Impact of Reduced VAT Rate on the Behavior of the Labour Intensive Services Suppliers

K. Randová, M. Krajňák, V. Friedrich

***Abstract*—** The paper is focused on the analysis of the impact of the potential transfer of the certain labour intensive services (restaurant and catering services, hairdressing services, minor repairing of shoes and leather goods and minor repairing of bicycles) from the standard to the reduced VAT rate on the behavior of these services suppliers in the current conditions of the Czech Republic. The data for the analysis were obtained by the questionnaire research. Analyzed are for example these relations: changes of VAT liability, trade margin, average price decrease, demand, location of the business, scope of the business, number of employees, use of potential free funds that could be created due to this possible legislative change. Following methods of the descriptive statistics, correlation and regression analysis, ANOVA (Analysis of Variance), chi-square test of independence were used. The data were mainly evaluated by the SPSS software.

***Keywords*—** Correlation and Regression Analysis, Labour Intensive Services, Pricing Policy, VAT Rates, Value Added Tax

I. Introduction

THE rules for application of value added tax [19] in the frame of European Union are regulated by the Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax (hereinafter referred to as "VAT Directive") [17], [13]. The VAT Directive has been amended since its approval many times, e.g. by Council Directive 2009/47/EC of 5 May 2009 amending Directive 2006/112/EC as regards reduced rates of value added tax, which entered into force on 1 June 2009. This Directive authorises the Member States to apply reduced VAT rate in the labour-intensive services on a permanent basis [2]-[3], [13], [16], [22]. It has been adopted pursuant to the results of the "Study on reduced VAT applied to goods and services in the Member States of the European Union" (hereinafter referred to as "Copenhagen Economics Study") from 2007.

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The conclusion of the Copenhagen Economics Study predicted positive influence on citizens, workers, businesses and, in particular, small and medium sized enterprises in case of application of reduced VAT rate on the above mentioned services [8]. For more about the empirical evidence of the impact of taxes other than income taxes on corporate investment and location decisions see [5].

The question of reduced VAT rates application within the frame of the European Union, especially in relation to the proper functioning of the local market [13], is still actual. The European Commission has just launched a public consultation "Consultation on Review of existing legislation on VAT reduced rates" [21].

II. Labour Intensive Services and VAT Rates in the Czech Republic

In accordance with the above mentioned Directives lots of Member States unlike the Czech Republic also apply reduced VAT rate at these categories of the labour intensive services: restaurant services, hairdressing services, minor repairing of shoes and leather goods and minor repairing of bicycles.

Currently, these services are included into the standard VAT rate in the Czech Republic, level of which is determined at 20 % [21]. One of the government´s arguments against the application of the reduced VAT rate was that economic effect of this legislative change would not be measurable. Comprehensively about using statistical methods see [10]. Reference [4] is related to impact of tax system changes to Romanian fiscal system.

For this reason, the authors decided to make the questionnaire research among suppliers of these services in current conditions of the Moravian-Silesian Region and compare the results with the conclusions of the Copenhagen Economics Study from 2007.

For the purpose of creation of a population of such a size to be able to conclude relevant findings there were obtained data about number of suppliers of these services from the Czech Statistical Office. In cases where the research is conducted at institutions within the region it is recommended the sample size from 200 to 500 respondents [20]. The total number of respondents reaches up to 317 respondents.

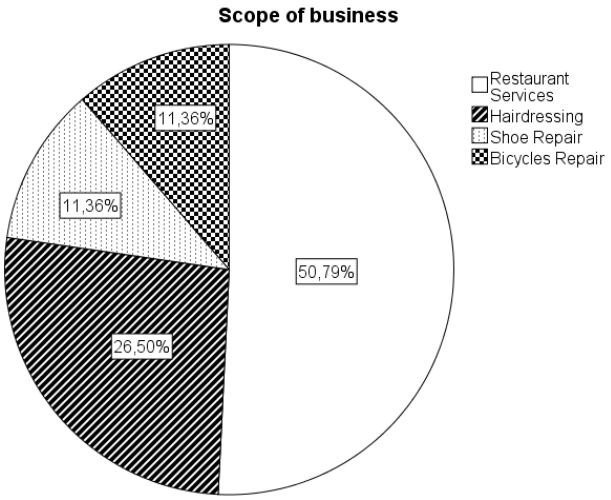

Fig. 1 Structure of the survey sample

The size of particular subgroups of the population is determined according to the proportion of suppliers of restaurant services, hairdressing services, minor repairing of shoes and leader goods and minor repairing of bicycles. The number of respondents in the category minor repairing of shoes and repairing of bicycles were not statistically relevant, so it was necessary to extend the population on condition that Moivre-Laplace theorem on the convergence of binomial distribution is fulfilled. For more about setting the population and its subcategories see [18].

The respondents reported the data about their business, especially turnover and sales in case of application of standard or reduced VAT rate, output and input tax according to VAT rates, tax liability, trade margin and data concerning employees. There is a comparison of the actual data for the last taxable period of the 2010 and data that are presupposed in case of the transfer of these services to the reduced 10% VAT rate. Furthermore, the analysis contains information about a way of using the possibly created funds. The pricing policy and the change of expected demand from the customers is also studied. Reference [23] shows another analysis of taxation impact on small business entities in current condition of Croatia.

III. Results of the Empirical Research

As follows results from the research carried out among services suppliers, the possible legislative change, which would cause the reduction of their VAT liability, on the one hand, will lead to creation of available funds in 98% of cases, on the other hand, not every all respondents would be willing to decrease the price of their services despite a 10% drop of the VAT rates.

A. VAT Rates Changes and Pricing Policy

The paper is focused on the testing of the relation that is based on the fact that the trade margin size does not affect the possible average price reduction of supplied services. Comprehensively about indirect taxation and tax incidence under nonlinear pricing see [12]. For link between VAT rates changes and pricing strategy of firms also see [9].

At first the linear regression model of relation between trade margin as independent variable and price decrease as dependent variable were established. The statistical software SPSS and Linear Regression method have been used. The regression model was found as insignificant (Sig F = 0.401) at both 5% and 10% level of significance – see Table 1 with results. Neither model extension to other quantitative regressors (revenues, expenses, number of employees) brought success in the form of significant dependence. None of these input variables seemed to be significant.

Table 1: Insignificant regression model trade margin → price decrease

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.119	1	18.119	0.706	0.401
	Residual	8,082.001	315	25.657		
	Total	8,100.120	316			

Source: authors' calculations using SPSS software

Therefore ANOVA (Analysis of Variance) was used for testing the significance of differences in average values of more than two samples, see [14]. As the subgroup of services suppliers contains 317 respondents in total, the data are due to the extensiveness of statistic population, organized into 10 groups depending on the amount of the trade margin. Number of 8 to 10 groups (intervals) is recommended for Samples Size from 101 to 500 respondents [14].

From the results of the questionnaire research follows that from the analyzed sample size the trade margin is varying in the interval from 2 % (*SN*) to 250 % (*LN*). The suppliers of the services would be willing to decrease prices of their services if the VAT burden is reduced. The level of decrease was reported from 0 to 40 %. The number of 189 respondents (i.e. 59.6 %) reported that they would not decrease prices of their services at all. More detailed information about the population divided into subgroups is shown in Table 2. The next analysis is concentrated on the issue whether the level of trade margin has statistically important influence on prices decrease in case of decreasing of output tax.

The variation range *R* is determined

$R = 250 - 2 = 248$

The interval width *W* is determined by equation

$$w = \frac{250-2}{10} = 24.8 \approx 25$$

By formation of the groups in dependence on the amount of trade margin and frequency determination and calculation of average price decrease there are values obtained for the mathematical expression of the null hypothesis that is based on the equality of the average price reduction.

The lower limit of the first group is set to 0.0 %, the width of each group is equal to 25. All the intervals are right closed.

Table 2: Trade margin divided into the groups

Trade margin	Number of respondents
<0.0, 25.0>	113
(25.0, 50.0>	114
(50.0, 75.0>	36
(75.0, 100.0>	30
(100.0, 125.0>	10
(125.0, 150.0>	9
(150.0, 175.0>	1
(175.0, 200.0>	3
(200.0, 225.0>	0
(225.0, 250.0>	1

Source: authors' calculations according to the data obtained by the questionnaire research

As the number of respondents in the last 4 groups is lower than 5 it comes to mergence of these groups into one. To analyze and draw conclusions from the group, where there is e.g. only 1 respondent is not statistically reliable. The new set of groups, including the distribution of each group interval, is stated in Table 3. The histogram of new distribution is in Figure 2.

Table 3: Trade margin and decreasing of price prepared for the analysis

Trade margin	Number of respondents	Average price decrease
<0.0, 25.0>	113	3.15
(25.0, 50.0>	114	2.97
(50.0, 75.0>	36	2.31
(75.0, 100.0>	30	2.83
(100.0, 125.0>	10	2.75
(125.0, 150.0>	9	1.67
(150.0, 250.0>	5	3.00
Total	317	

Source: authors' calculations according to the Table 1

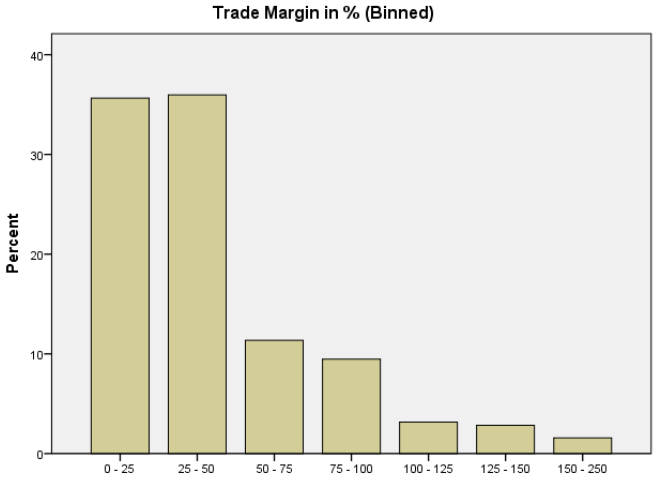

Fig. 2: Histogram of trade margin binned distribution

The means plot of average values of price decrease in each group is presented in Figure 3. The 95% confidence intervals of means are presented as error bars in the chart.

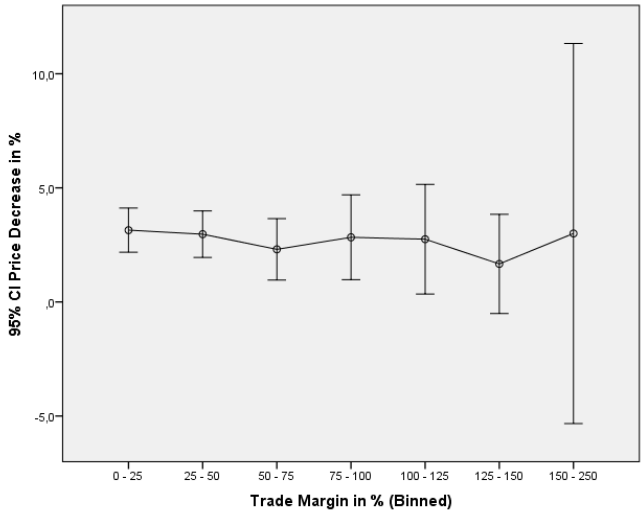

Fig. 3: Means plot with error bars of price decrease binned by trade margin

From the graph it could be seen that all the confidence intervals have nonempty common intersection. It means that no significant differences between average price decrease may be found. The exact confirmation of this hypothesis will be given the analysis of variance (ANOVA) itself.

In the process of ANOVA testing there will be two hypotheses used, one of them is the null hypotheses [7]

$$H_o = \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$$

An alternative hypothesis H_1 is based on the argument that not all μ_i are equal. [1]

The statistical software SPSS and the Compare Means – One-Way ANOVA method have been used.

Table 4: One-Way ANOVA – output table

ANOVA

Decrease Prices in %

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	34.206	6	5.701	0.219	0.971
Within Groups	8 065.914	310	26.019		
Total	8 100.120	316			

Source: authors' calculations using SPSS software

The test criterion F takes value 0.219 with significance Sig F = 0.971. Since the significance is greater than 0.05, therefore the null hypothesis H_0 is accepted at the 5% of the significance level. It can be seen on the chart that the level of the trade margin has not significant influence on the price decrease of the restaurant services during possible reduction of the output tax burden (in terms of this carried out research by 10 %).

Despite of reduction of their VAT liability, most of the respondents would not decrease prices of their services. Anyway, it could not be said, that the transfer of the certain labour intensive services from the standard to the reduced VAT rate would not be beneficial to the development of their businesses. In Fig. 4 there are the alternatives shown, which way would the respondents use these available funds in case of this legislative change.

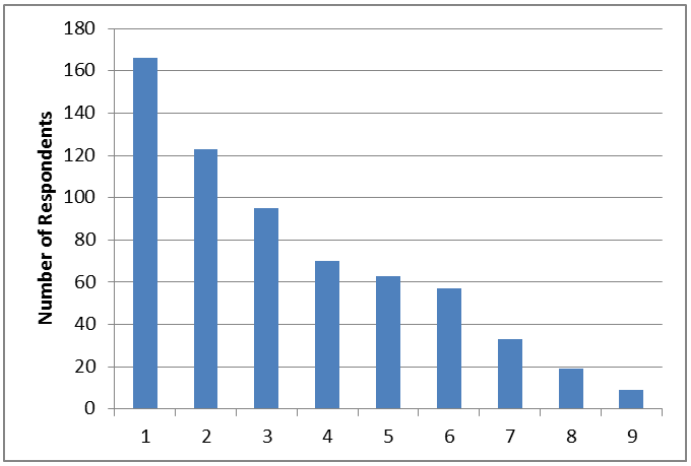

Fig. 4: Use of created free funds

Table 5: Legend for Figure 5

1	Investments in tangible assets (e.g. machines, means of transport, technologies)
2	Increasing of profit-sharing payements to a business owner
3	Range of services expansion
4	Increasing of wages to the current employees
5	Production capacity expansion
6	Training of staff
7	Increasing of number of employees
8	The free funds would not be created by this reason in our company
9	Others

Source: authors' calculations using Microsoft Excel software

The most of the respondents prefer using of these free funds to the acquisition to their business, in particular, investment to the tangible assets (purchase of the new machines, technologies, and means of transport). By preferring of this alternative they suppose benefits both in the long and the short time perspective.

Large number of respondents does not have any employees (especially the suppliers of minor repairing of shoes and leather goods). This finding can explain why they preferred using of the created free funds in favor of the business owner.
The least preferred alternative is increasing of employees' number. This also can be explained by the fact that many respondents do not have any employees, and due to the low sales volume (even if it would increase in many cases), it would not pay to take another employee.

Nevertheless, the available funds would also be used for the benefit of the employees, especially for the development of their skills. Thus, the labour productivity increase could be expected.

B. Pricing Policy and Increase in Demand

The next analysis was established to find if there is a significant relation between decreasing the prices and increasing the demand (force of supply – demand law).
First, the relation between the services suppliers, which decrease prices and those which increase the demand could be seen. The confidence table 2 x 2 using alternative variables (yes – no) was created – see Table 6 for results. The Crosstabs tool in SPSS software was used.

Table 6: Confidence table 2x2 for prices decrease and demand increase

Decrease Prices * Increase Demand Crosstabulation

			Increase Demand		Total
			NO	YES	
Decrease Prices	NO	Count	164	25	189
		% within Decrease Prices	86.8%	13.2%	100.0%
	YES	Count	19	109	128
		% within Decrease Prices	14.8%	85.2%	100.0%
Total		Count	183	134	317
		% within Decrease Prices	57.7%	42.3%	100.0%

Source: authors' calculations using SPSS software

It can be seen that most of services suppliers (85.2 %) which decrease the prices also increase demand. And vice versa most of the services suppliers (86.9 %), which did not decrease the prices not to increase demand.

In the process of testing the relation between prices decrease and demand increase alternative (binary) variables the following hypotheses will be used:

H_0: there is no relation between decrease prices and increase demand
H_1: there is a significant relation between decrease prices and increase demand

The chi-square test of independence and Cramer's confidence coefficient V were used to measure the strength of possible dependency.

Table 7: The chi-square test of independence for prices decrease and demand increase results

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	0.714	0.000
	Cramer's V	0.714	0.000
N of Valid Cases		317	

Source: authors' calculations using SPSS software

It could be seen that the significance of test criterion χ^2 asymptotically reaches zero (Sig G = 0.000) and the value of Cramer's V coefficient is high (V = 0.714) therefore it can be said that the alternative hypothesis cannot be rejected at the 5% (and also 1%) level of significance. It means that there is a significant and strong relation between the decision to decrease the prices and demand increase.

The quantitative level of relation between the value (percentage) of prices decrease and demand increase was measured using correlation and simple linear regression analysis. The real values of price decrease in % and demand increase in % were used.

Table 8: Correlation and Regression Analysis Results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.573[a]	0.328	0.326	7.9513

a. Predictors: (Constant), Decrease Prices in %

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9 718.059	1	9 718.059	153.709	0.000[b]
	Residual	19 915.529	315	63.224		
	Total	29 633.588	316			

a. Dependent Variable: Increase Demand in %

b. Predictors: (Constant), Decrease Prices in %

Source: authors' calculations using SPSS software

The relative high level of correlation (R = 0.573) was measured between the percentages of prices decrease and demand increase. The significance of test criterion F asymptotically reaches zero (Sig F = 0.000) thus it can be said that the relation is statistically significant.

The linear model of dependency can be found in Table 9.

Table 9: Linear Regression Model coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.097	0.515		4.073	0.000
	Decrease Prices in %	1.095	0.088	0.573	12.398	0.000

a. Dependent Variable: Increase Demand in %

Source: authors' calculations using SPSS software

It could be seen that the fix value of demand increase is about 2 % and the marginal propensity (relative flexibility) of the relation measured is about 1 therefore the change of price decrease in 1% force approximately the same value of demand increase change.

The linear regression model is graphically presented in Figure 5.

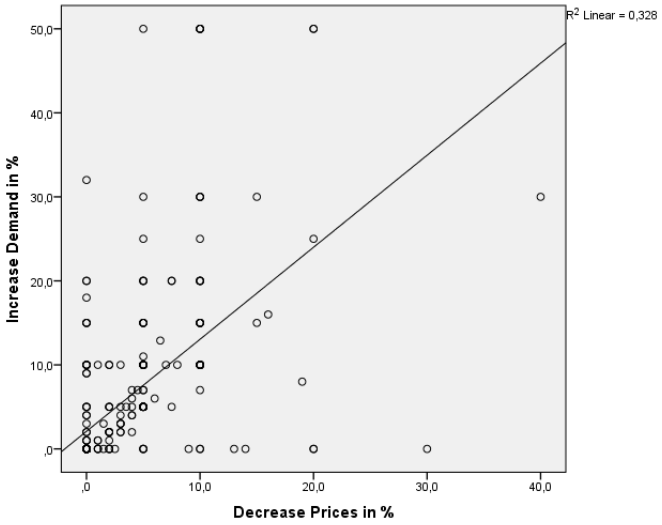

Fig. 5: The linear regression model between prices decrease and demand increase in %

It could be seen the strong concentration of values around the origin which represents the services suppliers not to decrease their prices whereas VAT liability was decreased. There are also a few services with outlier values but the number of them is not significant and has not any influence on the model.

This fact can be also presented using the histogram of standardized residuals which have a significant peak around zero which disrupts normality of residuals distribution – Figure 6.

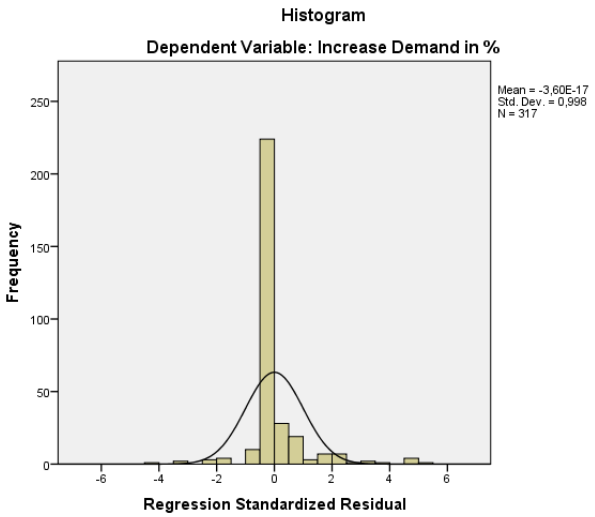

Fig. 6: Standardized Residuals Distribution in the Regression Model

Hence the more explanatory power can be reached by selecting only the services suppliers which react to the VAT decrease by decreasing their prices. There are 189 services suppliers in this sample. Building of the regression model with these services can be repeated only to obtain more proper values.

The results of this "corrected" model are presented in Table 10, the regression coefficients of the model are in Table 11.

Table 10: Correlation and Regression Analysis Results (only services with decreasing the prices)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.386[a]	0.149	0.142	11.2485

a. Predictors: (Constant), Decrease Prices in %

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2 788.884	1	2 788.884	22.041	0.000[b]
	Residual	15 942.644	126	126.529		
	Total	18 731.529	127			

a. Dependent Variable: Increase Demand in %

b. Predictors: (Constant), Decrease Prices in %

Source: authors' calculations using SPSS software

Table 11: Linear Regression Model coefficients (only services with decreasing the prices)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.338	1.599		3.338	0.001
	Decrease Prices in %	0.819	0.174	0.386	4.695	0.000

a. Dependent Variable: Increase Demand in %

Source: authors' calculations using SPSS software

In this model the fix value of demand increase is about 5.4 % and the marginal propensity (relative flexibility) of the relation measured is about 0.82 thus the change of price decrease in 1% force approximately 0.82% of demand increase change. This value is near to the typical level of macroeconomic marginal propensity of consume (mpc ≈ 0.8) thus it is more real than the value higher than 1 in the previous model including the services suppliers not making changes in price level due to VAT rates changes.

The standardized residuals distribution of this "corrected" model can be seen in Figure 7.

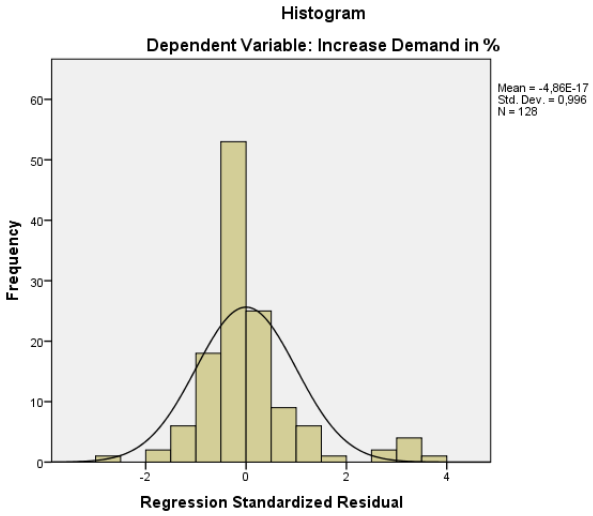

Fig. 7: Standardized Residuals Distribution in the Regression Model

There is still a significant peak around zero but it is not that striking as in previous model. The normal P-P plot presenting the normality (or "abnormality") of residuals is presented in Figure 8. Only the small deviations from the ideal normal line can be seen there.

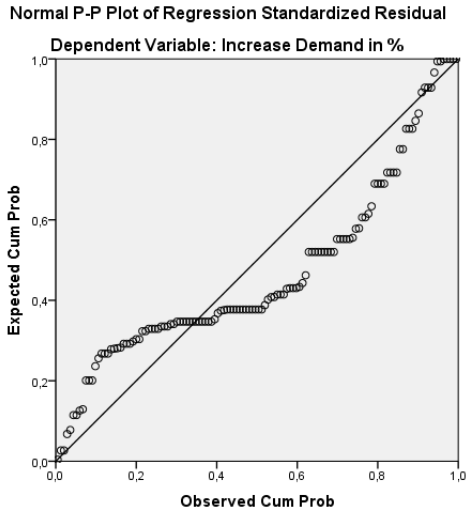

Fig. 8: Standardized Residuals P-P Plot of the regression model

For testing normality of residuals the One Sample Kolmogorov Smirnov test was used.

H_0: the standardized residuals have normal distribution
H_1: the standardized residuals have not normal distribution

The results of the test (Table 11) present that the normality of standardized residuals distribution was disrupted. The significance of the test (Sig = 0.000) is lower than 0.05, that the alternative hypothesis cannot be rejected.

Table 12: The results of Kolmogorov – Smirnov normality test of standardized residuals

One-Sample Kolmogorov-Smirnov Test

		Standardized Residual
N		128
Normal Parameters[a,b]	Mean	0.000
	Std. Deviation	0.996
Most Extreme Differences	Absolute	0.186
	Positive	0.186
	Negative	-0.157
Kolmogorov-Smirnov Z		2.110
Asymp. Sig. (2-tailed)		0.000

a. Test distribution is Normal.

b. Calculated from data.

Source: authors' calculations using SPSS software

Better results can be obtained using the "weaker" Wald – Wolfowitz Runs test which does not test the normality of residuals itself but their independence. If the normality of residuals in regression model is disrupted the independence of residuals must be found to accept the model.
The hypotheses for Runs test can be established:

H_0: the standardized residuals are mutually independent
H_1: the standardized residuals are mutually dependent

The results of the test (using SPSS software to do it) are presented in Table 13.

Table 13: The results of Wald-Wolfowitz runs test for independence of residuals

Runs Test

	Standardized Residual
Test Value[a]	0.000
Cases < Test Value	80
Cases >= Test Value	48
Total Cases	128
Number of Runs	52
Z	-1.705
Asymp. Sig. (2-tailed)	0.088

a. Mean

Source: authors' calculations with using SPSS software

The significance of the test (Sig = 0.088) is higher than 0.05, thus the zero hypothesis is accepted at the 5% level of significance. The standard residuals of the regression model are mutually independent, therefore the model can be used for description and explanation the relation between price decrease in % and demand increase in %.

C. More Complex Econometric Model

The way to achieve better results for prediction of demand increase in % using linear regression analysis is to build the more complex econometric model using both quantitative and qualitative predictors from the survey.

The quantitative predictors represent the measures of several financial parameters of service and the number of employees.

There are 5 potential quantitative predictors available:

- sales (excluding VAT)
- costs (excluding VAT)
- trade margin in %
- number of employees
- prices decrease in %

Two qualitative variables were also included into the regression model. To use these variables they must be converted into a set of $k - 1$ "dummy" binomial (alternative) variables where k is a number of origin qualitative variable values.

These variables are:

- scope of business (3 dummy variables)
- location (5 dummy variables)

To extract only significant predictors the stepwise algorithm was used which is implemented in SPSS software. This heuristic algorithm is searching for the optimal set of predictors enter the variables which cause the significance level of model (F statistic) to 0.05 or lower and remove variables which cause the increasing the significance level up to 0.10. As a rule, several steps must be taken to find the optimal set of predictors.

In this case 13 predictors were available to model and predict the demand increase. Only 189 services suppliers from the survey, which react to the VAT decrease by decreasing their prices, were included into the model.

The result was surprising. Only 2 predictors were included into the final model using stepwise algorithm to select the best set of predictors – one quantitative (prices decrease in %) and one dummy alternative variable (location – district town).

The correlation coefficient of the model is 0.422, which is higher than 0.386 using only price decrease as a single predictor.

The results of the final model are presented in Table 14, the regression coefficients are in Table 15.

Table 14: Regression Analysis Results for final model

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.422[a]	0.178	0.165	11.0989	1.624

a. Predictors: (Constant), Location - district town, Decrease Prices in %

b. Dependent Variable: Increase Demand in %

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3 333.273	2	1 666.637	13.529	0.000[b]
	Residual	15 398.255	125	123.186		
	Total	18 731.529	127			

a. Dependent Variable: Increase Demand in %

b. Predictors: (Constant), Location - district town, Decrease Prices in %

Source: authors' calculations using SPSS software

Table 15: Final Regression Model coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.730	1.589		3.606	0.000
	Decrease Prices in %	0.870	0.174	0.410	5.005	0.000
	Location - district town	-6.475	3.080	-0.172	-2.102	0.038

a. Dependent Variable: Increase Demand in %

Source: authors' calculations using SPSS software

The Durbin-Watson statistic DW == 1,536 is near to the "ideal" value of 2 therefore the autocorrelation in the model residuals is not significant.

It can be seen that the values of model parameters (constant as the autonomous demand increase and marginal propensity of prices decrease) are very similar to the previous model using only one predictor. The new regressor location – district town means that the demand increase in district town is about 6,5 % lower than in other locations in average.

The analysis of residuals returns also the similar results which can be seen in previous model. Figure 9 presents the distribution of standardized residuals, Table 16 and 17 results of Kolmogorov-Smirnov test of normality and Wald-Wolfowitz test of mutual independence of residuals.

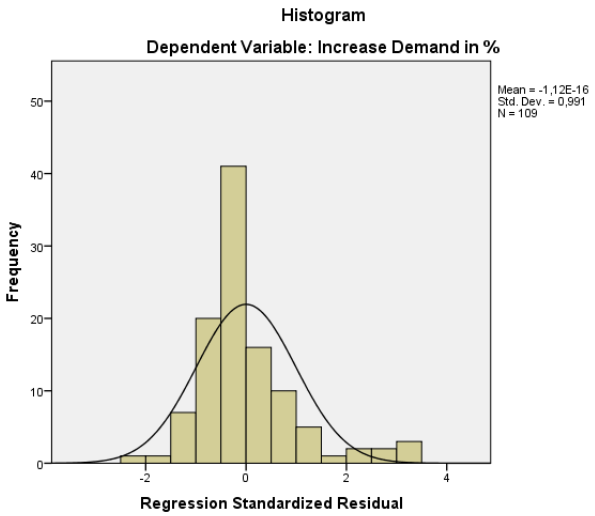

Fig. 9: Standardized residuals distribution in the final regression model

Table 16: The results of Kolmogorov – Smirnov normality test of standardized residuals in the final model

One-Sample Kolmogorov-Smirnov Test

		Standardized Residual
N		128
Normal Parameters[a,b]	Mean	0.000
	Std. Deviation	0.992
Most Extreme Differences	Absolute	0.170
	Positive	0.170
	Negative	-0.157
Kolmogorov-Smirnov Z		1.921
Asymp. Sig. (2-tailed)		0.001

a. Test distribution is Normal.

b. Calculated from data.

Source: authors' calculations using SPSS software

Table 17: The results of Wald-Wolfowitz runs test for independence of residuals in the final model

Runs Test

	Standardized Residual
Test Value[a]	0.000
Cases < Test Value	85
Cases >= Test Value	43
Total Cases	128
Number of Runs	49
Z	-1.814
Asymp. Sig. (2-tailed)	0.070

a. Mean

Source: authors' calculations using SPSS software

The result of the model can be interpreted that the demand increase depends only on the decision to decrease the prices due to the changes of VAT and marginally also on the location of the service. There is no significant dependence on the scope of business, nor the sales, costs, trade margin and the size of the service (number of employees).

D. Finding Typical Services Suppliers Behavior

The next tool found the typical services suppliers' behavior due to the changes of VAT. The classification statistical methods were used to find the typical clusters of services suppliers and the descriptive statistics to describe them. All the 317 services suppliers were included into this analysis. The same statistical variables as the predictors in previous regression analysis were used to make segments of services suppliers with similar behavior.

To find the optimal number of clusters some experiments with hierarchical cluster analysis were made. All the variables were transformed into Z – scores (standardized values) to be able to compare values of variables with different magnitudes and units. The square Euclidean distance was used to measure

differences between services suppliers or clusters and Ward method to identify the clusters. This method is used to find the cluster with similar number of members (to avoid creation of clusters with only one member at the high levels of clustering).

To study dendrogram (a tree diagram used to illustrate the arrangement of the clusters) – see Figure 10 - an optimal number of clusters was found between 3 and 7 clusters. Subsequently the number of 4 clusters was selected. (De facto it is also the number of scopes of business used in the survey.)

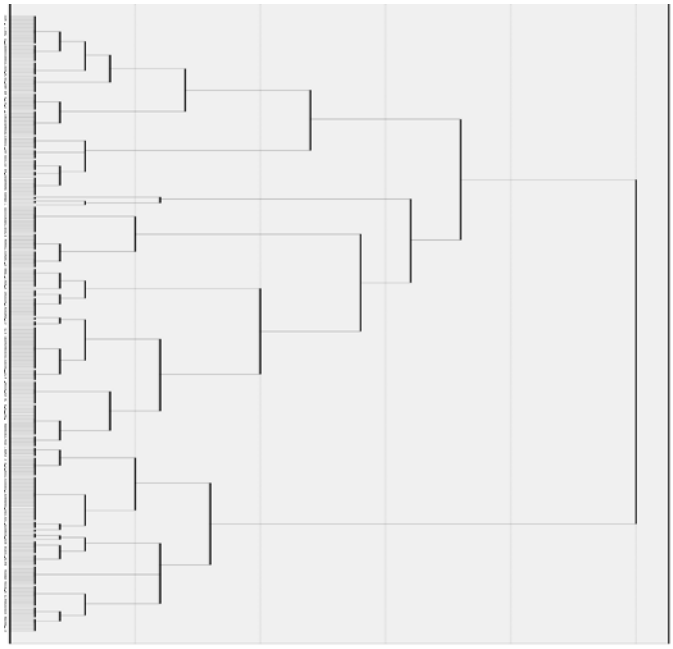

Fig. 10: A dendrogram of cluster analysis result

To find the parameters of the clusters the standard descriptive statistical methods were used. Table 18 shows the distribution of services suppliers into the clusters.

Table 18: Distribution of the services suppliers into the clusters

Ward Method

		Frequency	Percent
Valid	1	124	39.1
	2	95	30.0
	3	93	29.3
	4	5	1.6
	Total	317	100.0

Source: authors' calculations using SPSS software

It can be seen that only 3 of the clusters have significant number of members (the percentage higher than 5%). The fourth cluster is too small to be considered as significant representative of the segmentation. Therefore only these three clusters will be described. These 3 clusters contain 124, 95, and 93 services suppliers respectively.

The outputs of statistical software SPSS for analyzing these clusters would be very large to present in the paper thus only the results will be described later in the following paragraphs.
The first segment consists of 81.5 % restaurant services, the other scopes of business are represented in minority. These services suppliers are set in all the locations, so the locality is not significant for selecting this cluster.

The second cluster consists of 50.5 % restaurant services suppliers and 32.6 % of hairdressing services suppliers. The other scopes of business (shoe repair and bicycle repair services suppliers) are represented in minority. Most of the services suppliers (72.7 %) are situated in the bigger towns (district towns or towns with 100,000 inhabitants and more).

In the third cluster there are the majority of small services suppliers. The number of hairdressing, shoe repair and bicycle repair services suppliers is 91.4 % together. These services suppliers are again set in all locations.

The quantitative parameters of all the three clusters are cumulated in the table 19. The mean values of all the parameters are presented in the table.

Table 19: The quantitative statistics of the clusters

Descriptive Statistics

Mean

	Ward Method		
	1	2	3
Sales, excluding VAT	399,551.74	347,751.85	96,089.78
Costs, excluding VAT	272,953.63	239,333.96	63,274.53
Trade margin in %	59.92	41.17	30.30
Number of employees	4.73	3.74	1.14
Decrease Prices in %	1.052	7.800	0.462
Increase Demand in %	3.177	12.737	0.624

Source: authors' calculations using SPSS software

Significant difference can be observed in the number of employees and also in prices decrease and demand increase in %. The first and the second clusters contain mostly services suppliers with a small number of employees (small business – 1 to 10 employees), in the third cluster there are many services suppliers with one or none employee.

The first cluster has a relatively small average decrease of prices due to the fact that more than 80 % of services suppliers in this cluster do not decrease prices owing to decrease of VAT. On the other hand in the second sector 99 % of services suppliers decrease their prices, so that he average decrease was 7.8% and the demand increase 12.7 %. In the third cluster most of services suppliers do not decrease prices again.

To complete the results the problem can be seen via the scopes of business:
a) Restaurant services suppliers – most of them do not decrease their prices, especially the restaurants with more employees (the prices decrease is more obvious in the restaurants with smaller number of employees).
b) Hairdressing services suppliers – most of them decrease their prices, except those which have no employees.

c) Repair services suppliers (both shoe and bicycle) – typical services suppliers without employees or with a small number of employees, they mostly do not make any change in prices.
It can be stated that services suppliers with more employees have greater tendency to decrease the prices as a reaction to lower the VAT than the services with only one employee or without employees (self-employed). However, it must be clear that the correlation analysis did not find this dependency as significant in all the sample.

IV. CONCLUSION

By processing the questionnaire research results it was found out that in case of transferring of certain labour intensive services from the standard to the reduced value added tax rate, there would be created free funds almost with all the respondents, suppliers of these services in the current conditions of the Moravian Silesian Region of the Czech Republic, as a result of their tax liability decrease.

The presumption, based on the results of the Copenhagen Economics Study from 2007, that majority of these services suppliers would decrease prices of their services was not fulfilled. The main reason for this is their fear of the persistent economic crisis. The hypothesis based on the claim that the size of the trade margin has an impact on the pricing policy in this testing segment was not accepted as well.

However, an important positive economic effect of this possible legislative change would be the fact that the suppliers of these services would use these available free funds for their business development, especially for the investment into tangible assets, equipment and modernization of their premises, or into production capacity expansion.

These conclusions are similar to the results of the studies made in 2011 after the VAT cut in France in restaurant and catering services in 2009 and in Germany in hotel services in 2010 showed similar results as the VAT cut was not passed to the costumers but the suppliers of the services used the created free funds for the renovation and acquisitions of their business [6], [15].

The taxes analysis using statistical methods might be a little bit unusual, however, the statistical point of view on the taxes behavior in relation to other macro and microeconomics variables could be interesting and can extend the point of view on this "accounting" problem. Another statistical approach to taxes evaluating by using multidimensional correlation statistics was used e.g. in the paper [11]. Although the mentioned paper was dealing with income taxes, similar approach could be used for VAT application or other taxes [16].

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