PRICE EFFECTS OF VALUE ADDED TAX*

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1 INTRODUCTION

The forecast of price effects resulting from the introduction of value added tax (VAT) presented in this work is an elaboration of the forecast made within the project entitled "Analysis of the fiscal system of the Republic of Croatia with introduction of the value added tax" (Dalić et al., 1966). The estimate made within the mentioned project was based on a sample of goods whose prices are being scanned by the Central Bureau of Statistics in order to calculate the retail price index. To be more precise, the estimate was based on prices registered during January 1996 and has, within the defined assumptions, provided two sets of information.

First, we have obtained a value for the minimal average weighted tax burden in consumption, where we used the retail price index pondering system. It was shown that the average tax rate for goods whose prices are scanned for the retail price index, was a ***minimum*** of ***20 percent***. Second, assuming two basic scenarios of possible price behavior, a price effect of the VAT introduction was forecasted which shows how great the ***maximum*** change of the retail price index would have been, if for some reason VAT had been introduced right after the January price monitoring had been completed. It has been demonstrated that in the conditions of the 'optimistic' scenario - which assumes

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that there is no change in profit margins and profits, with a decrease in prices for products which have in January been burdened with real rates higher than 22 percent, and an increase in prices for products which have been burdened with real rates lower than the rate of VAT - the ***maximum increase of the retail price index would have been 2.4 percent***.

At the same time, in the conditions of the 'pessimistic' scenario - which with all other economic conditions unchanged, assumes an increase in prices of all products whose real tax burden in January was lower than the rate of VAT, with unchanged prices for products whose real tax burden was already higher (i.e. where the tax decrease resulted in higher profits and profit margins) - a ***maximum increase in prices of 5.2 percent*** could be expected.

However, the validity of these results - besides being limited by the method used - is further limited by the change (a decrease) of the standard sales tax rate from 20 percent to 15 percent, which occurred during the middle of March[1]. This instrumental change was the reason for the repeated prognosis procedure. The repeated procedure starts with the same sample of goods and services (those monitored) for the retail price index, but the evaluation of the price effects of VAT is based on the prices recorded in April. The intended and expected effect of the decrease in the standard sales tax rate was a decrease in the real tax burden of the sales tax on goods and services. But since the price effect of VAT basically depends on the relationship between the real tax burden of sales tax on goods and services (i.e. existing tax burden) and the tax burden which will be present in conditions of VAT, we can expect that the change (the decrease) of tax burden caused by a decrease in rates, will result in a different (greater) price effect by VAT introduction.

Therefore, the goal of this paper is to estimate a possible interval of oscillation for a singular change in prices after the introduction of VAT, in conditions created after the standard sales tax rate has been decreased. The paper is essentially divided into three parts. In part one we examine the reasons which prompted the author to use the chosen evaluation method, and general assumptions for evaluation procedure used to calculate the price effect of VAT introduction. In part two we present the procedure and evaluation results for the minimal average tax burden consumption - by individual products, product groups and aggregate - present after the mentioned decrease in standard sales tax rate. The

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[1] *The decrease of sales tax rate refers to all products except a) products to which excise tax is applied (oil, beer, alcoholic and nonalcoholic beverages) except for coffee; b) products which by law are exempt from paying sales tax, and c) products classified as third and fourth category by the Law on Sales Tax.*

estimate of the average weighted tax burden is an important indicator as it ensures all the elements needed to evaluate the price effect of VAT. It also indicates the direction of the price movement that should be expected after VAT is introduced. In part three we show the results of evaluation of the price effect of VAT introduction.

2
SELECTION OF THE EVALUATION METHOD AND THE BASIC ASSUMPTIONS

2.1 Selection of the evaluation method

Theoretically speaking, the method of evaluation of the price effects of VAT introduction should be chosen by encompassing as many relevant determinants as possible, which will have an effect on prices after VAT introduction. Although it is not possible to thoroughly establish all the determinants of price effect of VAT on price, it is clear that VAT introduction causes a change in relative prices, thus affecting patterns of demand, creating new price and income elasticities. The price effect of VAT also depends on the behavior and the correlation of a variety of other elements. These are primarily levels of wages, monetary policy and exchange rate policy introduced at the time of VAT introduction, change in rates of other taxes, business cycle, market conditions, downward price rigidity, and last but not least, the existence of inflationary expectations (Bole, 1996; Tait, 1988). Due to the large number of determinants of price effect of VAT, whose action is simultaneous and interrelated, the ideal tool for evaluation of price effect of VAT would be dynamic general equilibrium models. However, as Tait (1988) says, this approach was not used by any country that has VAT. The next useful method which was used for such evaluation purposes in numerous countries, most recently in Slovenia (Bole, 1996) - is the input-output model. Literature also lists examples of countries which have for this purpose used various polls on expectations (Tait, 1988).

Although we are aware of the complexity of the phenomenon we are trying to evaluate, the choice of the evaluation method for the price effects of VAT in Croatia is determined by the statistical data available. It is known that a model of general balance does not exist, neither does a relevant input-output

table.[2] The availability of forecast models has therefore conditioned our approach towards the analysis of prices of sampled goods and services. The process of evaluation consists of choosing a pattern of goods and services, analyzing their price structure and establishing the real percentage of tax included in the price. By knowing the real amount of the tax element within the price we can isolate the added value, i.e. the basis on which VAT will be calculated, and in this absolutely static environment we can calculate the price which the observed product will have at the moment of VAT introduction. Therefore, the logical choice of goods and their respective prices, were the goods used for the calculation of the retail price index, since in this way we can obtain a static evaluation of price change for each of the goods and services from the sample as well as a static evaluation of the change in the index itself.

The following price series were used: average production prices in April 1996, average wholesale and retail prices for the same month. To obtain the results we used a weighting structure and methodology for retail price index.

2.2 Basic assumptions of VAT introduction price effect forecast

1. Economically speaking, value added tax (as is applied in Croatia through a credit method based on the destination principle) and one-phase sales tax, which is calculated in retail, have the same effect if applied with the same rate on the same tax basis (Cnossen, 1987). The only difference is in the way the taxpayer is legally defined, as economically speaking in both cases the tax burden addresses the final consumer. Practical application of this assumption means that if VAT is directly comparable with single-stage taxation, then our system of sales taxation[3] needs to be implemented as a single-stage sales tax for retail sales, and we need to determine the real rates by which each of the observed products is burdened. In other words, it is necessary to determine which tax rate should be

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[2] *The last input-output table was made for Croatia in 1987 as a regional table within the former Yugoslavia.*

[3] *Where the sales of goods and services intended for final consumption are taxed in two stages - by sales tax on goods and sales tax on services. Among other things, both wholesale and retail sales are considered as services. Sales tax for goods is calculated for all products intended for final consumption, as well as for all sales of oil derivatives, office supplies and furniture, and personal vehicles, regardless of whether they are intended for final or intermediary consumption.*

applied to each of the monitored products if the single-stage sales tax was to be used, while at the same time keeping the prices and the tax included in the price at the same level. When the existing system is reduced to the system of sales tax, which is applied in the last phase of the production and distribution chain, then, from the point of view of our prognostic model, the introduction of VAT would simply mean substitution of the existing tax rates with the VAT rate.

2. The following price structure is assumed:

a) Production price reflects only costs and profits of the producer, i.e. it is assumed that there is no tax element in the production price.

b) Wholesale price reflects the price of input (goods at production price) enlarged by the profit margin of the wholesaler plus sales tax on services of the wholesaler.

c) Retail price reflects the price of input (wholesale price of the purchased goods) plus the profit margin of the retailer, plus sales tax on the services of the retailer.

The assumed price structure shows that the sales tax on goods and services is calculated partially as a tax on tax, which is why a cascading effect can be observed in the sales taxation system. However, this is not the only source of the cascading effect in the existing system of sales taxation. The most significant sources of the cascading effect are:

- the already mentioned method of sales tax calculation for retailer's services into whose tax base we also include the sales tax as well;
- the existence of sales tax for wholesaler's services which in the phase of retail enters into sales tax base for goods and services;
- the existence of a hidden tax element in the producers price, as well as in trade margins, which appears due to the provisions in the law[4] that demand of all persons (regardless of their legal and business status) acquisition of certain inputs at retail price (with sales tax on products included). This primarily refers to liquid fuels and oils (oil derivatives), office material, office furniture and passenger cars;
- the duty of providers of personal and craft services (for example washing, cleaning, hair-dressing, tailoring, etc.) to acquire materials needed for providing these services with sales tax

[4] *Law on Sales Tax for Products, articles 10, 11 and 12.*

included[5];

- the existence of sales tax on services which appears in production phases[6] regardless of the tax and legal status of the receiver of the service.

As the assumption a) shows, this work neglects the existence of a third, fourth and fifth source of the cascading effect. The result of this assumption is that the results obtained in connection with the tax burden have to be considered as the ***minimal tax burden***, while the forecasted price effect should be considered as the ***maximum price effect***.

3. It is assumed that all goods that pass through the phase of wholesale, pass through this stage only once. At the same time, the power of the cascading effect in the price is increased with every increase in the number of stages within the production and distribution chain through which the goods pass. Therefore, this assumption contributes to the previously described way of interpreting the results.

4. The forecast starts with average prices for April 1996 and implies that the result of the forecasts indicates a change of the price index that would occur had VAT been introduced at the very end of April 1996.

Starting with the previously described assumptions, the process of price effect forecasting took place in two steps. In step one, which we describe in the next part, we evaluate the real average tax burden in consumption. The evaluation of the real average tax burden has provided us with the elements needed (the basis for application of value added tax) for step two of the forecasting process, i.e. elements needed for the evaluation of the aggregate price effects of value added tax introduction on price, which we describe in more detail in chapter three.

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[5] *Regulations on Application of Law on Tax of Products and Services, article 18.*

[6] *For example, if a construction company that is building a new building hires another construction company to, say, lacquer the parquet, then the first company as a general rule has to pay the sales tax for services provided by the second company.*

3
EVALUATION OF THE EXISTING REAL AVERAGE TAX BURDEN

3.1 Evaluation of the tax burden for individual products

The idea of determining the existing average tax burden is to compare series of production, wholesale and retail prices, to find the products for which we can establish these three prices, and to determine the real portion of tax in the retail price.

It was determined that there are 80 products being continually scanned for all three series of prices: production, wholesale and retail. By applying appropriate arithmetic operations (presented in Appendix 1) to production, wholesale and retail prices of these 80 products, we have calculated the sales tax, wholesale services sales tax, and retail services sales tax, i.e. we have determined the real average tax burden in the prices of the mentioned products. The results are shown in Table 1.

Results shown in column 4 of Table 1 can also be seen as sales tax rate that should be calculated in retail if the single-stage sales tax were really applied, where, with all other factors constant, the absolute amount of sales tax in the final retail price remains unchanged.

The obtained results (Table 1) show that the real average tax burden on products is greater than the burden prescribed by the rates of the Law on sales tax on goods and services on sales tax for goods and services. This result is logical and expected because of the cascading effect which results from the technique used to calculate retail sales tax, and is further augmented by the existence of wholesale retail tax. However, it is necessary to bear in mind that according to the sequence of assumptions listed in part 2, the results shown do not encompass all the sources of the cascading effect, and that they show the minimal real (effective) tax rate which burdens the listed products.

Table 1

REAL AVERAGE BURDEN (by product)

Product name	Average retail price	Average retail price without tax	Real average burden in %
Wheat flower	4.02	3.43	17.15
Pasta with eggs	11.63	10.03	15.95
Biscuits	32.17	27.43	17.3
Food for children	48.91	42.29	15.66
Tomato puree	51.24	42.67	20.09
Canned green peas	13.59	11.4	19.17
Jam	22.66	18.86	20.12
Raspberry juice	17.7	15.23	16.22
Pressed ham	58.13	48.94	18.78
Beef gulash	44.04	37.55	17.27
Sardine in oil	36.95	29.66	24.58
Pig fat	12.71	12.66	0.42
Edible oil	10.31	10.29	0.18
Margarine	15.72	15.6	0.8
Cheese	47.43	40.82	16.19
Sugar	6.42	6.05	6.07
Cooking chocolate	53.12	46.08	15.28
Milk chocolate	62.68	54.33	15.37
Candy	46.03	39.5	16.53
Coffee (beans)	83.86	64.8	29.42
Salt	3.16	2.61	21.18
Vinegar	7.12	5.92	20.36
Chicken soup	4.24	3.59	18.07
"Vegeta"	58.39	49.87	17.09
Wine	13.03	9.57	36.1
Brandy 1	47.29	33.37	39.96
Brandy 2	55.04	39.64	38.86
Worsted woolen	132.4	103.77	27.59
Fine textile (mixed)	103.19	80.85	27.63
Textile for dresses	128.55	102.68	26.23
Textile for bed-sheets	33.25	26.28	27.5
Lining	37.84	29.34	28.97
Men's shirt, 100% cotton	231.54	178.39	28.79
Men's shirt, mixed	212.79	164.41	29.42
Men's undershirt	35.22	26.87	31.09
Men's poplin underwear	56.8	43.06	31.91
Men's cotton socks	20.42	15.75	29.65
Men's socks	15.21	11.49	32.4

Children tights	19.42	16.3	19.11
Women's stockings	18.82	14.66	28.37
Complete bed sheets	280.47	221.72	27.5
Cotton thread	2.75	2.13	28.98
Heating oil	1.05	1.78	15
Heating matches	0.51	0.4	28.53
Electric stove	2165.55	1711.9	26.5
Combined stove	2460.91	1945.38	26.5
Boiler	1244.3	981.06	26.83
Electric iron	239.1	184.3	29.73
Enamel stove	2345.92	1830.35	28.17
Solid fuel heater	2445.44	1901.58	28.6
Light bulb	4.09	3.13	30.61
Enamel pot	72.78	56.95	27.79
Cutlery	562.12	432.84	29.87
Deep plate	20.41	15.73	29.75
Cup for black coffee	17.86	14.08	26.88
Machine washing detergent	15.48	13.49	14.77
Toilet soap	39.91	34.4	16.03
Hair shampoo	14.34	12.29	16.66
Toothpaste	8.61	7.28	18.31
Facial cream	9.38	7.09	32.39
Shoe polish	6.27	4.84	29.52
Analgetic	9.78	8.41	16.31
Antipyretic	3.8	3.12	21.94
Cough syrup	48.11	39.12	22.97
Vitamin C	13.22	10.65	24.07
School notebook	3.43	2.92	17.33
Motor petrol 86	3.6	2.88	20
Motor petrol 98	4	3.2	20
Motor oil	19.92	16.23	22.72
Brick, full	2.07	1.7	21.64
Tiles	3.75	2.99	25.45
Brick, hollow	1.57	1.27	23.81
Concrete	0.66	0.53	24.32
Limestone	0.77	0.61	26.8
Tar paper	150.14	119.85	25.27
Chipboards	1441.04	1166.59	23.53
Dealboards	1504.28	1244.79	20.85
Nails	12.12	9.82	23.43
Synthetic white paint	44.56	33.76	31.99
Wall paper	39.32	30.62	28.42

3.2 Evaluation of the aggregate average tax burden

Results shown in Table 1 have been applied to all the products and services which are used for the calculation of the retail price index, in accordance with the following assumptions:

a) for 80 products whose price structure has been analyzed in detail in the manner previously described, the calculated average tax burden has been included in the evaluation of the overall average tax burden in consumption.

   - for other products similar to those listed in Table 1, it has been assumed that their tax burden can be approximated through the established burden of similar products (for example, the tax burden for a type of waffle and for salty buns have been approximated through the calculated burden for the biscuit).

b) it is assumed that the average tax burden in agricultural products is 8.5 percent. The average price of certain agricultural products is calculated based on the prices monitored in retail stores, as well as in markets specialized in agricultural products. Since sales tax for goods and services does not apply to products privately grown and brought to the market, while fresh agricultural products sold in retail stores have a tax burden of 5 percent for goods and 10 percent for services, for purposes of calculating the average price of agricultural products, it has been assumed that 45 percent of the prices are included in the calculation without sales tax, and 55 percent with sales tax on goods and services.

c) for all the products and services for which we had no additional information regarding the real tax burden, it has been assumed that their burden equals rates for sales tax on goods and services, as prescribed by the rates of the Law on Sales Tax.[7] Due to all of the previously listed reasons (inputs that have to be acquired with sales tax according to law - oil

[7] *The number of products for which the assumed rate according to the tarriff of the Law on Sales Tax is 127 and whose wights account for 33.92 percent of the sum of all weights. The tax burden of all services that account for 18.32 percent of weights has been assumed in the same way.*

derivatives, for example; numerous traders through whose hands the goods pass before reaching the final consumer; hidden tax element in the price of services), we can claim with a high level of certainty that these products have a tax burden higher than the nominal rates of sales tax for goods and services. Therefore, in order to interpret these results, this assumption implies that calculation for a certain number of products included the ***minimal tax burden***.

Following these assumptions and through the use of a weighting system used for the retail price index calculation, we have estimated the total tax burden for products and services in consumption. Results are shown in Table 2, which shows the evaluated total tax burden for products in consumption, i.e. average tax burden for specific product groups.

Having in mind all the previously described assumptions, the obtained results have to be interpreted in the following way: the total average tax burden for products and services that are used for the retail price index calculation is ***at 18.43 percent at minimum***. The estimated minimal tax burden on agricultural products is 8.5 percent and 13.61 percent for industrial food products. Industrial non-food products bear a burden of at least 22.36 percent, with textiles bearing a burden of at least 28.69 percent, lighting and heating at least 19.41 percent, and home decoration products at least 27.7 percent. The minimal tax burden for services is 10 percent.

This result also shows the direction of the price movement for specific product groups, as well as the movement of the total index after VAT introduction.

In accordance with the conventional conclusion regarding the price movement after VAT introduction, we can expect a change (an increase) in the level of prices, if the general rate of VAT is different (higher) than the effective tax burden, which is a result of the existing taxes, where the existing effective tax burden depends on the average tax rate and the cascadity of the existing system (Zee, 1993). Although the results obtained represent only one of the possible ways of evaluation of the average tax rate and include only a portion of the cascading effect, which results in the existing system (therefore called the minimum real, i.e. effective average burden), they indicate the price movements that can be expected across different product groups. The signals received are especially valid for those groups of products and services whose existing minimal tax burden is high above or far below the general rate of VAT.

Table 2

EVALUATED REAL AVERAGE BURDEN - by product groups

Product group		Average burden (in %)
TOTAL		**18.43**
Where:		
1.	**Goods**	**20.54**
1.1.	**Agricultural produces**	**8.50**
	Fresh vegetables	8.5
	Fresh fruit	8.50
1.2.	**Industrial products**	**20.92**
1.2.1.	**Industrial food products**	**13.61**
	Wheat products	7.56
	Bread and pasta	5.00
	Processed and canned vegetables	17.96
	Processed and canned fruit	17.27
	Fresh meat	15.50
	Processed and canned meat	18.34
	Processed and canned fish	24.58
	Milk, fresh and processed	3.34
	Fats	0.34
	Confectionery products	16.42
	Beverages	35.49
	Tobacco	20.00
1.2.2.	**Industrial non-food products**	**22.38**
	Textile products	28.69
	Leather products	25.21
	Lighting and heating	19.44
	Home decoration	27.70
	Hygiene products	22.45
	Medication	17.69
	Education, culture and leisure	4.45
		26.50
	Liquid fuels and lubricants	20.19
	Construction material	23.09
2. Services		**10.00**

4
FORECASTS OF THE PRICE INDEX MOVEMENT AFTER THE VALUE ADDED TAX INTRODUCTION

Using the real average tax burden (i.e. the tax rate which really burdens every product & service from our sample) in the last step we have reconstructed the 'pure' average price - VA price for every product and service from the retail price index. The 'pure' average price is calculated as a ratio of the retail price and the rate of the real tax burden for each individual product. In conditions of defined assumptions this price does not contain the sales tax element for products and services, and can therefore be considered an approximation of added value, i.e. the basis for value added tax calculation. Using the fact that the final effect of VAT is the same as sales tax in the retail phase, we have calculated the price, which should, with all factors unchanged, be present after VAT introduction. The calculation went as follows: the 'pure' average price of each product and service which will be subject to VAT has been increased by the VAT rate - 22 percent. It has been assumed that the price of services which are exempted from VAT by VAT Law will remain the same.[8]

In the forecast of the price index movement after value added tax introduction, we have examined two scenarios. For both basic scenarios we have calculated one additional variation which deviates from the basic scenario in the treatment of personal and craft services.

Scenario I

The first scenario assumes that all producers and traders in all the chains of added value will calculate tax with 'maximum correctness' right after VAT introduction. We wanted to examine the effects of the scenario according to which products to which really lower rates of sales tax are currently being applied (in the sense of rates evaluated in the previous section) go up in price by the exact difference between the real rate and the VAT rate, i.e. products which are currently

[8] *If a product or service is exempt from VAT it means that the business subject producing or selling this product or providing this service does not calculate VAT for the product/service. However, at the same time, the same business subject has no right to tax returns. This means that the price of his product or service, although formally without VAT elements included in it, contains an element of tax payed in the price of inputs. Assuming that the price of these products and services will remain the same in conditions of VAT, we have assumed that the sales tax currently present in the price acts as a sufficient compensation for VAT which such business subjects will pay within the price of inputs and most probably pass over as costs to their customers.*

found with rates higher than the VAT rate go down in price by the amount of difference of the two rates. For all the products and services which have been exempt from tax (for example, apartment rents, health services, education, etc.) it is assumed that their price after VAT introduction will remain the same. Mathematically speaking, the assumptions from this scenario are implemented in a way that a rate of 22 percent was calculated upon the 'pure' price obtained as previously described. Obviously, this scenario neglects the downward price rigidity and assumes an unchanged absolute (HRK) amount of profit rates and production profits.

A subvariant of the first scenario examines effects of previous assumptions on condition that those who provide craft and personal services remain outside the VAT system. It is well known that the VAT Law allows all those who have a revenue of less than 50,000 HRK to remain outside the VAT system, which means that their position is the same as the position of final consumers - they do not include VAT in their products, but they pay it included in the price of the inputs needed to perform their services. Therefore, the subvariant of this scenario has the same starting assumptions as the main scenario, but it eliminates the provider of personal and craft services from the VAT system. Elimination of the specified categories of services from the VAT system means that during the process of the index evaluation it is assumed that their prices will remain at the level of April 1996 even after VAT introduction, due to reasons listed under note 8.

Scenario II

The second scenario projects the value of the retail price index while assuming that all producers and traders, whose products currently have rates higher in real terms than the rate of VAT, will use the tax burden decrease to increase their profit rates and profits. With this scenario we wish to examine what will happen with the price index if prices increase for all products and services that at base moment had sales tax rates in real terms lower than the VAT rate, with prices of all other products remaining unchanged. Like in the previous scenario, it is assumed that the prices of products exempted from tax will remain unchanged, while all the services are included in the system.

A subvariant of this scenario examines the effect of elimination of personal and craft services (keeping their prices at base level) in the conditions set by the assumptions of scenario two.

Results

The results of the forecasts of the price index movement in conditions of described scenarios are shown in Table 3 and they should be interpreted with extreme caution. Each of the projected values of the retail price index shown in Table 3, in conditions of assumptions of the overall procedure of the forecasts and specific assumptions of individual scenarios, should be interpreted as the ***maximum*** change in price which, ***with all other economic factors unchanged***, can be caused by VAT introduction. All the values shown are maximum values, since they have been calculated through the use of prices from which we have excluded the minimum, although not the complete tax burden in the existing system. If the tax burden in prices is greater in real terms than the one used for the evaluation of the tax burden and the price effect of VAT (and it must be greater according to the second assumption from section 2.2), then in the case of proportional and exact VAT calculation the ***real upward change of prices should be smaller, and the real downward change should be higher***. It follows from this that the real reaction of the price index to VAT introduction should be smaller.

Results shown in Table 3 show that if scenario 1 came true with a perfect and exact application of VAT the ***maximum price increase would be 3.27 percent***. Broken down into components it means that agricultural products could on average experience a price increase of a maximum of 12.40 percent, while on the aggregate level average price of industrial products could experience a price increase of a maximum of 1.33 percent. Industrial food products could have a maximum increase in price of 7.87 percent (with variations within the group, from a possible decrease in prices for processed and canned fish by a minimum of 2.07 percent, to an increase in prices of bread and pasta by a maximum of 16.72 percent, and fats group by a maximum of 21.58 percent, while industrial non-food products could experience a decrease in price by a minimum of 0.2 percent. The total result of the price decrease for industrial non-food products by a minimum of 0.12 percent results from variations within the group, which range from a possible price increase in education and culture by a maximum of 15.97 percent, to a possible price decrease in textile products by a minimum of 5.35 percent. According to this scenario, services could experience a maximum price increase of 10.45 percent.

As is shown in columns 5 and 6, i.e. in the results of the subvariant of the first scenario, if some service providers remain outside of the VAT system and do not change the price of their services due to previously listed reasons, then due to a smaller aggregate price increase of services (by 7.72 percent), the total price increase in the conditions of the first scenario could amount to a maximum of 2.77 percent.

Table 3

MAXIMUM ONE-TIME PRICE CHANGE

Name	Scenario 1		Scenario 1/1		Scenario 2		Scenario 2/1	
	Index	Rate of change	Index	Rate of change	Index	Rate of change	Index	Rate of change
TOTAL INDEX	**103.27**	**3.27**	**102.77**	**2.77**	**105.20**	**5.20**	**104.70**	**4.70**
Agricultural products	**112.40**	**12.40**	**112.40**	**12.40**	**112.40**	**12.40**	**112.40**	**12.40**
Fresh vegetables	112.50	12.50	112.50	12.50	112.50	12.50	112.50	12.50
Fresh fruit	112.40	12.40	112.40	12.40	112.40	12.40	112.40	12.40
Industrial products	**101.33**	**1.33**	**101.33**	**1.33**	**103.75**	**3.75**	**103.74**	**3.74**
Industrial food products	**107.87**	**7.87**	**107.87**	**7.87**	**108.07**	**8.07**	**108.07**	**8.07**
Wheat products	114.07	14.07	114.07	14.07	114.07	14.07	114.07	14.07
Bread and pasta	116.72	16.72	116.72	16.72	116.72	16.72	116.72	16.72
Processed and canned vegetables	103.49	3.49	103.49	3.49	103.49	3.49	103.49	3.49
Processed and canned fruit	104.12	4.12	104.12	4.12	104.12	4.12	104.12	4.12
Fresh meat	105.63	5.63	105.63	5.63	105.63	5.63	105.63	5.63
Processed and canned meat	103.08	3.08	103.08	3.08	103.08	3.08	103.08	3.08
Processed and canned fish	97.93	-2.07	97.93	-2.07	100.00	0.00	100.00	0.00
Milk, fresh and processed	113.42	13.42	113.42	13.42	113.42	13.42	113.42	13.42
Fats	121.58	21.58	121.58	21.58	121.58	21.58	121.58	21.58
Confectionery products	104.80	4.80	104.80	4.80	104.80	4.80	104.80	4.80
Beverages	90.57	-9.43	90.57	-9.43	100.00	0.00	100.00	0.00
Tobacco	101.67	1.67	101.67	1.67	101.67	1.67	101.67	1.67
Industrial non-foods products	99.88	-0.12	99.88	-0.12	102.74	2.74	102.74	2.74

Table 3 (continued)

Name	Scenario 1		Scenario 1/1		Scenario 2		Scenario 2/1	
	Index	Rate of change	Index	Rate of change	Index	Rate of change	Index	Rate of change
Textile products	**94.65**	**-5.35**	**94.65**	**-5.35**	**100.20**	**0.20**	**100.20**	**0.20**
Leather products	97.51	-2.49	93.90	-6.10	100.66	0.66	100.66	0.66
Lighting and heating	102.36	2.36	102.36	2.36	103.70	3.70	103.70	3.70
Home decoration	95.55	-4.45	95.55	-4.45	100.00	0.00	100.00	0.00
Hygiene products	100.25	0.25	100.25	0.25	102.70	2.70	102.70	2.70
Medication	100.72	0.72	100.72	0.72	101.38	1.38	101.38	1.38
Education, culture and leisure	**115.97**	**15.97**	**115.97**	**15.97**	**116.40**	**16.40**	**117.40**	**17.40**
Transportation vehicles	96.44	-3.56	96.44	-3.56	100.00	0.00	100.00	0.00
Liquid fuels and lubricants	101.50	1.50	101.50	1.50	101.50	1.50	101.50	1.50
Construction material	99.13	-0.87	99.13	-0.87	100.28	0.28	100.28	0.28
Services	**110.45**	**10.45**	**107.72**	**7.72**	**110.45**	**10.45**	**107.72**	**7.72**

Scenario 2 with which we wanted to examine the possible price index movements while assuming that there will be no price decreases, has shown that such, extremely unfavorable development could result in a ***maximum price increase of 5.19 percent***. In this case, prices of agricultural products could again rise by a maximum of 12.4 percent, while the maximum price increase for industrial products could amount to 3.74 percent with variations among components as is shown in columns 7 and 8 of Table 3. In the conditions of this scenario, like in the conditions of scenario 1, services could increase in price by a maximum of 10.45 percent. A subvariant of the second scenario which examines the effect of the elimination of certain services from the system with maintenance of their price at base level, shows that the aggregate effect of such a situation could be a maximum of 4.68 percent price increase, where, with all other results equal to the results of the basic scenario (columns 9 and 10), services experience a price increase of a maximum of 7.72 percent.

Through the examined scenarios we have tried to evaluate effects of two extreme assumptions. The ideal and correct application of VAT from the moment of its introduction is described in the first scenario, which we can therefore label as 'optimistic'. At the same time, the second scenario depicts a very pessimistic assumption in terms of behavior of producers and traders whose products currently have high tax rates. However, with all the previously listed limitations, both scenarios show that VAT introduction could cause a one-time price increase for a wide variety of products. Furthermore, it can be seen that the total price increase in both scenarios greatly contributes to a price increase for services.

In reality we can expect the real effect of VAT on price movement to be somewhere between these two extremes. In other words, we will probably experience certain difficulties in the application, because taxpayers or tax authorities could get confused. Likewise, we can expect that the downward price rigidity would not be perfect, which means that products which would objectively become less burdened by tax, would still experience a certain decrease in price. This conclusion also supports the price movement noted after the lowering of the standard sales tax rate, i.e. the total result of the evaluation of the tax burden in conditions of the April prices. This also leads us to a conclusion that the results of the forecasts should be interpreted also as ***higher limits of the interval*** of the one-time price change which could be caused by the VAT introduction.

Finally, it is important to stress once again that the obtained results do not represent a forecast of the size of the price index which we can expect in the first month of VAT application. The obtained results assume

unchanged economic conditions and only show that portion of the price change which can be explained by the VAT introduction. They are merely a static evaluation of the change in the price index which would occur if VAT were introduced suddenly and without prior notice at the moment of price monitoring in April 1996.

5
CONCLUSION

Comparing the results of the second iteration of the forecast of the aggregate price change as a result of the value added tax introduction conducted on prices from April 1996, with results obtained through the application of the same process on prices from January of the same year, we can conclude the following: lowering of the standard sales tax rate from 20 percent to 15 percent resulted in the lowering of the overall average tax burden in consumption from a minimum of 20 percent to a minimum of 18.43 percent. This shows that the prices do not have a perfect downward price rigidity, i.e. it shows that the smaller tax burden does not automatically flow into profits. This result can also be used as an indicator of the reaction producers and traders will have when the tax burden is decreased for a certain group of products as a result of VAT application. It has been shown that a certain price sensitivity exists in relation to a lowering of the tax rates, and that we can expect at least some price decrease for products which will experience a decrease in the tax burden as a result of the VAT introduction.

At the same time these movements of the real average burden show that in the conditions of the new structure of sales tax rates for products, where the standard rate is decreased, compared to the forecasts based on the January prices, a slightly higher one-time effect of VAT introduction can be expected. This signal has confirmed the procedure implemented in order to evaluate the price index. Assuming there are no difficulties and confusion during the first stage of VAT application, and assuming margins and profits remain unchanged, with all other factors in the economy remaining unchanged, a one-time price increase of a maximum of 3.27 percent can be expected, which, compared to the forecasts based on the January prices (a price increase of a maximum of 3.27 percent), indicates a slightly greater price effect. A higher, pessimistic limit of price increase, which assumes the prices have perfect price rigidity, remained unchanged at 5.2 percent in both prognostic attempts. This result can be expected since it is determined only by that group of products which

is currently in real terms burdened with a rate lower than 22 percent and for which there have been no legislative changes since January this year.

We think it is important to stress here once again that the obtained results need to be interpreted and used as a ***maximum one-time*** price change, which, ***with all other conditions in the economy unchanged***, can be caused by VAT introduction. What will really happen also depends on the monetary and the exchange rate policies, changes in the income policy (increase in wages), the stage of the economic cycle, the level of liquidity in the economy, and a variety of psychological factors. Whether the VAT introduction will initiate a constant price increase (inflation) will in the end also depend on factors outside the actual fiscal reform. Results of an evaluation of the price effect of VAT introduction conducted in 1988 by the IMF (Tait, 1998, 1990) also support this conclusion. The evaluation compared the price movement before and after VAT introduction in 35 countries. It showed that in 22 countries VAT had no effect on prices, while 6 countries experienced a faster price increase. However, out of these 6 countries, 4 introduced VAT in order to increase their budget income (increase in tax burden), and 5 out of 6 countries from this group recorded a faster rate of price increase even before VAT introduction. Furthermore, it is estimated that all of the 6 countries had conducted expansive monetary and income policies after VAT introduction.

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APPENDIX

Steps in the calculation of the real tax burden shown in Table 1

Starting with the assumptions of the price structure (section 2.2) the wholesale price (VPC) can be written as:

(1) VPC = PROC + MV + MV * PPU or
VPC = PROC + MV (1 + PPU)

where PROC is production price, MV is wholesale profit rate, PPU is sales tax rate for wholesale services - 10 percent

Based on this equation (1) it follows that the HRK amount of sales tax for wholesale services can be calculated based on the differences between the production and wholesale price, as is shown by equation (2). This difference actually represents the wholesale profit rate increased by the sales tax for wholesale services.

(2) MV_{PPU} = VPC - PROC

where MV_{PPU} is wholesale profit rate including tax on wholesale services.

By dividing this difference with the expression (1 + PPU), where PPU represents the sales tax rate for services, according to expression (3) we get the size of wholsale profit rate - MV.

(3) MV = MV_{PPU} / (1 + PPU)

Obviously, the difference between the profit rate increased by the sales tax on wholesale services and the 'pure' profit rate (without tax) is the HRK value of sales tax on wholesale services.

(4) PPU_{-V} = MV_{PPU} - MV

where PPU_{-V} is the HRK amount of sales tax on wholesale services.

In the next step we calculate the sales tax for products and services in retail. The following structure of retail price is assumed:

(5) MPC = Š(VPC + MM) * (1 + PPP)Ć * (1 + PPU)

where MPC is the retail price, VPC is the wholesale price, MM is the retail profit rate, PPP is the sales tax rate according to the tarrif of Law on sales tax, PPU is the sales tax rate for reatail services according to the tariff of Law on sales tax for services.

From expression (5) it follows that the HRK amount of sales tax for retail services can be calculated in the following manner:

(6) $PP_{-M} = MPC * Š1 - 1/(1+PPU) * (1+ PPP)Ć$

where PP_{-M} is the HRK amount of the tax calculated during the retail stage.

At the same time, by using the following expression, it is possible to calculate the 'pure' retail price - MPCF which does not contain taxes included in the retail stage:

(7) $MPC_F = MPC / Š(1 + PPP) * (1 + PPU)Ć = (VPC + MM)$

It follows from this expression that the retail profit rate (costs and profits of retail) is equal to the difference between the wholesale and the 'pure' retail price - MPC_F

(8) $MM = MPC_F - VPC$

The total tax in the retail price is determined by adding the sales tax for wholesale services (calculated according to expressions (2), (3) and (4)), and the sales tax for products and services in retail (calculated according to expression (6)).

(9) $TAX = PPU_{-V} + PP_{-M}$

The price that excludes all the sales taxes in retail and wholesale has been calculated as the sum of the production price (PROC), the wholesale profit rate (VM) calculated by expression (3) and the retail profit rate (MM) determined according to expressions (6) and (7) - column 3 of table 1.

(10) $VA = PROC + MV + MM$

By expressing the real amount of all sales taxes for products and services - TAX - as a ratio of VA price, from which we have excluded the total tax element (and by multiplying it by 100) we have obtained the average tax burden for each individual product - PPO; column 4 of table 1.

(11) $PPO = TAX/VA * 100$

At this point it is important to note that the retail price - MPC, is equal to the VA price multiplied by the calculated rate of the real tax burden

$MPC = VA * (1 + PPO/100)$.

Finally, the price which will exist in the conditions of VAT can be calculated by multiplying VA from expression (10) with the value added tax rate:

$New\ price = VA * 1.22$.