The Reform From BT to VAT Effect on Transport Industry

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Abstract. By theoretical calculations and empirical analysis, we analyzed the influence of reform to replace business tax (BT) with value-added tax (VAT) on transport industry. We selected 67 listed companies from railway transport, road transport, pipeline transport, maritime transport, air transport and other transport companies. This paper made an empirical study on these companies' financial data in the third quarter of 2014. The results show the reform to replace BT with VAT can reduce the corporate tax burden and improve performance.

Keywords. replace business tax with value-added tax (VAT Reform); Transport Industry; Empirical Analysis

1 Introduction

From January 1, 2012 pilot VAT Reform started in transport (not including railway transport) and part of the modern service industry in Shanghai[1]. Premier Keqiang Li chaired a state council executive meeting on December 4, 2013. From January 1, 2014, VAT Reform expanded pilot sectors to railway transportation. At this point, all transport industries are incorporated into the scope of VAT Reform. The VAT Reform has been implemented for a year in all transport industry. What kind of impact did the reform bring to transport industry?

2 Theoretical analyses

VAT Reform made turnover tax of transport industry change. Furthermore, it impacted turnover surtax, corporate income tax and net profit. The theoretical analysis was based on a specific case. By calculating business tax and value-added tax, we analysed the effect on transport industry.

Assuming sales of a certain transport company are 10000000 yuan. The costs of sales are at a rate of 60%. 38% of operating costs have VAT invoices desirable. Input tax deduction rate is 17%. Corporate income tax rate is 25%. If the company pays sales tax, business tax rate is 3%. If the company pays VAT, the VAT rate is 11%.

2.1 VAT Reform effort on operating income

Business tax is included in the calculated prices. The VAT is not included in the calculated prices. Therefore, when the transport company pays business tax all revenues is recorded as operating revenue. After VAT Reform, operating income is the balance that all income excluding value-added tax.

When the transport company pays business tax, operating income=sales=10000000 yuan

When the transport company pays value-added tax, operating income = sales ÷ (1+11%)=9009009 yuan

2.2 VAT Reform effort on operating costs

When the transport company pays business tax, the VAT input tax of the purchased goods is not deductible. So operating costs include VAT at this moment. After VAT Reform, a part of the VAT input tax of the purchased goods can be deducted[2]. At this time the operating costs does not contain this part.

When the transport company pays VAT, operating costs= sales × the cost of sales ratio=10000000×60%=6000000 yuan

When the transportation company pays business tax, operating costs= sales × the cost of sales ratio – sales× the cost of sales ratio÷(1+17%) × 17% × credit rate of input tax =5668718 yuan

2.3 VAT Reform effort on turnover tax

Business tax and value added tax are the major turnover tax. VAT Reform made transport industry change from paying business tax to paying VAT[3].

Business tax= operating income×3%=300000 yuan

VAT= operating income×11% - sales× the cost of sales ratio÷(1+17%)×17% × income tax deduction rate=659709 yuan

Changes in the amount of turnover tax= VAT- business tax=359709 yuan

2.4 VAT Reform effort on additional tax

Additional tax is levied and imposed with regular tax[4]. The tax basis is usually the payable amount of regular tax. The additional tax of turnover tax mainly contains urban maintenance and construction tax and extra charges of education funds. The tax rate is generally performed by 7% and 3%. After AVT Reform, the tax of transport business has changed; therefore, additional taxes may be changed.

Additional tax of business tax = business tax × (7%+3%)=30000 yuan

Additional tax of VAT= VAT× (7%+3%)=65971 yuan

The amount of additional tax changes= additional tax of VAT - additional tax of business tax =35971 yuan

2.5 VAT Reform effort on enterprise income tax

The tax basis of enterprise income tax is the enterprise business income minus costs, expenses and losses. In this case, after VAT Reform, operating income and operating cost changed. In addition, when the transport company pays business tax, business tax is included in the business tax and additional tax, as the deduction of enterprise income tax basis. And VAT is not deductible from taxable income of enterprise income tax. Therefore, before and after replace business tax with value-added tax, the enterprise income tax is different.

When the transport company pays business tax, enterprise income tax= (operating income – operating costs– business tax and additional tax) ×25%=917500 yuan

When the transport company pays VAT, enterprise income tax= (operating income–operating costs–business tax and additional tax) ×25%=818580 yuan

The amount of enterprise income tax changes=818580-917500=–98920 yuan

2.6 VAT Reform effort on enterprise net profit

The profit is the balance of income minus expenses in a certain period. It reflects the enterprise business results. In China's current accounting system, the calculation formula of net profit is：

Net profit= operating income – operating costs – business tax and surcharges – selling expenses – management expenses – financial expenses – asset impairment loss + changes in fair value gains and losses + investment income + non business income – non business expenditure – income tax expenses.

There is no obvious effect on selling expenses, management expenses, financial expenses, asset impairment loss, changes in fair value gains and losses, investment income, non-business income and non-business expenditure. Therefore, the net profit formula can be simplified to:

Net profit= operating income – operating costs – business tax and surcharges – income tax expenses.

When the transport company pays business tax, net profit= operating income – operating costs – business tax and surcharges – income tax expenses =2752500 yuan

When the transportation company pays VAT, Net profit = operating income– operating costs – business tax and surcharges – income tax expenses =2455740 yuan.

The amount of net profit changes=2455740–2752500= –296760 yuan

Table 1. Statement of profit calculation before VAT Reform

Subject	Formula	Amount
sales		10000000
operating income	sales	10000000
operating costs	sales× the cost of sales ratio	6000000
business tax	operating income× 3%	300000
business tax and surcharges	business tax + business tax× （7%+3%）	330000
income tax expenses	(operating income – operating costs– business tax and additional)× 25%	917500
net profit	operating income – operating costs –business tax and surcharges –income tax expenses	2752500

Table 2. Statement of profit calculation after VAT Reform

Subject	Formula	Amount
sales		10000000
operating income	Sales ÷ （1+11%）	9009009
operating costs	sales× The cost of sales ratio – Sales× the cost of sales ratio ÷ (1+17%)× 17% × credit rate of input tax	5668718
output tax	operating income× 11%	990991
input tax	Sales × The cost of sales ratio÷(1+17%)× 17%× credit rate of input tax	331282
VAT	output tax – input tax	659709
business tax and surcharges	VAT × (7%+3%)	65971
income tax expenses	(operating income – operating costs – business tax and additional) × 25%	818580
net profit	operating income – operating costs – business tax and surcharges –income tax expenses	2455740

From table 1 and table 2，the enterprise' sales is the same 100000 yuan. If the enterprise pays business tax, net profit is 2752500 yuan. If the enterprise pays VAT, net profit is 2455740 yuan. The analysis results show that VAT Reform did not reduce the tax burden of enterprises. This is

contrary to the objectives of the reform– the implementation of large-scale structural tax reduction. The reasons for this result may be the following two: First, although part of input tax can be deducted, but compared VAT rate 11% with the business tax rate 3%, the magnitude of increase is relatively large. Second, the deductible rate of input tax is low, only 38% or so. If the input tax deduction scope can be expanded, such as toll fee, insurance fee included in the scope of deduction, the result may be different.

3 Empirical analyses

3.1 Sample selection and data sources

Based on standard classification of industries in China, we selected 67 listed companies from railway transport, highway transport, pipeline transport, water transport, air transport, auxiliary transport industry and other transportation as 67 samples. The sample data from CITIC Securities, Shanghai Securities Exchange and Shenzhen Stock Exchange announced in the third quarter financial reports of 2014. Data is true and reliable. The empirical analysis used SPSS.

3.2 Research hypothesis

We assume that, no significant effect of VAT Reform on performance of transport industry. If the model and the coefficient through the significance test, then the null hypothesis will be rejected. It means that there are significant effects of VAT Reform on the performance of transport industry.

3.3 Variable selection and model establishment

3.3.1 The explained variable

We choose the most commonly used index reflecting the enterprise performance– earnings per share as the explained variable. It is set to Y, Y= (net profit – preferred stock dividends) ÷ the number of ordinary shares

3.3.2 The explaining variable

The explaining variable is the difference between business tax rate and the actual VAT rate after VAT Reform. It is set to X. The VAT rate of transport industry is 11%.But only a part of input tax can be deducted. The input tax deductible rate is 38% or so.

The actual VAT rate= [operating income × 11%- operating costs ÷ (1+17%) × 17% × 38%]/ operating income.

X=3% – [operating income × 11%- operating costs ÷ (1+17%) ÷ 17% × 38%]/ operating income.

3.3.3 The control variables

(1)The enterprise scale

Studies have shown that enterprise size has a significant influence to the enterprise business performance. We use the natural logarithm of total assets as enterprise scale. It is set Z_1, $Z_1 = \ln$ (total assets).

(2)Asset-liability ratio

Enterprise's capital structure impacts business performance. Capital structure is generally expressed in asset-liability ratio. This variable for Z_2, $Z_2 =$ total debt/total assets.

(3)Gross profit margin

Market price volatility affects gross profit margin of unit product or service. Thus it influences enterprise operating performance. So we choose gross profit margin as a control variable, notes for Z3, Z3=（operating income – operating cost）/ operating income.

Multiple linear regression models are as follows:

$$Y = \alpha + \beta_1 X + \beta_2 Z1 + \beta_3 Z2 + \beta_4 Z3 + \varepsilon$$

3.4 Descriptive statistics

The explained variable, explaining variable and control variables were analysed by descriptive statistics. The results are shown in table 3.

Table3. Descriptive statistics of variables

	N	Minimum	Maximum	Mean	Standard deviation
Y	67	-1.0800	4.3085	0.2766	0.5824
X	67	-0.0985	0.0977	-0.0433	0.0270
Z1	67	10.8821	16.8491	13.8614	1.4165
Z2	67	3.2697	95.0509	46.0515	21.5075
Z3	67	-2.2945	0.8965	0.2925	0.3890

Table 3 shows the sample size is 67. The mean of earnings per share is 0.2766, which shows that most of the transport industry's earnings per share are in the vicinity of 0.2 yuan. The mean of change amount in turnover tax rate is -0.0433. Thus, it shows that turnover tax burden increased. The standard deviation is 0.0270, volatility is very small. It shows that most sample enterprises' change amount in turnover tax rate is about -4%. The influence of VAT Reform on turnover tax is almost same. There is little difference between the minimum and maximum of total assets' natural logarithm. The standard deviation is also small. It shows that the gap among listing corporations from transport industry is not big. The minimum of Asset-liability ratio is 3.2697. The maximum of asset-liability ratio is 95.0509. The standard deviation is 21.5075.The results show that asset-liability ratio among listing corporations have a big gap. The average gross margin rate is 0.2959 and the standard deviation is 0.3890. They are all in normal level.

3.5 Regression analysis

By SPSS software we did regression analysis on explained variable, explaining variable and control variable. Results are shown in table 4, table 5 and table 6.

Table4. Goodness of fit test of regression analysis

Model	R	R square	Adjust the R square	The standard error of estimate
1	.563[a]	.371	.239	.217

Note: a. Predicting variables: constant, X, Z1, Z2, Z3

From table 4, multiple determination coefficient of regression model updating is 0.239. It means that multiple linear regression models to explain the degree of earnings per share is 23.9%. Fitting degree of regression model is not ideal. The main reason is that there are many factors affecting enterprise earnings per share, such as issuance of stocks, corporate bonds issued, economic environment, and executive ability. Therefore, multiple decision coefficient of regression model updating is not high, that does not impact the results of empirical studies.

Table5. Test of significance of regression model [b]

Model		Sum of the squares	df	mean square	F	Sig.
1	regression	1.326	4	.332	.976	.037[a]
	residue	21.060	62	.340		
	total	22.386	66			

Note: a. Predicting variables: constant, X, Z1, Z2, Z3; b. dependent variable: Y

We can see from the table 5, the regression model through the F test shows that the model is significant in statistics, linear relationship is significant. It can be used to explain VAT Reform impact on business performance.

Table 6. Test of significance of regression coefficient [a]

Model		Unstandardized Coefficients		Standardized coefficients		
		B	standard error	trial version	t	Sig.
1	constant	1.372	.770		1.781	.080
	X	4.350	8.088	.202	.538	.059
	Z1	-.085	.052	-.207	-1.629	.010
	Z2	.003	.003	.107	.833	.040
	Z3	.482	.559	.322	.864	.039

Note: a. dependent variable: Y

According to the table, this paper estimated functional multivariate linear regression model are as follows:

$$Y = 4.350X - 0.085Z1 + 0.003Z2 + 0.482Z3 + 1.372$$

The regression coefficient between the enterprise performance and VAT Reform(X) is 4.350 which passed the test in the 10% significant level. It explains that there is a positive correlation between the enterprise performance and VAT policy. Therefore, we could reject the original hypothesis of the empirical analysis and draw the inclusion that VAT Reform contributes to improve the enterprise performance of transport industry.

The regression coefficient between the enterprise performance and enterprise scale (Z1) is -0.085 which passed the test in the 1% significant level. It explains that there is a negative correlation between the enterprise scale and the enterprise performance. The regression coefficient between the enterprise performance and enterprise asset-liability ratio (Z2) is 0.003 which passed the test in the 5% significant level. It explains that moderate debt could improve the enterprise performance. The regression coefficient between the enterprise performance and gross margin (Z3) is 0.482 which passed the test in the 5% significant level. It confirms that there is direct relationship between the enterprise gross margin and the enterprise performance.

From the empirical analysis we can see that VAT Reform is the important link of our country's structural tax cuts. In the pilot of transport enterprises, it really has played an important role in reducing tax burden and improving performance[5]. That provides support for VAT Reform in much more industry.

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