Political connections, government subsidies and firm financial performance: Evidence from renewable energy manufacturing in China

Huiming Zhang, Lianshui Li, Dequn Zhou, Peng Zhou

China Institute of Manufacturing Development, Nanjing University of Information Science & Technology, Nanjing 210044, China
Institute of Soft Energy Science, Nanjing University of Aeronautics and Astronautics, Nanjing 210016, China

Abstract

The relationship among political connections, government subsidies and firm financial performance of wind and solar manufacturing companies is analyzed based on panel data model. The results illustrate that government subsidies, in long and short-terms, have significant positive effects on the financial performance of wind energy manufacturing companies; however, a government background of firm executives weakens subsidy effects. In contrast, both key variables, government subsidies and an interaction term of subsidies & political connections, have insignificant effects on the financial performance of solar energy manufacturing companies. Following from the empirical analysis, this paper proposes the suggestions: (1) Reform subsidy policies of wind manufacturing companies, and increase indirect subsidies for key wind energy equipments. (2) Strengthen a strict supervision on wind energy manufacturing companies with political background. (3) Adopt effective measures to reduce individual decision-making in listed wind energy manufacturing companies, and promote collective decisions to reduce the institutional possibilities of rent-seeking. (4) Make clear rules for the use of government subsidies in solar energy manufacturing companies.

1. Introduction

The renewable energy manufacturing industry functions as a basis for the renewable energy industrial chain as well as acting as a prerequisite for promoting competitiveness in the renewable energy industry. Currently, major energy producers and consumers such as the United States, Germany, Japan and Brazil have formulated policies to support renewable energy manufacturing with subsidies.


Government subsidies received by different renewable energy producers may, however, vary greatly. Even for the same renewable energy producer, the subsidies received in different years may differ sharply. A number of studies have indicated that political connections of executives are valuable resources and have played a significant role in deciding the amount of subsidies [1–3].

The corporate political connection highlights the fact that senior managers, including board members, major shareholders or persons in management authority hold positions or have been in...
government agencies [4]. It exists throughout the economic transition period in China, which is conducive to enhancing the firms’ value by using this resource with the change of system environment. In the corporate crisis, however, the political relations will help to obtain financial support. Political connections are common in the renewable energy manufacturing industry. The executives in some listed renewable energy manufacturing companies such as Bearing Science & Technology Ltd., Times New Material Technology Ltd., Sinoma Science & Technology Ltd. and Yin Xing Energy Ltd. have government backgrounds. This gives rise to two issues that this paper attempts to explore: (1) to what extent do government subsidies influence the financial performance of firms and (2) whether political connections affect the effectiveness of subsidies to the enterprise.

In theory, the effectiveness of government subsidies can be looked at from two different viewpoints: the promotion of efficiency and the results of rent-seeking. The former argues that the subsidies received by firms with political connections will advance R&D input and thus improve financial performance, while the latter holds that firms with political connections obtain subsidies through an act of rent-seeking by officials who have the power to allocate fiscal subsidies. In this case, because the granting of subsidies is not based on a firm’s promising prospects or social contributions, it follows that subsidies based on political connections are not beneficial to company performance [3,5].

Considering the above, this paper wishes to make two following contributions: (1) Analyze the relationship between government subsidies and financial performance of renewable energy manufacturing companies. (2) Explore the influence of political connections on the effectiveness of subsidies.

The arrangement of the remaining parts of this paper is as follows: Section 2 reviews references. Section 3 describes the methods used including model construction, definitions of variables and data sources. Section 4 includes empirical research results and analysis. Section 5 provides some policy recommendations.

2. Literature review

The research work related can be categorized as follows.

(1) The relationship between political connections and firm financial performance. ◎ Positive impact of political connections on firm financial performance. Based on the data of Chinese firms, Li et al. examined the role of affiliation with the ruling Communist Party in the operation of private enterprises. The findings revealed that the Party membership of private entrepreneurs had a positive effect on the performance of their firms when human capital and other relevant variables were controlled [6]. Goldman et al. showed that the announcement of the nomination of a politically connected individual to a company’s board of directors in the United States would lead to a positive stock return [7]. Taking listed private enterprises between 2004 and 2006 as samples, Luo and Liu maintained that the closer political relations private firms had with governments, the more possible those enterprises would enter high-barrier industries and the better performance they would achieve in high-barrier industries than other enterprises [8]. Amore and Bennedsen employed a difference-in-differences model to confirm positive impacts of political power on the profitability of Danish firms related by family to local politicians. The estimates are consistent with an elasticity of firm performance to political power [9]. ◎ Negative impact on firm financial performance. A game model with government official and entrepreneur as two players was established by Shleifer and Vishny, which confirmed a grabbing hand role of political connections [10]. The theoretical research results were echoed by Boubakri et al., who investigated the extent of political connections in newly privatized firms using a sample of 245 privatized firms headquartered in 27 developing and 14 developed countries over the period 1980–2002. According to their findings, politically connected firms exhibit a poor accounting performance compared with their non-connected counterparts [11]. A survey of Fan et al. on Chinese listed companies suggested that the government background of executives did not help increase the value of the company, but led to a decline in its business performance [12]. Li et al. carried out an empirical study from the aspect of double influence of political connections. Regression results showed that PC index had a significant negative relationship with company financial performance [13]. A focus on the association between Malaysian politically connected firms and leverage by Bliss and Gui confirmed that borrowing politically connected (abbreviated PCON) firms had significantly lower ROA compared to non-PCON firms [14]. ◎ Complicated relations between political connections and firm financial performance. Whether the political connections affect firm financial performance significantly may depend on certain prerequisites such as types of political connections [5], ownership [15–17] and the time lag [18], which demonstrated the complicated relations between the two variables.

(2) The relationship between subsidies and the firm financial performance. Most scholars argue that subsidies do not increase but, on the contrary, lower the financial performance of the companies. Beason et al. analyzed the investment subsidy effects and found government subsidies led to low growth of enterprises and decline in returns to scale [19,20]. Employing a database of firms in the Greek food and drinks manufacturing sector for the period 1982–1996, Tzeleis and Skuras proved the negative and insignificant effects of subsidization on the efficiency measure [21]. Balsar et al. investigated top 100 enterprises in Istanbul and Chinese agricultural companies, respectively. Their empirical study results also supported the viewpoints of Beason and Tzeleis [22,23]. Taking listed Chinese companies between 2002 and 2004 as samples, Tang and Luo studied the motive and effect of government subsidies. According to their findings, subsidies were in distinctive positive correlation with firm performance, that is, subsidies did not remarkably facilitate the economic performance of the firms [24]. Contrary to the major viewpoints, a few studies reinforced the positive effects of subsidies. For example, Duch-Brown et al. compared the performance of publicly subsidized companies with that of similar, but unsubsidized companies in Catalonia, and indicated that recipient firms on average seem to increase their value added as a direct result of public subsidy programs [25]. Likewise, Leng and Wang showed that tax subsidies and income subsidies could increase the current profit [26].

(3) The relationship among political connections, subsidies and firm financial performance. In a sample of firms from 42 countries, Faccio and Masulis found that politically connected firms were significantly more likely to be bailed out than similar non-connected firms because the former could receive more subsidies. However, among bailed-out firms, politically connected firms exhibit significantly worse
financial performance than their non-connected peers [27]. Pan et al. also selected companies in economic distress as samples, and the results showed that for private enterprises, political connections had significant positive impact on subsidies, but for state owned enterprises, the impact was insignificant. As for subsidy effects, the firm performance could be improved in the first year of receiving assistance, whereas the long-term development of firm performance varied according to degrees of political connections and the ownership [2]. Using a firm fixed effects framework, Claessens et al. confirmed that politically connected firms could access to preferential bank loans, but the return of assets of these firms were very low [28]. Similar results were also found in the recent studies of Yu et al. [3] and Guo and Du [29], who took politically connected private firms in China as samples, and provided the evidence of politically connected private firms underperforming the non-connected ones. Yeh et al. also proved the positive relationship between political connections and preferential bank loans, and lent partial support to the research of Claessens et al. In contrast, however, they found that whether political connections are positively related with firms’ returns depends on the types of parties [30].

To summarize, the current studies have reached a consensus on the following two aspects: (1) Subsidies are negatively correlated with company performance. (2) Politically connected firms will receive more subsidies, however, due to rent-seeking, the political connections can also play a “grabbing hand” role.

Current studies mainly focus on large industries like agriculture and manufacturing, with little attention to renewable energy. It is of interest whether subsidies weaken firm financial performance and whether politically connected firms will fail to optimize allocation of granted subsidies in renewable energy manufacturing industries. Few studies explore the effects of political connections on government subsidies. Based on above, this paper, for the first time introduces on the interaction term between political connections and government subsidies to empirically analyze the relationship between political connections, government subsidies and financial performance in particular renewable energy industries.

3. Method

3.1. Data and samples

This analysis utilizes data on renewable energy manufacturing companies listed on Shanghai and Shenzhen stock exchange. The data on political connections are collected manually from annual reports of listed companies. All estimations are done using Stata software.

Due to the low number of biomass manufacturing companies, only wind and solar manufacturing companies are included in the sample. Moreover, New Accounting Standards were implemented in 2007. Under these government subsidies were credited to no-operating income. The study therefore only considers data from 2007 onwards. Eliminating companies with incomplete records, the final sample sizes for wind and solar manufacturing companies are 19 and 15, respectively.

3.2. Models

Consider two types of panel data models. The first one is static panel data model without lagged effects.

\[
\ln(\text{ROA}_{it}) = \alpha_0 + \beta_1 \ln(\text{Sub}_{it}) + \beta_2 \ln(\text{Sub}_{it} \times \text{Polindex})
+ \lambda_1 \ln(\text{Top}_{it}) + \lambda_2 \ln(\text{Market}_{it})
+ \lambda_3 \ln(\text{Capital}_{it}) + \epsilon_{it}
\]

(1)

where the subscripts \(i\) and \(t\) describe the cross-sectional and time dimensions of the panel data respectively; \(\alpha_0\) is the intercept; \(\epsilon_{it}\) is the term error; \(\beta_1 \sim \beta_2, \lambda_1 \sim \lambda_3\) are coefficients to be estimated.

(1) The dependant variable is ROA. Versions of ROA are frequently found in the literature include return on total assets \([2,3,5,6,13,16]\), return on total core assets \([13]\), return on net assets \([5,8]\) and return on total net worth \([8]\). The ROA indicator used here is calculated as net profit/total assets. Since the indicator, compared with ROE, can better illustrate the profitability of executives in utilizing assets by shareholders and creditors, it is widely accepted by most scholars and adopted by this paper as a measurement.

(2) Explanatory variables. In the literature, three measurements of political connections are typical. First is a dummy variable: the executives with \((-1)\) and without \((0)\) political connections \([3-5,13]\). Second is the proportion of executives with political connections in board of directors \([8]\). Third is the administrative level of the firms and their administration staff level \([2,13]\). Since political connections are common in renewable energy manufacturing companies, the measurement of political connections by dummy variables does not fully reflect the strength of political connections. Similarly, the administrative level of executives in different firms varies widely, a proportion measurement may therefore not reveal the intensity of political connections. For this reason, this paper follows Pan et al. and gives different scores to the political influence of executives (general manager, chairman of the board, board directors and other senior management staffs etc.) according to their highest executive level. The score given for those without any executive experience is 0; those below the secondary division is 1; 3, 4, 5 for section chiefs, vice division directors and division directors respectively, and so on. The political connection index is the sum of the individual executive scores. Data concerning government subsidies comes from the annual report of listed companies. It should be noted that a subsidy provided in the form of, say, a production credit will have a different impact than a subsidy in the form of, for instance, an investment tax credit, accelerated depreciation. The different forms of subsidy were not classified until the year 2009 and there may, therefore, be great differences between the firms, which makes it impossible to analyze the subsidy forms using econometric methods. For these reasons, we work with the sum of all subsidies instead of classifying the subsidy forms.

(3) Controlled variables. By drawing on the current references, this paper selects the proportion of the largest shareholder in total shares (Top\(_h\)), capital intensity (Capital\(_h\)) as controlled variables. Currently, China is still in the process of marketization. With the boosting trend of marketization, the efficiency of resource allocation has increased, thereby improving firms’ financial performances. Based on this, Marketization index (Market\(_h\)) is also used as a controlled variable. Capital intensity is indicated by the ratio of fixed assets to total assets, and marketization index is measured on the basis of Fan and Wang’s research, which most researchers accept \([31]\).

The second model is panel data model with lagged variables. Due to the lagged effects of subsidies and capital intensity to the
companies are illustrated in Table 1. The rate of return on total capital intensity.

For wind energy manufacturing companies, the average ROA in 2007 was 7.342% declining to 5.724% in 2008 and 4.075% in 2009. As for the mean of three control variables (marketization index, largest shareholder and capital intensity), values for solar energy equipment manufacturing companies are higher than those for wind energy.

The statistics for both listed solar and wind manufacturing companies are illustrated in Table 1. The rate of return on total assets for the two types of companies differs between 2007 and 2010. The average ROA for solar energy manufacturing companies in 2007 was 7.342% declining to 5.724% in 2008 and 4.075% in 2009. For wind energy manufacturing companies, the average ROA decreased from 6.287% in 2007 to 5.532% in 2010, indicating a worsening financial status. Similarly, from 2007 to 2010, the government subsidies received by solar energy manufacturing companies also fluctuated. In 2007, the average was 11.4 million yuan, rising to 43.6 million yuan with instability in 2008 and 2009. It should be noted that the trend of government subsidies was opposite to the ROA for wind energy manufacturing companies; the government subsidy in those companies increased from 14.9 million yuan in 2007 to 53 million yuan.

In terms of the political connection index, the wind manufacturing companies outperformed listed solar energy manufacturing companies revealing that executives in wind manufacturing companies are more closely connected to the government.

As for the mean of three control variables (marketization index, largest shareholder and capital intensity), values for solar energy equipment manufacturing companies are higher than those for wind energy.

### Table 1
The descriptive statistics.

<table>
<thead>
<tr>
<th>Year</th>
<th>Wind companies</th>
<th>Solar companies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td>2008</td>
</tr>
<tr>
<td>ROA (%)</td>
<td>Mean</td>
<td>6.287</td>
</tr>
<tr>
<td></td>
<td>Min</td>
<td>1.65</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>17.55</td>
</tr>
<tr>
<td>Sub (billion yuan)</td>
<td>Mean</td>
<td>0.149</td>
</tr>
<tr>
<td></td>
<td>Min</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>1.42</td>
</tr>
<tr>
<td>Political connections</td>
<td>Mean</td>
<td>38.790</td>
</tr>
<tr>
<td></td>
<td>Min</td>
<td>6.00</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>73.00</td>
</tr>
<tr>
<td></td>
<td>Min</td>
<td>5.31</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>11.39</td>
</tr>
<tr>
<td>Top (%)</td>
<td>Mean</td>
<td>33.476</td>
</tr>
<tr>
<td></td>
<td>Min</td>
<td>16.79</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>56.30</td>
</tr>
<tr>
<td>Capital (%)</td>
<td>Mean</td>
<td>22.174</td>
</tr>
<tr>
<td></td>
<td>Min</td>
<td>3.96</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>67.19</td>
</tr>
</tbody>
</table>

### 4. Empirical results

#### 4.1. Descriptive statistical analysis

Firstly, correlation analysis is presented in Table 2. The absolute values of correlation coefficients are less than 0.5, demonstrating the weak correlation of independent and control variables.

#### (1) Empirical results of model without lagged variables

The parameter estimation value in Table 3 provides evidence that subsidies have a positive effect on financial performance of renewable energy manufacturing companies, with a significance level of 1%. Model (1) shows a lack of lagged effects, while model (2) highlights lagged variables of subsidies and capital intensity. With every 1% increase in subsidies, the ROA of the company will increase 0.256%. However, the coefficient for interaction term of subsidy and political connections is –0.193 with a significance level of 5%. This shows that through government subsidies, the political connections of renewable energy manufacturing companies act as a “grabbing hand”. The two variables (the largest shareholder and capital intensity) have insignificant impacts on renewable energy manufacturing companies ROA. Coefficient symbols of all the controlled variables, however, provide evidence that only the proportion of the largest shareholder in total shares is negatively correlated with financial performance of the firms. Results prove the success of marketization in improving the financial performance of renewable energy firms.

#### (2) Empirical results of model with lagged variables

When lagged variables are taken into consideration, the coefficient symbols and significant levels of explanatory and controlled variables are similar to those of the model without lagged variables. The only difference between the results of the two models is the coefficient. When the government subsidy grows by 1%, ROA of renewable energy manufacturing companies will increase to...
Energy hi-tech industrialization equipment issued by the Ministry of Finance in 2008, government would provide wind energy turbine producers with 600 high megawatt wind turbines. Government would provide wind energy turbine producers with 600 high megawatt wind turbines.

0.341%, showing that the lagged subsidy has a greater positive effect. The interaction term coefficient between the subsidy and political connections is −0.160, and the significance level is 5%, which demonstrate that the negative influence of lagged subsidy declines when political connections are considered.

The empirical results of all samples suggest that subsidies themselves can, to some extent, promote the financial performance of renewable energy manufacturing companies. These are opposite to empirical studies relating to general manufacturing and agricultural companies where political connections often weaken the positive effects of subsidies.

### 4.3. Regression analysis of sub-renewable energy industries

Comparison of solar manufacturing companies and wind manufacturing companies based on political connections, subsidies and firm financial performance is shown in Table 3:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model (1)</th>
<th>Model (2)</th>
<th>Model (1)</th>
<th>Model (2)</th>
<th>Model (1)</th>
<th>Model (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>6.172***</td>
<td>5.684***</td>
<td>4.450**</td>
<td>3.122 (1.40)</td>
<td>9.476**</td>
<td>9.138***</td>
</tr>
<tr>
<td>Subsidy</td>
<td>0.256**</td>
<td>0.341***</td>
<td>0.260**</td>
<td>0.311**</td>
<td>0.135</td>
<td>0.201</td>
</tr>
<tr>
<td>Subsidy × Polindex</td>
<td>−0.193** (−2.15)</td>
<td>−0.160** (−1.98)</td>
<td>−0.179 (−1.64)</td>
<td>−0.254 (−1.91)</td>
<td>0.025 (0.16)</td>
<td>0.118 (0.89)</td>
</tr>
<tr>
<td>Market</td>
<td>0.636***</td>
<td>0.787**</td>
<td>1.059***</td>
<td>1.270**</td>
<td>0.455 (1.04)</td>
<td>0.727 (1.29)</td>
</tr>
<tr>
<td>Top</td>
<td>0.171 (1.13)</td>
<td>0.192 (1.30)</td>
<td>−0.188 (−0.74)</td>
<td>−0.154 (−0.57)</td>
<td>−0.422** (−2.31)</td>
<td>−0.123 (−0.57)</td>
</tr>
<tr>
<td>Capital</td>
<td>0.082 (0.64)</td>
<td>0.053 (0.64)</td>
<td>−0.129 (−1.12)</td>
<td>−0.091 (−0.70)</td>
<td>0.394** (3.55)</td>
<td>0.279** (2.47)</td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.1195</td>
<td>0.1221</td>
<td>0.2477</td>
<td>0.3075</td>
<td>0.2621</td>
<td>0.1400</td>
</tr>
<tr>
<td>F</td>
<td>3.96</td>
<td>2.98</td>
<td>5.40</td>
<td>5.24</td>
<td>4.40</td>
<td>1.47</td>
</tr>
</tbody>
</table>

Note: the figures in brackets are T test results; ** and *** represent 10%, 5% and 1% significant level.

Further controlled variables are analyzed. Marketization index is positively related to firm financial performance for the total samples and wind manufacturing companies. Whether in the long or short-term, the percentage of shares owned by the majority shareholder and capital intensity are insignificantly related to financial performance.

### 4.4. Limitations and future research

The empirical results of all samples suggest that subsidies themselves can, to some extent, promote the financial performance of renewable energy manufacturing companies. These are opposite to empirical studies relating to general manufacturing and agricultural companies where political connections often weaken the positive effects of subsidies.

Empirical analysis proves that with all other factors equal, the subsidies produce a significant supporting effect and are essential to the development of wind energy manufacturing companies.

Similar to the regression results of total samples, for wind energy manufacturing companies the interaction between political connections and subsidies has a significant negative correlation with financial performance. The coefficient of lagged interaction term, −0.254, is less than the −0.179 of the model without lagged variables, showing that although a political background for executives is beneficial for tax preferences, low interest and longer bank loans, it will weaken the firm’s financial performance and this weakening effect will increase in the following years. The reasons for the negative correlation of the two variables may be explained as follows. Firstly, political connections can place decision making more or less under government intervention. For example, in order to promote local economic development and maintain regional stability, the government may interfere with the employment decisions of a firm. One typical case is that, in some provinces, the renewable energy industry has been recognized as a new growth area for employment. As such, political connections will lead to a heavier operating burden for firms, and further worsen their financial performance. Secondly, subsidies received by firms with government background are acquired through rent-seeking from officials with the power of subsidy fund allocation. This means that scarce resources received might not be used in production and thus may bring about a crowding-out effect on productive activities. As a result, the firm performance will be undermined. Although the central and local governments have provided wind energy manufacturing companies with research and development subsidies, those companies are still deficient in independent innovation capabilities and lack the core technologies necessary for the manufacture of high megawatt wind turbine parts. The shortage of core technologies coupled with poor grid connection leads to serious overcapacity in the wind turbine manufacturing industry resulting in profit squeeze.

Further controlled variables are analyzed. Marketization index is positively related to firm financial performance for the total samples and wind manufacturing companies. Whether in the long or short-term, the percentage of shares owned by the majority shareholder and capital intensity are insignificantly related to financial performance.

### 4.5. Conclusion

Comparison of solar manufacturing companies and wind manufacturing companies based on political connections, subsidies and firm financial performance is shown in Table 3.

1. **Empirical results for the wind energy manufacturing enterprises**

For both models, the data calculated illustrate the significant positive impact of subsidies on financial performance of wind energy manufacturing companies. It suggests that the implementation of subsidy policies by central and local governments may improve financial performance.

Since 2005, the central government has published a series of subsidy policies for wind energy manufacturing companies. For example, Special Notice of Implementing Renewable Energy and New Energy Hi-tech Industrialization, which was published in 2005, set out the fiscal and tax policies for supporting the manufacture of high megawatt wind turbines. Interim Measures for Management of Renewable Energy Development Special Fund published in 2006 stipulated not only that a special fund should be set up primarily for promotion of local production of renewable energy equipment but also that the special funds should be distributed in two ways: unpaid use and discount loans. In Interim Measures on Management of Special-Project Funds of Industrialization of Wind Power Generation Equipment issued by the Ministry of Finance in 2008, government would provide wind energy turbine producers with 600 RMB/KW for the first 50 MW allocated on the basis of 50% going to machine manufacturers and 50% going to key component manufacturers.

From an enterprise aspect, the central and local governments have supported wind manufacturing companies with research and development subsidies, project subsidies and tax refunds. Empirical analysis proves that with all other factors equal, the subsidies produce a significant supporting effect and are essential to the development of wind energy manufacturing companies.

Similar to the regression results of total samples, for wind energy manufacturing companies the interaction between political connections and subsidies has a significant negative correlation with financial performance. The coefficient of lagged interaction term, −0.254, is less than the −0.179 of the model without lagged variables, showing that although a political background for executives is beneficial for tax preferences, low interest and longer bank loans, it will weaken the firm’s financial performance and this weakening effect will increase in the following years. The reasons for the negative correlation of the two variables may be explained as follows. Firstly, political connections can place decision making more or less under government intervention. For example, in order to promote local economic development and maintain regional stability, the government may interfere with the employment decisions of a firm. One typical case is that, in some provinces, the renewable energy industry has been recognized as a new growth area for employment. As such, political connections will lead to a heavier operating burden for firms, and further worsen their financial performance. Secondly, subsidies received by firms with government background are acquired through rent-seeking from officials with the power of subsidy fund allocation. This means that scarce resources received might not be used in production and thus may bring about a crowding-out effect on productive activities. As a result, the firm performance will be undermined. Although the central and local governments have provided wind energy manufacturing companies with research and development subsidies, those companies are still deficient in independent innovation capabilities and lack the core technologies necessary for the manufacture of high megawatt wind turbine parts. The shortage of core technologies coupled with poor grid connection leads to serious overcapacity in the wind turbine manufacturing industry resulting in profit squeeze.

Further controlled variables are analyzed. Marketization index is positively related to firm financial performance for the total samples and wind manufacturing companies. Whether in the long or short-term, the percentage of shares owned by the majority shareholder and capital intensity are insignificantly related to financial performance.
In contrast to the wind manufacturing companies, marketization index is related to financial performance insignificantly, while the capital intensity has a notable impact. This proves that regional marketization achieves no apparent success for the solar manufacturing firms’ earnings.

4.4. Robust test

To verify the reliability of results, we look at different measurements of firm financial performance, political connections and capital intensity.

As the chairman and general manager have the special status in a listed company, we limited the scope of the company executives to the chairman and general manager and investigated their political background. Results were the same as before.

In terms of firm financial performance, we replaced ROA by ROE (return on equity). The regression results consisted with forgoing analysis with ROA.

As for capital intensity, there is a second measurement, the ratio of inventory to total assets. The regression results are also roughly identical to the previous research.

5. Conclusions

The aim of this study is to analyze relationships between political connections, government subsidies and the financial performance of wind and solar companies. Results suggest that subsidies have significant positive effects on the performance of renewable energy manufacturing companies as a whole. Nevertheless, when the government background of executives in the company is considered, political connections reduce the effect of subsidies.

For wind energy manufacturing companies, the research also leads to a similar conclusion. The empirical results, however, of solar energy manufacturing companies differ greatly from those involved in wind energy. The two variables, subsidies and interaction term between political connections and subsidies, are positively correlated with the firm’s financial performance, but the coefficient is not significant. This has policy implications and suggests the following:

(1) Convert direct subsidies into indirect ones, and increase the support to wind energy manufacturing companies. The empirical analysis shows that subsidies will improve the financial performance of those companies. Unfortunately the hard truth is that China annulled direct subsidies following pressure by the United States. This means that for eligible companies, China no longer provides subsidies for the first 50 sets of megawatt wind power generation units. As the wind energy manufacturing industry faces a great shortage of key technologies, and more than 75% of wind energy manufacturing companies are small and medium sized enterprises in need of urgent support, the cancellation of the subsidies will have a serious impact on both the growth of SMEs and technological innovation in the wind energy manufacturing industry as a whole. In such circumstances, it is very necessary to convert direct subsidies into indirect ones. This means the key subsidy policies should be focused on the factor inputs such as tax exemption and interest rate subsidies to accelerate depreciation; instead of the links of international trade and domestic production. Because of the improvement of production factors, the indirect subsidy modes have a marked vagueness and concealment in comparison to direct ones.

(2) Strengthen the supervision of subsidies in wind energy manufacturing companies with political connections, and reduce the possibility of executives’ rent-seeking possibilities through the institutional improvement. On the one hand, information should be more transparent resulting in a system that strengthens the supervision of subsidies in wind energy manufacturing companies with political connections. On the other hand, in order to reduce the possibilities of rent-seeking, the government should not only adopt effective measures to reduce individual decision-making in listed wind energy manufacturing companies but should also promote collective decision making.

(3) Make clear rules for the use of government subsidies in solar energy manufacturing. This could be done by governments concentrating on either key equipment or new processes.

With regard to key equipment, some equipment in China, such as reduction furnaces in polycrystalline silicon material production lines, polycrystalline silicon etching washers, and Panel PECVD, currently relies heavily on exports. Although in 2009, China promulgated both Interim Management Measures for Financial Subsidies of PV Building and Application Guidelines for PV Building Demonstration Projects, thereby setting the technological threshold for Photovoltaic manufacturers that receive government subsidies, the scope of these key equipment subsidies still needs to be specified or extended. Moreover, in 2011, a joint declaration by the Ministries of Finance, Science and Technology and Housing and Urban-Rural Development further stated that key equipment would be subsidized at 50% of contract price. To this date, however, the details have not yet been fully set out.

The other question is whether or not to provide subsidies for key processes. Compared to foreign counterparts, some processes, especially online testing technologies of PV products and improvement in the Siemens method of high purity silicon are still remain to be fully developed in Chinese solar energy manufacturing. To address the problem, the government should put forward subsidy guidelines for these processes.

Acknowledgments

This study is funded by National Natural Science Foundation of China (Project no. 71173116), National Social Science Foundation of China (Project no. 11BGL038), Humanities and Social Science Foundation of Ministry of Education (Project no. 10YJC630381), Jiangsu Social Science Funding Program (12EYD015); Open Project of 2012 in China Institute of Manufacturing Development (Project no. 20120200–10) and the Priority Academic Program Development of Jiangsu Higher Education Institutions. This paper is also funded by National Social Science Foundation of China (Project no. 13CG1094); Jiangsu Environmental Protection Scientific Research Fund (no. 2012086); Major Project of Key Research Base of Philosophy and Social Science Fund in Jiangsu Province (2012JXM012).

References


