to the financial evaluation indexes. The financial evaluation indexes of telecom operators are shown as figure table 1.

**Table 1**
**The Performance Evaluation Management System of Telecom Operations**

| Target layer | Index | Index factor | Specified index |
|---|---|---|---|
| The performance evaluation management system of telecom operators | Financial Indexes | Profitability | EVA or EVA rate<br>Asset profit rate<br>ROL<br>Net profit rate<br>OPE<br>Net cash flow<br>ROI<br>ROE |
| | | Debt paying ability | Asset-liability ratio etc. |
| | | Operating capacity | Capital accumulation ratio etc. |
| | | Growth capacity | Sales Profit growth ratio etc. |
| | Customer Indexes | Customer satisfaction survey, market share etc. | |
| | Business Process Indexes | Network quality, service quality, network utilization etc. | |
| | Innovation Indexes | New business exploitation, new business profitability etc. | |
| | Staff Indexes | Staff productivity etc. | |

Table 1 shows that EVA is one index of profitability indexes, furthermore, the profitability comprises the performance evaluation of OPE, Cash flow, ROI, ROE and so on. So, these indexes are also the variables in our model proposed in this paper.

### 1.2 EVA-Based Internal Operation Value Chain

EVA is proposed by Stern Stewart managerial consultant firm of America. EVA is the balance that net operating profit after tax (NOPAT) deducts operating capital cost (e.g. liability cost and cost of equity capital). It overcomes the shortcoming traditional performance evaluation in that EVA reflects accurately the value for company shareholders and reflects accurately the excess return ability for shareholders using actual investment.

Calculation formula: EVA=NOPAT− capital cost (see Figure 1)

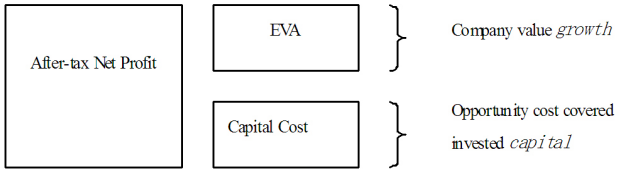


**Figure 1**
**Calculation Method of EVA**

The calculation of EVA converts traditional accounting profit into economic value added, which reflects fully capital cost-to-use and pays more attention to the capacity of value-creativity of the enterprise. Capital cost is the opportunity cost of liability cost and cost of equity capital occupied by enterprise, reflects the minimum return require of creditors and shareholders.

For telecom operators, EVA is an important index to measure the profitability and runs through the entire operational process of telecom operators, the EVA-based internal value chain of telecom operators is shown as Figure 2.

From the Figure 2 we can find that the business total determines the prime operating revenue, yet tariff level determines the business total indirectly. The operating capacity of telecom operators is determined mainly by the efficiency and level of enterprise management and also affects the tariff and ROI. Therefore, we choose prime operating revenue, investment, assets to do empirical research and analyze EVA further in order to scale the role of EVA in the performance management of telecom operators more accurately.

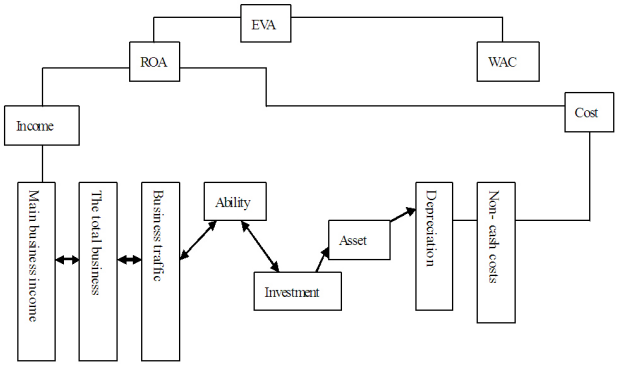


**Figure 2**
**EVA-based Internal Value Chain of Telecom Operators**

## 2. HYPOTHESIS AND MODEL

### 2.1 Variable Selection

By the analysis of the performance evaluation system of telecom operators and operation value chain EVA-based, we select the variables and their definitions are shown as Table 2.

**Table 2**
**The Selection of Variables**

| Variable | Definition | Variable Declaration |
|---|---|---|
| EVA | Economic Value Added | NOPAT−capital cost |
| OPE | Operating profit ratio | Prime operating profit/Prime operating revenue |
| ROI | Return On Investment | Net profit/Average total assets |
| ROE | Return On Equity | Net profit/Net assets |
| EVA rate | EVA rate | EVA rate=ROIC (Return on Investment Capital)−WACC (Weighted Average Cost of Capital) |

### 2.2 Research Hypothesis and Design of Model

Hypothesis $H_1$: OPE, ROI, ROE and EVA are significantly positively correlated, i.e., it is also good to scale corporate performance by EVA so long as traditional performance indexes are good.

For the definition of EVA, OPE, ROI, ROE and EVA are all the indexes to scale the profitability of telecom operators and based on profit margin. Generally, OPE, ROI, ROE and EVA are all positively correlated. So the following model can be constructed:

EVA rate=$a_1$+$b_1$OPE+$c_1$

EVA rate=$a_1$+$b_1$OPE+$c_1$

EVA rate=$a_2$+$b_2$ ROI +$c_2$

EVA rate=$a_3$+$b_3$ROE+$c_3$

There, $a_1$, $a_2$, and $a_3$ are constants, $b_1$, $b_2$, and $b_3$ are regression coefficients and larger than 0, $c_1$, $c_2$, and $c_3$ are random items.

### 2.3 Data Selection

This selected data in this paper come from the annual reports of China Telecom, China Unicom and China Mobile from 2003 to 2008.

## 3. Empirical Research

Input the related data and calculated EVA rate in the annual reports to spss11.5 and carry out correlation and regression analysis to draw the corresponding conclusion.

### 3.1 Regression Analysis Result of Hypothesis $H_1$

The whole sample is EVA rate, OPE, ROI and ROE of three telecomm operators from 2003 to 2009, the result output from spss11.5 is shown as Table3.

**Table 3**
**Regression Result of the Whole Sample**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -0.983 | 0.289 | | -3.158 | 0.005 |
| | OPE | 0.007 | 0.004 | 0.059 | 2.095 | 0.565 |
| 2 | (Constant) | -0.745 | 0.284 | | -2.654 | 0.005 |
| | ROI | -0.005 | 0.001 | 0.085 | -2.695 | 0.009 |
| 3 | (Constant) | -0.785 | 0.269 | | -3.048 | 0.006 |
| | ROE | 0.001 | 0.001 | 0.054 | 4.854 | 0.107 |

**Table 4**
**Regression Result of China Telecom**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -4.815 | 0.854 | | -6.888 | 0.000 |
| | OPE | 0.147 | 0.028 | 0.156 | 5.746 | 0.002 |
| 2 | (Constant) | -1016 | 0.458 | | -2.541 | 0.006 |
| | ROI | 0.002 | 0.001 | 0.015 | 0.258 | 0.586 |
| 3 | (Constant) | -0.958 | 0.459 | | -2.341 | 0.020 |
| | ROE | 0.002 | 0.008 | 0.222 | 5.086 | 0.001 |

**Table 5**
**Regression Result of China Unicom**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -6.415 | 0.854 | | -6.888 | 0.058 |
| | OPE | 0.547 | 0.028 | 0.056 | 5.746 | 0.502 |
| 2 | (Constant) | -1616 | 0.458 | | -2.541 | 0.006 |
| | ROI | 0.402 | 0.001 | 0.015 | 0.258 | 0.786 |
| 3 | (Constant) | -0.658 | 0.459 | | -2.341 | 0.720 |
| | ROE | 0.502 | 0.008 | 0.012 | 5.086 | 0.501 |

**Table 6**
**Regression Result of China Mobile**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 4.452 | 0.774 | | 5.129 | 0.002 |
| | OPE | 0.075 | 0.025 | 0.051 | 4.125 | 0.103 |
| 2 | (Constant) | 6.518 | 0.456 | | 15.124 | 0.001 |
| | ROI | 0.010 | 0.005 | 0.152 | 0.695 | 0.002 |
| 3 | (Constant) | 3.108 | 0.418 | | 4.884 | 0.000 |
| | ROE | 0.215 | 0.001 | 0.254 | 6.759 | 0.000 |

From the Table 3 we can see the correlation coefficient between EVA rate and OPE, ROI, ROE are all less than 0.15, concomitant probability (Sig.) >0.05 of the whole sample, so we can think that they are irrelevance, i.e., there is a big difference between EVA-based performance evaluation and traditional OPE, ROI based on income and investment. It is because of the calculation difference between OPE, ROI and EVA, and the calculation of EVA needs to make many accounting adjustments.

From the other three tables we can see that EVA rate and OPE, ROI, ROE are insignificant interrelated in China Telecom and China Unicom except China Mobile. From the whole operation in China telecom market, we can see that China Mobile is far ahead of China Telecom and China Unicom in market share, number of users etc. EVA and ROI, ROE of China Mobile increase year by year, so they are positive correlation. However, EVA rate and ROI, OPE of China Telecom and China Unicom are not positive correlation.

### 3.2 Empirical Result Analysis

Combined with empirical research on the whole sample of three telecomm operators, we can see that EVA and OPE, ROI are insignificant interrelated. The reason is the expression meaning, computation method and evaluation point of EVA, OPE and ROI are all different. For telecom industry with the character of scale economy and scope economy, EVA is more effective compared with traditional performance evaluation indexes based on investment scope and asset profit due to EVA reflecting the cost of corporate capital. Corporate capital not only includes liability cost (e.g. interest) and consumption during the production and management activities, but also includes the cost of equity capital. The implementation of EVA evaluation has truly achieved total cost accounting, eliminated overestimated operating result and provided an effective carrier to ensure the interest of stockholder.

It can be seen from regression result of China Mobile that OPE, ROI and EVA are interrelated. For performance evaluation of China Mobile, there is no evident difference between EVA and traditional ROE, ROI. It shows that China Mobile has a good momentum of development in recent years. Annual reports of China Mobile show that OPE, ROI, EVA and other indexes take on a rising tendency year by year and the telecom recombining has no evident influence on China Mobile. The number of users and market income of China Mobile all exceed the other two telecomm operators, the service theory and performance management of China Mobile are perfect too.

For China Telecom and China Unicom, The correlation coefficients of EVA and OPE, ROI, ROE are poor. Annual reports show that operating revenue and other financial indicators take on gradual rising tendency. Due to telecom recombining and the lack of related management and service quality, enterprise assets are not used effectively. So, EVA grows gently and shows the different change in direction with OPE, ROI, ROI. According to EVA rate and annual reports, China Telecom has taken up large capital and the follow-up investment is enormous for constructing CDMA network. So, the value of EVA is negative and takes on the downtrend in recent year.

In sum, for 3G construction and network operation in China, we shouldn't blindly relay on expanding network scale, fighting for the number of users and carrying out price war with each other to achieve value growth of telecom operators. By implementing EVA evaluation

scheme, make telecom operators use capital effectively and don't take scale as the only goal. Especially, we should treat the value creation as the basis of new investment. At the same time, we need to improve further the use efficiency for existing assets, avoid excessive overlapping construction, achieving the value growth through the assets flowing and enterprise recombining.

## CONCLUSION

This paper shows that OPE, ROI, OPE and EVA are insignificantly interrelated for telecom operators through the empirical research, however, EVA reflects true creation value of enterprise, not limited to the level of corporate profit especially for telecom operators. At the same time, EVA has some deficiencies in practical application, for example, EVA can not identify the fake hided in the report of listed companies and exists complexity in the index calculation for the adjustment of accounting. As a whole, SASAC issued EVA evaluation scheme is propitious to the development of the whole telecom industry healthily and stably, increase sustainable development ability of telecom operators greatly and improve the incentive and restrict mechanisms gradually.

## REFERENCES

[1] YANG Guobin, & LI Chunfang (2001). Index of Enterprise Performance Evaluation Index - EVA. *Economic Management, 9*.

[2] ZHANG Xiaoning (2004). Value Judgment of Company -- Decomposition of EVA and Principal Component Analysis. *Industrial Economic of China, 4*.

[3] LI Baohua (2004). Contrastive Studies Between Evaluation Index of EVA and Traditional Financial Factor Analysis of Corporate Performance. *Zhengzhou Institute of Aeronautical Industry Management Journal, 3*.

[4] LEI Yimin, & MA Chaoqun (2005). EVA and Enterprise Valuation. *Modern Management Science, 10*.

[5] MOU Weiming (2005). The Thinking of Application of EVA Index. *Accounting Newsletter, 10*.

[6] WANG Zongjun, & YANG Lin (2005). EVA-Based Listed Company Empirical Research on Performance Evaluation. *Wuhan University of Technology Journal, 1*.