Study on Multi-Dimensional Linkage of Financial Core Indexes of Large Grid Enterprises

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Abstract. In recent years, with the continuous progress of power transmission and distribution price reform and state-owned and state-owned enterprise reform, it is necessary for large state-owned power grid enterprises to carry out multi-dimensional linkage research on core financial indicators. According to the requirements of the State-owned assets Supervision and Administration Commission of the State Council, the National Development and Reform Commission and other government regulators for enterprises to optimize the mode of group control and strengthen border control, in order to "plan as a whole to grasp the good balance of investment, energy, electricity prices, profits, asset-liability ratio and EVA, guarantee the sustainable development" as the research base, we carry out the study on multi-dimensional linkage of financial core indexes, measuring and evaluating linkage relationship to lay a foundation for setting risk boundaries and implementing effective control.

Keywords: grid enterprises; financial core indicators; multi-dimensional linkage.

1. Research Background

Since distribution electricity price reform, with the domestic power grid enterprise profit model changing, the State-owned assets Supervision and Administration Commission of the State Council put forward higher requirements of operating indicators such as EVA, profit and asset-liability ratio EVA, profits and asset-liability ratio. But in recent years, affected by the high level of fixed asset investment and the decrease of exogenous capital sources, grid enterprises are facing severe pressure due to the accumulation of debt risks and increasing pressure of value creation. With the power transmission and distribution price reform transforming from ‘building mechanism’ to ‘strengthening supervision’, The National Development and Reform Commission has continuously promoted the establishment of regulatory system, the formulation of regulatory rules, the improvement of regulatory capacity and the strengthening of process supervision, making strong correlation and constraints on core indicators such as electricity price and investment level before and after the regulatory cycle in power grid enterprises. Now it is urgent for power grid enterprises to establish dynamic analysis tools which take different regulatory cycles into account.

2. Principles and Objectives

2.1 Research Principles

2.1.1 From one to Many, from Simple to Complex.

The internal linkage between core indicators is complex. We classify and decompose them according to their nature and importance. Starting from simple relationship, we increase the analysis dimension layer by layer, and finally realize the multi-dimensional linkage analysis under different scenarios.

2.1.2 Qualitative Analysis and Quantitative Measurement.

On the basis of sorting out the linkage relationship of core indicators, we comprehensively consider various influence and restriction factors, use sensitivity analysis and programming solution method to calculate the quantifiable logical relationship, and judge the change direction and range of other indicators caused by the change of some variables.

2.1.3 Positive and Negative Derivation to Realize Organic Combination.

With the growth in electricity, electricity price policy, investment scale, management goal, such as assumptions are premises, both from the price, quantity, investment and other business index to profits, asset-liability ratio, EVA financial indexes such as positive conduction calculation logic, and business data changes by financial index method boundary, indicators of multi-dimensional three-dimensional analysis function.

2.2 Research Objectives

2.2.1 Sorting out Linkage Relationship and Improving Lean Management.

At present, power grid enterprises are affected by the performance assessment and regulatory policies of the State-owned assets Supervision and Administration Commission of the State Council. Besides, the constraints of investment, cost and benefit are becoming tighter. It is difficult to meet the needs of development and external supervision simply by completing the profit target. The operation and management are facing great pressure. By sorting out and studying the internal relations among various core indicators, the linkage relationship among important factors affecting the development of power grid can be accurately grasped and the lean management and control level of power grid enterprises can be effectively improved.

2.2.2 Establish Control Model and Measure System Quantitatively.

Factors such as investment, electricity level and electricity price level have a significant impact on the financing scale and benefit level of power grid enterprises, and are related to the high quality and sustainable development of power grid enterprises. By studying and analyzing the mathematical relationship between the investment capacity, transmission and distribution price and business objectives of power grid enterprises, a multi-dimensional financial control model with linkage between core indexes is constructed. The interaction between indexes in different scenarios is quantified through actual calculation to support the management decisions of power grid enterprises.

2.2.3 Define the Boundary of Control and Allocate Resources Reasonably.

According to the power grid enterprise management goal and requirement of assessment of the State-owned assets Supervision and Administration Commission of the State Council, we determine the bottom line of important financial indicators such as EVA, profit and asset-liability ratio and calculate and determine the scientific and reasonable investment scale, transmission and distribution price and other business boundaries with the help of the control model. According to the existing mechanisms such as investment arrangement, price competition, cost control and project management, we can clarify the control rules inside and outside the boundary and embed them into the budget and joint assessment to ensure their implementation.

3. Overall Logical Relationship

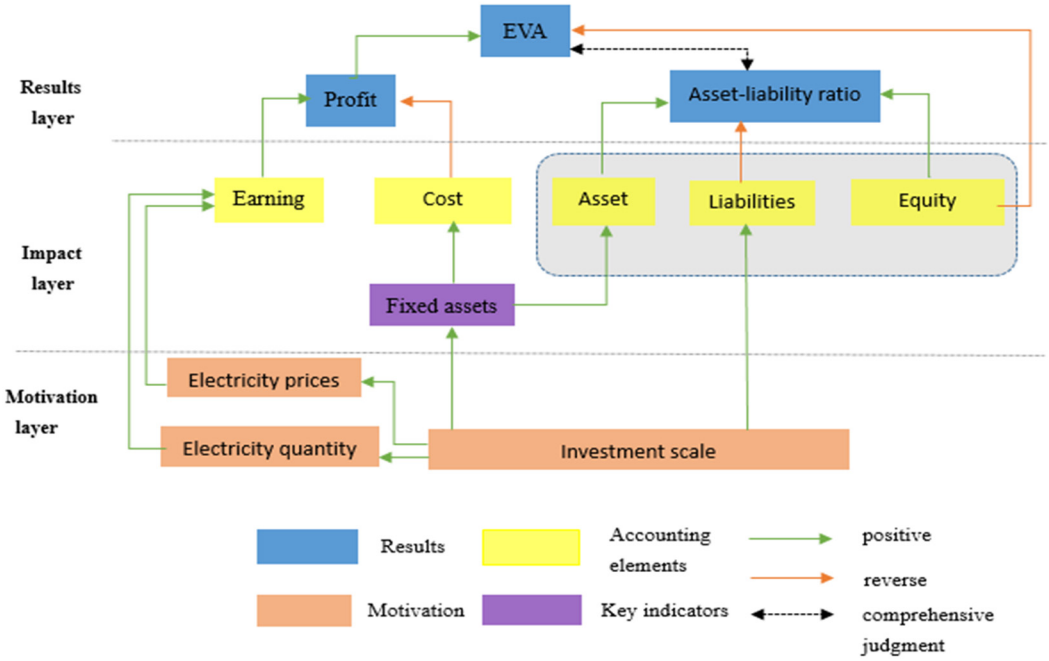

Figure 1. Multi-dimensional linkage diagram of core indicators

Starting from the operation and management process and goal of power grid enterprises, we carry out internal and external linkage analysis of core indicators and build a multi-dimensional financial control model to provide support for quantitative linkage. After discussion and research, we believe that investment, as the basis of business expansion and reproduction of power grid enterprises, is the origin of affecting other core indicators. On the one hand, Investment determines the future electricity transmission and distribution price by influencing the permitted income, and improves the level of electricity sold by improving the quality of power supply, thus affecting the income level and directly promoting the improvement of profit and EVA. On the other hand, through the formation of fixed assets to affect the cost and debt scale, investment put pressure on profits and the asset-liability ratio, eventually to EVA. As the core index of the State-owned assets Supervision and Administration Commission of the State Council's supervision and assessment, EVA is the concentrated demonstration of financial performance and value creation ability of power grid enterprises, which is consistent with profits. However, under different situations such as reduction of investment, cost management and receipt of user assets in power grid enterprises, there is an intricate internal relationship with asset-liability ratio. EVA is mainly affected by core indicators such as investment, power and electricity price.

4. Index Linkage Analysis

In the process of research and analysis, we defined EVA, asset-liability ratio and total profit as achievement indicators and defined investment, electricity, electricity price and other indicators as motivation indicators. Firstly, the internal linkage among the core motivation indexes is analyzed. Secondly, we analyze the influence of motivation index on achievement index and the constraint of achievement index on achievement index; Finally, considering the compound influence of multi-motivation indexes on multi-achievement indexes, we select typical scenes were to deduce the linkage effect of core indexes under different management objectives, so as to support the management decision. The specific analysis is as follows:

4.1 Basis of Analysis

The data is calculated on the basis of electricity transmission and distribution price of 198.3 yuan/thousand KWH, electricity sales growth rate of 5% and fixed asset investment of 500 billion yuan.

4.2 Linkage Analysis of Core Motivation Index

4.2.1 Investment and Electricity Price

The newly increased investment in power grid will be converted into effective assets, which will affect the permitted income and support the electricity transmission and distribution price. During the regulatory period, electricity price can compensate the value of assets by affecting income, provide a source of funds for subsequent investment and support the sustainability of power grid investment. Therefore, increased investment helps to guarantee a stable price level.

4.2.2 Investment and Electric Quantity

Electricity sales are mainly determined by macroeconomic environment and other external factors, but power grid enterprises can improve the network structure, improve the quality and reliability of power supply through investment to meet the needs of power growth. Through a new round of transformation and upgrading of rural power networks, the per capita electricity consumption of rural power network users increased by 35.1% [4] compared with the previous year. The increase of electricity sales has stricter requirements on the construction of strong power grid. As the income level of power grid enterprises rises, their ability to meet the investment demand is enhanced, thus stimulating the increase of power grid investment. Therefore, the increase of investment promotes the increase of electricity sales, and the growth of electricity sales is conducive to ensuring the stability of investment.

4.2.3 Electricity Price and Quantity

From the perspective of supply and demand, falling electricity prices help stimulate demand for electricity, so that electricity sales rise. From the perspective of price-setting, if the permission income is established, the expected increase of electricity quantity will drive the price level down in the future. Therefore, the electricity price level and the electricity sold show the reverse change.

4.3 Linkage Analysis of Motivation Index and Achievement Index

4.3.1 Impact of Investment Changes

From the perspective of the total profit, the new effective investment will form the support for the future electricity price and electricity quantity, which is conducive to the rise of the profit level of power grid enterprises in the future. However, the resulting cash gap will expand the scale of interest-bearing liabilities of power grid enterprises, resulting in higher debt costs, while the new fixed assets will lead to increased depreciation and operation and maintenance costs. Investment has a negative impact on current profits.

From the perspective of EVA, the increase in the scale of projects under construction brought by the increase in investment is helpful to improve EVA, but it is not enough to make up for the decrease in net profit and the increase in capital cost. The increase in investment is 100 billion yuan, which mainly affects the decrease in net profit by 2 billion yuan. Investment has a negative impact on current EVA.

From the perspective of asset-liability ratio, the new investment will generate additional financing demand, which will expand the scale of liabilities and assets of power grid enterprises. However, the increase of liabilities is higher than that of assets, and the asset-liability ratio rises. Investment has a negative impact on the asset-liability ratio.

Overall, the increase in investment is the main driving force for future income growth, but it is not conducive to the optimization of current profit, EVA and asset-liability ratio indicators.

4.3.2 Influence of Electricity Price and Quantity Change

The rise in electricity price or increase in electricity sales will lead to the overall income growth of power grid enterprises, which is conducive to the improvement of profit level and the increase of EVA. At the same time, the asset-liability ratio can be effectively reduced by making up the capital gap of power grid enterprises. Therefore, the increase of electricity sales revenue brought by the increase of electricity transmission and distribution price or electricity sales has a positive effect on the achievement index.

5. Conclusion

1. The necessary means to improve EVA, profit and reduce the asset-liability ratio is to increase supply and expand sales and pay attention to improve quality and efficiency. Profit increase can effectively improve the level of asset-liability ratio and is also an important source of EVA. In order to increase the income and increase the profit level of power grid enterprises, it is necessary to increase the supply and marketing, tap the market potential, and promote the replacement of electric energy. At the same time, we should continue to improve quality and efficiency, make sustained efforts in Supply-side Structural Reform, and enhance our capacity for independent innovation. On the basis of the steady growth of income, pay attention to the improvement of operation efficiency, coordinate the scale, speed, quality and efficiency of power grid development, urge power grid enterprises to become the forerunner of high-quality development enterprises, and successfully complete the control objectives of EVA, profit and asset-liability ratio.

2. The implementation of precise investment control can help support the electricity price and electricity quantity, and meet the requirements of EVA, profit and asset-liability ratio assessment. It is difficult for power grid enterprises to maintain the current electricity transmission and distribution price level based on the current impact of general industrial and commercial price reduction and the consideration of the price-setting in the next regulatory cycle. For price-setting parameter, to carry out the reasonable electricity price level and ensure the steady growth in electricity, we should improve the investment efficiency based on energy and electric power development plan. Guided by the demand, the investment scale should be reasonably determined, the investment focus and structure should be clearly defined, the input-output efficiency and benefit and the investment capacity should be coordinated. The investment intensity and the carrying space of electricity price should be reasonably matched and the significant adverse impact on profit and EVA caused by the decline of electricity and electricity price should be avoided.

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