Research on Deleveraging of New Energy Enterprises and Risk-taking of Enterprises

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Abstract: In the passing years, thanks to the support of the state and the government, the new energy industry has advanced in leaps and bounds and thus become a vital supporting force for China's economic growth. The rapid growth of new energy enterprises requires a large amount of financial support, and debt financing is its inevitable choice. In the context of deleveraging of non-financial enterprises, does deleveraging of new energy enterprises exert an impact on corporate risk-taking? With A-share new energy listed companies from 2011 to 2018 as research samples, this thesis analyzes the impact of debt scale changes on corporate risk-taking from three perspectives: the overall debt level, the degree of deleveraging and the degree of deleveraging of bank loans. The results turn out that the asset-liability ratio significantly increases corporate risk-taking, the degree of deleveraging significantly reduces corporate risk-taking, while the deleveraging of bank loans reduces corporate risk-taking. Analysis of the impact of deleveraging of new energy enterprises on corporate risk-taking is conducive to clarifying the extent of the impact of deleveraging policy on investment willingness of new energy enterprises, thus providing theoretical basis for formulation and implementation of policies.

1. Introduction

Since 2003, especially since the financial crisis, China's supply-demand relationship has been confronted with structural imbalance. Thus, in October 2015, General Secretary Xi Jinping proposed to "intensify the structural reform on the supply side while appropriately expanding the total demand, and endeavor to upgrade the quality and efficiency of the supply system", and regarded "deleveraging" as an important task in financial work. Debt financing plays a non-negligible role in boosting the healthy and rapid development of enterprises. By June 2019, the leverage ratio of the government, residents and non-financial enterprises in China was 35.3%, 51.0% and 156.4% respectively. Viewing from international experience, the leverage ratio of China's real economy is in the middle reaches, while the leverage ratio of non-financial enterprises is the highest among major economies (Zhong Ninghua, 2017; Tan Xiaofen et al. 2019), the leverage ratio is 63% higher than that of developed economies and 53.8% higher than that of emerging market economies. Hence, the Report on the Work of our Government for the year of 2019 requires "to continue to insist on the supply-side structural reform as the main line" and "to insist on structural deleveraging". Thus it can be seen that deleveraging of non-financial enterprises is still a vital issue facing the macro economy.

Along with the decline of global energy reserves and the increasingly serious environmental problems, it has become a vital issue arousing worldwide concern on how to achieve sustained and stable economic growth by utilizing new energy resources. China has introduced a series of measures to facilitate the research and development and utilization of new energy. It is clearly stated in the
"Strategic Action Plan for Energy Development (2014-2020)" that "efforts should be made to optimize the energy structure" and "the proportion of renewable energy such as wind power, solar energy, geothermal energy and nuclear power consumption should be substantially increased". Thanks to the support of the state and the government, the new energy industry has advanced in leaps and bounds and thus become a vital supporting force for China's economic growth. So, in the context of deleveraging of non-financial enterprises, has the investment willingness of new energy enterprises been affected? Has the risk-taking of such enterprises changed? Risk-taking reflects the level of risk that enterprises are willing to undertake in a bid to pursue the return of investment projects. It can facilitate enterprises to implement high-tech and high-risk projects, upgrade the core competitiveness of enterprises, and advance technological progress and rapid growth of enterprises. Analysis of the impact of deleveraging of new energy enterprises on corporate risk-taking is conducive to clarifying the extent of the impact of deleveraging policy on the investment willingness of new energy enterprises, thus providing theoretical basis for formulation and implementation of policies. In the passing years, there have been a lot of researches on the factors influencing corporate risk-taking, principally focusing on corporate governance and enterprise characteristics. However, the literature on the analysis of the impact of deleveraging of new energy enterprises on corporate risk-taking is relatively rare. With A-share new energy listed companies from 2011 to 2018 as research samples, this thesis analyzes the impact of debt scale changes on corporate risk-taking from three perspectives: the overall debt level, the degree of deleveraging and the degree of deleveraging of bank loans. The results turn out that the asset-liability ratio significantly increases the corporate risk-taking, the degree of deleveraging significantly reduces the corporate risk-taking, while the deleveraging of bank loans reduces the corporate risk-taking. Analyzing the impact of debt financing structure on corporate risk-taking is of certain application value for clarifying the risk degree of enterprises and upgrading innovation capability and sustainable growth ability of enterprises.

2. Theoretical Analysis and Research Assumptions
Agency Theory reflects the contractual relationship between the owner and the user of the resource: the owner of the resource is the principal and the user of the resource is the agent. In the debt contract, the creditor transfers the right to use the funds in order to seek a stable income of principal and interest as the return on investment. Within the duration, the debtor is entitled to use the funds transferred by the creditor to achieve its own economic goals. Operation of modern enterprises on borrowings has become an inevitable choice for shareholders to maximize their wealth. The creditor lends funds to entrust shareholders to operate in order to obtain a fixed income of principal and interest, forming a principal-agent relationship. As the shareholders of the company assume "limited liability", they are provided with the minimum guarantee under extremely unfavorable conditions such as bankruptcy and enjoy "unlimited claim rights", which enables them to enjoy all the residual income successfully obtained from investment projects. Therefore, as a "rational economic man", the higher the overall debt level, the more motivated the shareholders of the company are to implement risk-based projects with high risks and returns to transfer risks, so as to maximize the return rate of shareholders' equity and lead to an increase in the risk-taking level of the enterprise.

Therefore, Hypothesis 1 is put forward: the higher the overall debt level of new energy enterprises, the higher the corporate risk-taking.

In the context of deleveraging of non-financial enterprises, new energy enterprises have begun the deleveraging process due to the needs of enterprise management strategy, financial strategy and financial management environment. The deleveraging process will decrease the asset-liability ratio of the enterprise, thus increasing the proportion of shareholders' capital contribution in the enterprise's capital source. As the degree of deleveraging is higher, the portion of shareholders' capital contribution is larger accordingly, and the motivation for implementing high-risk projects also decreases as a result (Xia Zihang, 2015), thus reducing the fluctuation degree of the enterprise's surplus, that is, to a certain extent, deleveraging of non-financial enterprises will decrease the corporate risk-taking.

Therefore, Hypothesis 2 is put forward: the higher the deleveraging level of new energy enterprises,
the lower the corporate risk-taking.

With reference to the Principal-agent Theory, there will be contradictions between the creditor and the shareholder due to their different preferences: the creditor wishes that the enterprise will have a stable return on investment to ensure its own investment safety, while the shareholder's pursuit of inefficient investment to maximize its own interests may decrease the overall value of the enterprise. Thus, as a vital external stakeholder of an enterprise, the creditor will provide financial support to the enterprise while restricting the enterprise's behavior through debt contracts and other means, resulting in external governance effects. China's banks are large in scale and have a relatively strong voice. In their relationship with deep cooperative enterprises, they are more like a "cooperator" than a "supervisor". Along with the increasing deleveraging of bank loans, the relationship between banks, as "relationship creditors", and "cooperators" among enterprises has become indifferent, and their status as "supervisor" has gradually emerged. As a result, high-risk behaviors such as enterprise innovation and investment are reduced, and the level of corporate risk-taking will be lowered.

Therefore, Hypothesis 3 is put forward: the higher the deleveraging level of bank loans, the lower the corporate risk-taking.

3. Research Design

3.1. Sample Selection
In line with the industry classification standard of the China Securities Regulatory Commission (CSRC) (2012 edition), this thesis selects solar energy, wind energy, nuclear energy, biomass energy, ethanol gasoline, fuel cell and green energy-saving lighting and other industries from 2011 to 2018 as research objects, and carries out the following treatment: first, ST enterprises and financial enterprises are eliminated; second, enterprises that have been listed for less than three years are eliminated due to the need to measure the corporate risk-taking; finally, to avoid the impact of abnormal data, the data on insolvency and missing data are eliminated; after screening, 387 valid data of 91 sample enterprises are gained, and the sample data are from the database of CSMAR.

3.2. Variable Definition

3.2.1. Enterprise risk-taking (RISK). By referring to the measurement method of John et al. (2008), the volatility of corporate profit is employed to measure the corporate risk-taking (RISK) by the following measurement method. First, calculate the ratio of earnings before interest and tax to assets, average the above results by industry based on the industry classification method of the CSRC in 2012, and then calculate the adjusted corporate profits $E_{i,c,t}$ for each period, and finally calculate the volatility of $E_{i,c,t}$ to measure corporate risk-taking.

$$E_{i,c,t} = \frac{EBIT_{i,c,t}}{A_{i,c,t}} - \frac{1}{N} \sum_{k=1}^{N} \frac{EBIT_{i,k,t}}{A_{i,k,t}}$$

$$RISK = \frac{1}{\sqrt{T-1}} \sum_{t=1}^{T} \left( \frac{E_{i,c,t} - \frac{1}{T} \sum_{t=1}^{T} E_{i,c,t}}{T} \right)^{2}$$

3.2.2. Independent and Control Variables. Based on the existing literature, the asset-liability ratio (DB, total liabilities at the end of the period/total assets at the end of the period), deleveraging ratio (CDB, asset-liability ratio in the previous period-asset-liability ratio in the current period) and de-leverage ratio of bank loans (BCBD, bank loan/assets in the previous period-bank loan/assets in the current period) are selected as dependent variables; the company market value (TQ, Tobin Q value), current ratio (FR, current assets/current liabilities), management fee rate (OVR, management fees/operating income), non-debt tax shield (NDTS, depreciation, amortization increase/operating income) are selected as control variables, and the virtual variables such as controller nature (STA), year (TEAR), industry (IND) are controlled.
3.3. Model Building

Inspired by the research ideas of John et al. (2008), the following research models are established based on the characteristics of China’s capital market:

\[ RISK = \alpha_0 + \alpha_1 DB + \alpha_2 TQ + \alpha_3 FR + \alpha_4 OVR + \alpha_5 NDTS + \alpha_6 STA + \alpha_7 YEAR + \alpha_8 IND + \varepsilon \]

Model 1

\[ RISK = \alpha_0 + \alpha_1 CDB + \alpha_2 TQ + \alpha_3 FR + \alpha_4 OVR + \alpha_5 NDTS + \alpha_6 STA + \alpha_7 YEAR + \alpha_8 IND + \varepsilon \]

Model 2

\[ RISK = \alpha_0 + \alpha_1 BCBD + \alpha_2 TQ + \alpha_3 FR + \alpha_4 OVR + \alpha_5 NDTS + \alpha_6 STA + \alpha_7 YEAR + \alpha_8 IND + \varepsilon \]

Model 3

4. Empirical Test

4.1. Descriptive Statistics

| Variable | N | MIN  | MAX  | MEAN   | STDEV  |
|----------|---|------|------|--------|--------|
| RISK     | 387 | 0.0005 | 0.2992 | 0.0277 | 0.0326 |
| DB       | 387 | 0.0924 | 0.9789 | 0.4895 | 0.1751 |
| CBD      | 387 | -0.4521 | 0.4384 | -0.0142 | 0.0936 |
| BCBD     | 387 | -0.02969 | 0.5635 | -0.0244 | 0.9603 |
| TQ       | 387 | 0 | 8.8832 | 1.9149 | 0.9603 |
| FR       | 387 | 0.5016 | 8.2491 | 1.7803 | 1.1018 |
| OVR      | 387 | 0.0167 | 0.4591 | 0.0940 | 0.0571 |
| NDTS     | 387 | -0.1559 | 0.5331 | 0.0513 | 0.0740 |

The descriptive statistical characteristics of the main variables are listed in Table 1. The mean and standard deviation of the risk-taking (RISK) of new energy enterprises are 0.0277 and 0.0326 respectively, with the maximum value of 0.2992 and the minimum value of 0.0007, while the mean of the corporate risk-taking in the period 2007-2013 is 0.044 (Xia Zihang et al., 2014). In contrast, the risk-taking of new energy listed companies is slightly lower. The mean of de-leverage ratio of new energy enterprises is -0.0142, and the de-leverage ratio of bank loans is -0.0244, which suggests that in the context of de-leveraging of non-financial enterprises, the leverage ratio of new energy enterprises does not decrease but increases, and the de-leverage ratio of bank loans increases more obviously.

4.2. Analysis of Empirical Results

| Model 1 | Model 2 | Model 3 |
|---------|---------|---------|
| DB      | 0.0630*** | CDB     | -0.0368*** |
|         | (4.59)   |         | (-2.06)   |
| TQ      | 0.0034*  | TQ      | 0.0010    |
|         | (1.71)   |         | (0.54)    |
| FR      | -0.0016  | FR      | -0.0042***|
|         | (0.80)   |         | (-2.80)   |
| OVR     | 0.1184***| OVR     | 0.0933***|
|         | (3.57)   |         | (2.69)    |
| NDTS    | -0.0772***| NDTS    | -0.0718***|
|         | (-3.02)  |         | (-2.75)   |
| STA     | 0.0021   | STA     | 0.056     |
|         | (0.59)   |         | (1.56)    |
| YEAR    | Control  | YEAR    | Control   |
| IND     | Control  | IND     | Control   |
| R²      | 0.1984   | R²      | 0.1619    |
| F       | 4.53     | F       | 3.52      |

Note: (*, *, ***, *** mean significant at the levels of 10%, 5% and 1% respectively)
Refer to Table 2 for the empirical results. The following conclusions are drawn through the empirical process:

To test the impact of the overall debt level of new energy enterprises on corporate risk-taking, this thesis conducts empirical tests using asset-liability ratio as a substitute variable. The results indicate that the asset-liability ratio is significantly positively correlated with the risk-taking of new energy enterprises, with a coefficient of 0.0630, which is significant at the level of 1%, thus verifying Hypothesis 1 as a result. This reveals that the higher the asset-liability ratio, the higher the corporate risk-taking and that the higher debt level makes shareholders choose investment projects with higher risks, thus increasing their risk-taking.

To test the impact of deleveraging of new energy enterprises on corporate risk-taking, the balance of asset-liability ratio between the previous period and the current period is tested as a substitute variable. The results display that the deleveraging ratio of new energy enterprises has a significant negative correlation with corporate risk-taking, with a coefficient of -0.0368, which is significant at the level of 5%, thus verifying Hypothesis 2 as a result; that is, the higher the deleveraging ratio, the lower the corporate risk-taking. This suggests that the deleveraging of new energy enterprises is conducive to reducing the inefficient investment behavior of enterprises, thus reducing corporate risk-taking.

To test the impact of bank loan deleveraging of new energy enterprises on corporate risk-taking, the bank loan/asset difference between the previous period and the current period is tested as a substitution variable. The results turn out that the deleveraging ratio of bank loans has a significant negative correlation with corporate risk-taking, with a coefficient of -0.0367, which is significant at the level of 5%; that is, the higher the deleveraging ratio of bank loans, the lower the corporate risk-taking. The empirical results manifest that, as a financial institution specializing in capital and credit business, banks have changed their attitude and effectively conducted external governance of enterprises by taking advantage of their own professional competence, prompting enterprises to choose lower-risk investment projects, thus decreasing the risk-taking of enterprises.

5. Research Conclusions and Policy Recommendations

5.1. Research Conclusions

On the basis of theoretical analysis and with A-share new energy listed companies from 2011 to 2018 as research samples, this thesis analyzes the impact of debt financing structures on corporate risk-taking from three perspectives: the overall debt level, the degree of deleveraging and the degree of deleveraging of bank loans. The research demonstrates that, first, the asset-liability ratio will increase corporate risk-taking; second, deleveraging of new energy enterprises will decrease corporate risk-taking; third, bank loans deleveraging of new energy enterprises will decrease corporate risk-taking.

5.2. Policy Recommendations

5.2.1. To Continue to Implement "Structural Deleveraging". The deleveraging of new energy enterprises exerts a negative impact on the risk-taking level of enterprises. Relevant government departments should fully recognize the significance of new energy enterprises, continue to implement the "structural deleveraging" policy, determine the deleveraging objectives and supporting policy measures of new energy enterprises, guide them to optimize the capital structure, optimize the debt structure, decrease financial risks through multiple channels, endeavor to achieve stable and gradual decline of macro leverage ratio, and resolve overall financial risks in a targeted manner.

5.2.2. To Reinforce the Transformation of Debts. Equity capital is the long-term capital of an enterprise with no need for repaying principal and interest. Increasing equity financing can enhance the reputation of the enterprise and lower financial risks. To help decrease the financial leverage pressure
of new energy enterprises, relevant government departments have introduced a series of measures, such as "Guiding Opinions on Converting Creditor's Rights to Equity Rights of Marketable Banks" and "Measures for the Administration of Newly Established Debt-to-Equity Swap Implementing Institutions in Commercial Banks", etc., which encourage enterprises to further optimize their capital structure by increasing equity financing and debt-to-equity swap. New energy enterprises should make the best of the relevant policies of "three eliminations, one reduction, one supplement", fundamentally solve the long-term capital allocation problem of enterprises by issuing stocks, restructuring debts, etc., and transform short-term deleveraging achievements into long-term continuous optimization of capital structure, so as to ravel out the later concerns about capital for the sake of long-term development of enterprises.

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