Research on Owner's Engineering Materials Purchasing Strategy under the "VAT" taxation method

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Abstract: Under the current policy of switching to VAT taxation in China, there is an issue we need to consider with, that is how to use the reasonable strategy to reduce the procurement of materials in the engineering project cost. We base on the method of constructing mathematical models and actual case analysis, to analyse when suppliers provide VAT invoices with different tax rates, the owner should ask them how to discount the price of the corresponding material for the overpaid tax. The analysis results show that when the owner chooses the supplier, he should give priority to the one who can provide the special VAT invoices; when the supplier can only provide 3% of the invoice, he should require a discount of the material more than 15.45%; if the VAT invoice cannot be provided, the supplier should be required to provide a discount of 12.92% or even more.

1. Introduction

On March 23, 2016, the Ministry of Finance and the State Administration of Taxation issued the “Notice on the Comprehensive Push-Up of the Business Tax Reform VAT Pilot”; on May 1, 2016, the nationwide VAT pilot was launched, and the engineering construction industry was also included in the pilot scope. On May 1, 2018, the VAT reform new policy was implemented, and the VAT rate was reduced from 11% to 10%. However, the particularity and complexity of the engineering construction industry itself has led to many difficulties in its reforms. After the tax reform, theoretically, the tax reduction effect of the engineering construction industry should be more obvious\(^1\), but in fact, most enterprises still have more actual tax payments than the theoretical tax payable, and there is a decline in profits\(^2\). Comparing the 2016 national engineering construction industry statistics with 2017, although the overall output value and profit have increased simultaneously, the output value profit rate has dropped from 3.61% to 3.58%\(^3\), which reflects from the side, the taxation method of changing the business tax to value-added tax has not yet achieved a real “burden reduction” for the engineering construction industry.

The reason is mainly due to the diversified sources of construction materials, and the differences in the procurement methods of different materials\(^4\), which in turn affects the amount of tax payable in enterprises. According to the relevant foreign research by Muhammad and Biemo on the Indonesian construction supply chain, they found that reducing inventory and transportation costs does not effectively reduce costs. The factors that really affect the cost are related to the procurement strategy of the project, the material demand plan, and the screening process of supplier qualification\(^5\). Material procurement is an important part of the project, and it is an important foundation for project construction, which greatly affects the total cost of the project. The cost of material procurement accounts for about 60% of the total cost of the project. For China's construction enterprises, the
procurement cost is even about 70% of the total cost[6]. The above data clearly shows that the cost of material procurement is the core of the total cost of engineering construction enterprises. In other words, controlling the procurement cost of engineering materials is the key to controlling the total cost of construction projects.

In view of this, from the perspective of the owner, through the establishment of mathematical models and the use of case analysis methods, we aim to research in the process of dealing with the suppliers who can provide different tax rates VAT invoices, the owner should require at least how much discount of the material price to offset the overpaid VAT caused by the suppliers. Thereby reducing the total cost of engineering construction projects, and helping the engineering construction industry to respond to the sensitive national policy and market information and to achieve a long-term development.

2. Basic theory
According to the type and quantity of engineering materials procurement, it can be divided into centralized procurement and sporadic procurement. Centralized procurement refers to the way to integrate the resources of the enterprise, manpower, material resources and other resources, and to purchase a large amount of materials needed for engineering construction. It is used by many large-scale construction enterprises, and it has obvious economies of scale. It can effectively save the cost of procurement and logistics, and has the advantages of high transparency, convenient supervision, convenient service management and unified configuration. The sporadic procurement is a temporary procurement activity for a small amount of engineering materials, it has the advantages of simple procedures and easy to meet the individual needs of users. However at the same time it also leads to high management costs, weak control, and can’t guarantee the transparency of product prices, quality, and prone to be corruption and other shortcomings[7]. Generally, sporadic purchases are not used for projects with a wide variety of materials. Therefore, for the construction industry, a special industry with a huge transaction amount, it is recommended that enterprises adopt centralized purchasing methods. Foreign practice has proven that at least 10% of the funds can be saved by implementing centralized procurement[8].

The tax calculation method is divided into general taxation law and simple taxation law according to the taxpayer's identity choice. When the taxpayer status is a small-scale taxpayer, only simple taxation can be selected, and the input tax amount cannot be deducted; when the taxpayer status is a general taxpayer, the general taxation law or the simple taxation law can be selected. However, since the simple taxation law cannot deduct the input tax, the invoice of the general taxation law is more convenient, most construction companies adopt the general taxation law and cooperate with large suppliers to ensure a reliable source of value-added tax invoices.

Therefore, under the background of the owner's centralized procurement as a general taxpayer, to discuss the material procurement strategy if the supplier can provide a VAT special invoice with different tax rates.

3. Model construction
If the supplier cannot provide the VAT invoice issued by the tax authority when the owner purchases the engineering materials, the supplier can be required to make a certain discount on the price to offset the VAT amount paid in this part.

Assuming that the tax-included income of a certain engineering construction company is X, the applicable tax rate is 16%. In the case that the enterprise can obtain special VAT invoices with different tax rates during the procurement process, the tax-included expenditures are Y16% (Y1), respectively. Y3% (Y2), Y0% (Y3), urban construction tax rate is 7%, education fee is 3%, local education surcharge is 2%, corporate income tax is 25%, stamp duty is 0.03%, property original value is K, real estate When the tax is 1.2%, the company profit can obtain is S.

Profit = income - [expenditure - value added tax - stamp duty - urban construction tax - education surtax - local education surtax - corporate income tax - property tax]
a. The VAT invoice that can be requested is 16%
\[
S = X - \left\{ Y_1 + \frac{(X - Y_1)}{(1 + 16\%)} \times 16\% + Y_1 \times 0.3\% \right. \\
+ \left. \frac{(X - Y_1)}{(1 + 16\%)} \times Y_1 \times (7\% + 3\% + 2\%) \times 25\% \\
+ K \times (1 - 30\%) \times 1.2\% \right\} = 0.6431X - 0.6344Y_1 - 0.0084K
\]

b. The VAT invoice that can be requested is 3%
\[
S = X - \left\{ Y_2 + \frac{X}{1 + 16\%} \times 16\% - \frac{Y_2}{1 + 3\%} \times 3\% \right. \\
+ \left. \left( \frac{X}{1 + 16\%} \times 16\% - \frac{Y_2}{1 + 3\%} \times 3\% \right) \times (7\% + 3\% + 2\%) \times 25\% \\
+ K \times (1 - 30\%) \times 1.2\% \right\} = 0.6341X - 0.7258Y_2 - 0.0084K
\]

c. Unavailable VAT invoice
\[
S = X - \left\{ Y_3 + \frac{X}{1 + 16\%} \times 16\% - 0 \right. \\
+ \left. \left( \frac{X}{1 + 16\%} \times 16\% - 0 \right) \times (7\% + 3\% + 2\%) \times 25\% \\
+ K \times (1 + 30\%) \times 1.2\% \right\} = 0.6341X - 0.7503Y_3 - 0.0084K
\]

When the general taxpayer can ask for a 3% VAT invoice in the process of purchasing the engineering materials, the critical point of the price discount that the supplier should provide is:
\[
0.6341X - 0.6344Y_1 - 0.0084K = 0.6341X - 0.7258Y_2 - 0.0084K
\]
\[
Y_2 = 0.6344 \\
Y_1 = 0.7258 \quad 87.08\%
\]

The maximum discount that the supplier can offer is
\[
1 - 87.08\% = 12.92\%
\]

When the general taxpayer has no VAT invoice in the process of purchasing the engineering materials, the critical point of the price discount that the supplier should provide is:
\[
0.6341X - 0.6344Y_1 - 0.0084K = 0.6341X - 0.7503Y_3 - 0.0084K
\]
\[
Y_3 = 0.6344 \\
Y_1 = 0.7503 \quad 84.55\%
\]

The maximum discount that the supplier can offer is
\[
1 - 84.55\% = 15.45\%
\]

4. Case Study
There is an S engineering construction company in Chengdu that is a general VAT taxpayer. At present, it needs to carry out 500 tons of centralized procurement of certain materials. After the project is completed, the income including tax will be 5 million. There are three options: A supplier can provide 16% value-added invoice, the material price is 6,000 yuan per ton including tax price; B supplier is a small-scale taxpayer, can provide 3% tax agency value-added For tax invoices, the price per ton of tax included is 5,000 yuan; C supplier cannot provide VAT invoices, and the price per ton of materials is 4,800 yuan. Assume that the S company's urban construction tax rate is 7%, the
education fee is 3%, the local education surcharge is 2%, and the original value of the property is 5 million yuan. Using the above-mentioned construction mathematical model to analyze and select the discount point of the supplier's material price.

a. If A supplier is selected, A can provide the maximum amount of VAT invoice, so there will be no discount on the material price. At this time, the profit of enterprise S is:

\[
0.6341 \times 500 - 0.6344 \times 500 \times 0.6 - 0.0084 \times 500 = 122.53 \text{(Ten thousand yuan)}
\]

b. If B supplier is selected, you first need to ask for a discount on the material price:

\[
500 \times 0.8708\% = 4354 \text{(yuan / tonne)}
\]

At this time, the profit of the company S is:

\[
0.6341 \times 500 - 0.7258 \times 500 \times 0.4354 - 0.0084 \times 500 = 154.84 \text{(Ten thousand yuan)}
\]

c. If C supplier is selected, the material price should be corrected to:

\[
4800 \times 0.8455\% = 4058.4 \text{(yuan / tonne)}
\]

The profit at this time is:

\[
0.6341 \times 500 - 0.7503 \times 500 \times 0.40584 - 0.0084 \times 500 = 160.60 \text{(Ten thousand yuan)}
\]

Because 160.60(Sc) > 154.84(Sb) > 122.53(Sa)

So you should choose C supplier.

5. Conclusion

As the owner, in the procurement of engineering materials, we should try to use centralized procurement to avoid the additional expenses caused by sporadic procurement. And in the procurement process, suppliers should be carefully selected. At the same time, as a superior buyer, suppliers who can't provide 16% VAT invoices can be required to provide corresponding discounts on the material price. If the supplier can only provide 3% of invoices, the owner should require a discount of more than 15.45%; If VAT invoices cannot be provided, the supplier should be required to provide a discount of 12.92% or even more to ensure that the extra VAT paid by the owner is compensated. Since the policy of China's value-added tax is still in the national pilot, the tax rate is also constantly changing. Therefore, when using the above model, it is necessary to specifically adjust the policy fluctuations to better explore the real “burden reduction” of the engineering construction industry.

Acknowledgments

This research was supported by the Sichuan Agricultural University Student Research Interests Project (NO.1911113520). The corresponding author of this paper is Xuan Deng.

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