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ADAPTATION OF VAT RATES TO THE EU STANDARDS – ASSESSMENT OF PRICE EFFECTS IN THE INPUT-OUTPUT FRAMEWORK

1. Introduction

Changes in levels and relations of prices have an important place among the expected economic consequences of Poland's integration with European Union. The report prepared by the Committee of European Integration on benefits and costs of accession to EU mentions two groups of reasons for such effects. Firstly, they can be macroeconomic factors, such as intensification of competition or inflow of foreign transfers. Secondly, a source of inflationary effects can be seen in adaptation of some regulations to the European law, especially in the fields of environment protection standards, common agriculture policy and indirect taxes. In this elaboration we take a closer look at the last mentioned aspect, i.e. influence of indirect tax rates on prices.

The immediate effect of regulations concerning indirect taxes is adjustment of prices paid by final consumers of products and services. However, this is not the end of the price formation process, since in many cases taxes on products are also borne by producers. Thus, in those cases changes in tax rates affect production costs and, consequently, the so called basic prices, which are prices exclusive of all taxes. At the next stage those effects are spread over different branches of the economy. An appropriate tool to simulate this process and to assess the scale of the resulting price changes is an input-output-type price model, extended with elements of indirect taxes.

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2. Extended input-output price model

The most characteristic feature of the input-output approach to modelling and economic analyses is the description of interrelations among different activity sectors. Assume that an economy can be divided into n branches of production and services. It is convenient for further considerations to assume that all branches supply homogenous products, which makes it possible to identify a given branch with an adequate group of products. For symmetrical input-output tables such assumption does not hide any simplification. Denote by x_{ij}, $(i, j = 1,...,n)$ the value of outlays on materials and/or services provided by the branch j and used in production of branch i. In other words, that is the value of intermediate inputs of goods or services of type j in production of goods and services of type i. Denote further by X_j, $(j = 1,...,n)$ the total output of branch j (or, in other words, total production of goods or services of type j). Total output of a given branch is equal to material costs augmented by costs of primary production factors (value added), i.e.:

$$X_j = \sum_{i=1}^{n} x_{ij} + V_j. \tag{1}$$

Both intermediate expenditures x_{ij} and global output X_j are given in current prices. According to the principles of the System of National Accounts (SNA), intermediate expenditures are evaluated in the so called 'final prices', while global output in 'basic prices' (see: *The System of National Accounts*, vol. II, 1997). SNA defines basic prices as amounts of money received by producers for their products, not counting taxes and subsidies on products, as well as trade and transport margins. Final prices are amounts as seen from consumers' point of view, i.e. they are inclusive of all taxes and margins. The relation between basic and final prices can be presented as follows (see: Zienkowski 2002):

basic price
\+ customs duties and other import charges
\+ excise and taxes on selected services (gambling, lottery etc.)
– subsidies
\+ VAT
\+ trade margin
\+ transport margin
= final price (purchaser's price, market price).

Referring to the quoted definitions, global output of a given branch in basic prices is obtained by adding up material costs, evaluated in final prices, and the

value added of that branch. As a consequence the basic price of a given product is a function of, among other things, all indirect taxes included in values of products and services used in the production process. Those taxes can be, as presented in the definition of final price, customs duties and other import charges as well as excise and taxes on selected services. Also VAT can be in special cases included in the material cots. VAT liability of a producer is calculated as the difference between VAT charged on his sales and VAT paid on their purchases of intermediate products and services (see: Bardazzi and Grassini 1991). In such case, VAT makes in fact no cost to the producer, while it can be fully deducted from their tax liability. In terms of prices, VAT does not affect the basic price but rather the final price and can be treated therefore as a tax on final consumption. However, often there are departures from such a "pure" VAT system, i.e. there are rules limiting deduction of tax paid on producer's inputs. R. Bardazzi and M. Grassini [1991] mention three typical reasons for which the deduction of VAT is restrained in the EU countries. Firstly, sectors selling products or services which are fully exempted from VAT (in Poland: education, health care, public administration services, financial services etc.) have no right to deduct the tax. Secondly, the general rule is that VAT can be deducted only for those products and services which are strictly connected with the output of a given sector. Since such classification of intermediate goods is often difficult, especially for unincorporated family firms, usually special rules are applied, for example rules limiting deduction of VAT paid on particular goods (e.g. fuels). Finally, for small businesses there usually exist simplified and standardised methods of tax settlement. In such cases the deductible VAT is established basing on some fixed economic parameters rather than the actual value of intermediate goods and services used in production (e.g. for farmers). In all of the cases the non-deductible VAT takes part in formation of basic prices and, as well as other product taxes, should be present in the equation describing basic prices. According to estimation within the framework of the model used in this paper, non-deductible VAT makes approximately 16% of overall VAT paid to the budget.

In the proposed price model it is also taken into account that intermediate inputs can originate either from domestic production or from imports. Obviously, changes in costs of domestic production should not affect import prices in the model, otherwise price effects of the cost-push inflationary spiral could be overestimated in simulations. Therefore in the model the use of imported products and services is separated from that of domestic ones.

Consider now intermediate inputs and global output in physical terms (quantities). One can write values of intermediate inputs and global output as function of quantities, basic prices and rates of indirect taxes:

$$X_j = Q_j \tilde{p}_j^{(d)}, \tag{2}$$

and:

$$x_{ij} = \left(q_{ij}^{(d)} \tilde{p}_i^{(d)} \left(1 + s_i^{(d)} + d_i\right) + q_{ij}^{(m)} \tilde{p}_i^{(m)} \left(1 + s_i^{(m)} + d_i\right)\right)\left(1 + h_{ij} t_i\right), \tag{3}$$

$$d_i = b_i + c_i, \tag{4}$$

where Q_j stands for quantity of global output of branch j, $q_{ij}^{(d)}$ and $q_{ij}^{(m)}$ represent quantities of products of type i (i.e. originating from branch i) used as intermediate inputs in production of branch j, domestic and imported, respectively, $\tilde{p}_j^{(d)}$ are basic prices of domestic products, $\tilde{p}_j^{(m)}$ – basic prices of imported products. $s_i^{(d)}$ stands for average rate of indirect taxes except VAT (minus subsidies) paid on domestic products of type i (i.e. excise tax and special taxes on selected services), $s_i^{(m)}$ – average rate of indirect taxes except VAT (minus subsidies) paid on imported products of type i (i.e. duties and other import charges as well as excise tax), t_i – average VAT rate for products of type i (the same for domestic and imported goods), h_{ij} – coefficients showing what part of an individual intermediate purchase (in terms of value including all indirect taxes except VAT) is subject to taxation with non-deductible VAT. In other words, $h_{ij}t_i$ show rates which can be named as "effective" VAT rates for subsequent inputs of intermediate products and services. Symbols b_j and c_j stand for trade and transport margin rates, respectively. It is thus assumed that margins are determined according to a fixed proportion of product value expressed in the basic price.

As can be seen from equation (3), all indirect taxes are treated as *ad valorem* taxes with fixed rates. Such treatment of taxes is perhaps not fully adequate, as it does not represent the actually existent non-linearities in calculation of taxes. This restriction can be, though, justified by the fact that most of the considered taxes are based on values. Rates are named "average", since individual groups of products or services in many cases are not homogenous and, thus, within a group there may coexist products or services taxed at different nominal rates.

Regarding (2) and (3), cost equation (1) can be written as (see: Grassini 1997; Tomaszewicz, Boratyński 2003):

$$Q_j \tilde{p}_j^{(d)} = \sum_{i=1}^{n} \left(q_{ij}^{(d)} \tilde{p}_i^{(d)} \left(1 + s_i^{(d)} + d_i\right) + q_{ij}^{(m)} \tilde{p}_i^{(m)} \left(1 + s_i^{(m)} + d_i\right)\right)\left(1 + h_{ij} t_i\right) + V_j. \tag{5}$$

Dividing (5) by Q_j yields:

$$\tilde{p}_j^{(d)} = \sum_{i=1}^{n}\left(\frac{q_{ij}^{(d)}}{Q_j}\tilde{p}_i^{(d)}\left(1+s_i^{(d)}+d_i\right)+\frac{q_{ij}^{(m)}}{Q_j}\tilde{p}_i^{(m)}\left(1+s_i^{(m)}+d_i\right)\right)\left(1+h_{ij}t_i\right)+\frac{V_j}{Q_j}. \tag{6}$$

Denoting:

$$\tilde{a}_{ij}^{(d)} = \frac{q_{ij}^{(d)}}{Q_j}, \tag{7}$$

$$\tilde{a}_{ij}^{(m)} = \frac{q_{ij}^{(d)}}{Q_j}, \tag{8}$$

and

$$\tilde{v}_j = \frac{V_j}{Q_j}, \tag{9}$$

equation (6) resolves itself to:

$$\tilde{p}_j^{(d)} = \sum_{i=1}^{n}\left(\tilde{a}_{ij}^{(d)}\tilde{p}_i^{(d)}\left(1+s_i^{(d)}+d_i\right)\left(1+h_{ij}t_i\right)+\tilde{a}_{ij}^{(m)}\tilde{p}_i^{(m)}\left(1+s_i^{(m)}+d_i\left(1+h_{ij}t_i\right)\right)\right)+\tilde{v}_j \tag{10}$$

Values of $\tilde{a}_{ij}^{(d)}$ and $\tilde{a}_{ij}^{(m)}$ are called technical coefficients (the notion widely used in input-output analysis), and they show – in quantity terms – the amount of products or services of type i – domestic and imported, respectively – necessary to supply a unit of products or services of type j. Finally, if "$\circ$" stands for element by element multiplication, equation (10) can be written in the matrix form:

$$\tilde{\boldsymbol{p}}_d = \left(\tilde{\boldsymbol{A}}_d' \circ \left(\boldsymbol{J}+\boldsymbol{H}'\boldsymbol{T}\right)\right)\left(\boldsymbol{I}+\boldsymbol{S}_d+\boldsymbol{D}\right)\tilde{\boldsymbol{p}}_d + \left(\tilde{\boldsymbol{A}}_m' \circ \left(\boldsymbol{J}+\boldsymbol{H}'\boldsymbol{T}\right)\right)\left(\boldsymbol{I}+\boldsymbol{S}_m+\boldsymbol{D}\right)\tilde{\boldsymbol{p}}_m+\tilde{\boldsymbol{v}} \tag{11}$$

which after solving yields:

$$\tilde{\boldsymbol{p}}_d = \left(\boldsymbol{I} - \left(\tilde{\boldsymbol{A}}_d' \circ \left(\boldsymbol{J} + \boldsymbol{T}'\boldsymbol{H}'\right)\right)\left(\boldsymbol{I} + \boldsymbol{S}_d + \boldsymbol{D}\right)\right)^{-1} \cdot \left(\left(\tilde{\boldsymbol{A}}_m' \circ \left(\boldsymbol{J} + \boldsymbol{T}'\boldsymbol{H}'\right)\right)\left(\boldsymbol{I} + \boldsymbol{S}_m + \boldsymbol{D}\right)\tilde{\boldsymbol{p}}_m + \tilde{\boldsymbol{v}}\right) \tag{12}$$

where: $\tilde{\boldsymbol{p}}_d = \left[\tilde{p}_i^{(d)}\right]$, $\tilde{\boldsymbol{p}}_m = \left[\tilde{p}_i^{(m)}\right]$, $\tilde{\boldsymbol{A}}_d = \left[\tilde{a}_{ij}^{(d)}\right]$, $\tilde{\boldsymbol{A}}_m = \left[\tilde{a}_{ij}^{(m)}\right]$, $\boldsymbol{H} = \left[h_{ij}\right]$, $\boldsymbol{S}_d$ is a diagonal matrix of elements $s_i^{(d)}$, $\boldsymbol{S}_m$ – diagonal matrix of elements $s_i^{(m)}$, **T** – diagonal matrix of elements t_i, **D** – diagonal matrix of elements d_i, **I** is a unitary matrix, **J** – matrix with all elements equal 1.

However, since input-output tables in physical terms are unavailable, value based tables are used to calculate input-output coefficients instead of technical coefficients. Using value-based coefficients in price equation is in fact equivalent to assuming that initially all prices equal 1. Under such assumption, solving price formula leads to obtaining price indices p_i rather than levels $\tilde{p}_i$. It is worth noticing that results are independent of the initial levels of prices (see: Miller and Blair 1985). Define:

$$a_{ij}^{(d)} = \frac{z_{ij}^{(d)}}{X_j}, \tag{13}$$

$$a_{ij}^{(m)} = \frac{z_{ij}^{(m)}}{X_j}, \tag{14}$$

and

$$v_j = \frac{V_j}{X_j}, \tag{15}$$

where:

$$z_{ij}^{(d)} = q_{ij}^{(d)} \tilde{p}_i^{(d)}, \tag{16}$$

and

$$z_{ij}^{(m)} = q_{ij}^{(m)} \tilde{p}_i^{(m)}, \tag{17}$$

where: $z_{ij}^{(d)}$ and $z_{ij}^{(m)}$ represent intermediate consumption evaluated in basic prices and can be considered as observable at a certain stage of decomposition of

the input-output table. Values of $a_{ij}^{(d)}$ and $a_{ij}^{(m)}$ represent value-based input--output coefficients. The final, applicable version of the extended price model can be, thus, written as:

$$\boldsymbol{p}_d = (\boldsymbol{I} - (\boldsymbol{A}'_d \circ (\boldsymbol{J} + \boldsymbol{T}'\boldsymbol{H}'))(\boldsymbol{I} + \boldsymbol{S}_d))^{-1}((\boldsymbol{A}'_m \circ (\boldsymbol{J} + \boldsymbol{T}'\boldsymbol{H}'))(\boldsymbol{I} + \boldsymbol{S}_m)\boldsymbol{p}_m + \boldsymbol{v}), \tag{18}$$

where: $\boldsymbol{p}_d = [p_i^{(d)}]$ and $\boldsymbol{p}_m = [p_i^{(m)}]$ are vectors of basic price indices for domestic and imported goods, $\boldsymbol{A}_d = [a_{ij}^{(d)}]$, $\mathbf{A}_m = [a_{ij}^{(m)}]$, $\boldsymbol{v} = [v_i]$.

Model presented by equation (18) provides a wider range of possible applications than the elementary input-output price model. Apart from analyses of price reaction to changes in unitary value added, the model enables to examine effects of changes in tax rates represented by matrices $\mathbf{S}_d$, $\boldsymbol{S}_m$ and $\mathbf{T}$, as well as effects of fluctuations of import prices (vector $\boldsymbol{p}_m$) and changes of trade and transport margin rates (matrix $\mathbf{D} = \mathbf{B} + \mathbf{C}$).

The concluding stage of the analysis is determining final prices, based on basic prices obtained by means of formula (18). Final price for particular group of products or services can be calculated as:

$$r_i^{(d)} = (1 + t_i)(1 + s_i^{(d)})p_i^{(d)} \tag{19}$$

Values of $r_i^{(d)}$ show the relation of the final to the basic price. Changes of final prices of domestic goods are represented by the following indices:

$$\pi_i^{(d)} = r_i^{(d)} / \grave{r}_i^{(d)} \tag{20}$$

where: $\grave{r}_i^{(d)}$ stands for initial values of $r_i^{(d)}$, that is the values calculated basing on original parameters of the model (not changed due to scenario assumptions).

Analogously, final prices as well final price indices for particular imported commodities can be calculated, i.e.:

$$r_i^{(m)} = (1 + t_i)(1 + s_i^{(m)})p_i^{(m)} \tag{21}$$

and

$$\pi_i^{(m)} = r_i^{(m)} / \grave{r}_i^{(m)}. \tag{22}$$

For interpretation purposes, it is usually convenient to use a weighted price index for subsequent groups of products, both domestic and imported:

$$\pi_i = \frac{(1-\mu_i)r_i^{(d)} + \mu_i r_i^{(m)}}{(1-\mu_i)\bar{r}_i^{(d)} + \mu_i \bar{r}_i^{(m)}} \tag{23}$$

where: μ_i are shares of imports in global supply (evaluated in basic prices) of goods of type i.

3. Obtaining parameters of the model

As was already stated, formulation of the extended price model, as well as its application, is strictly based on input-output tables available for the Polish economy. Assessment of price effects presented in this paper is based upon a table for the year 2000 – the latest available. The symmetrical input-output table'2000 was elaborated by the author basing on the so called supply and use tables (SUT) as well as additional data for that year (mainly in *National Accounts by Institutional Sectors* [2002] and *Statistical Yearbook of Industry 2000* [2001]).

Using the table concerning the year 2000 to forecast price effects expected from the year 2004 on, implies the assumption that in between there were neither significant changes tax rates nor in technology of production (represented by technical coefficients). The latter assumption is difficult to verify, however it is usually admitted that technology is rather stable and evolutes slowly. As far as tax rates are concerned, there were only slight modifications of tax–rate regulations during those years.

The major problem in practical application of the model (29) is that the necessary parameter matrices ($\mathbf{A}_d$, $\mathbf{A}_m$, $\mathbf{S}_d$, $\mathbf{S}_m$, **T, H, B, C**) are not explicit in the input–output table. Generally, calculation of the necessary parameters requires knowledge of tax components of individual transactions concerning final and intermediate use of products and services. Such detailed data are, however, unavailable from the Polish Central Statistical Office. Therefore, in the Polish case, as perhaps for most other European countries, application of the proposed price model requires decomposition of the input-output table, basing on incomplete data and using simplifying assumptions. Assumptions in this study have been partially reflected in the formulation of the model:

Table 1. Tax and margin rates obtained by means of decomposition of i-o table'2000 (in %)

i	Products and services	$s_i^{(d)}$	$s_i^{(m)}$	b_i	c_i	t_i
1	Agriculture and forestry	–0.1	8.1	12.5	1.2	0.8
2	Fishery	–1.1	0.3	54.6	13.8	0.0
3	Mining	0.0	0.1	6.2	11.2	7.1
4	Food	5.3	21.6	30.8	0.2	6.0
5	Tobacco	157.2	269.2	123.0	0.0	10.8
6	Fabrics	0.0	2.6	25.2	1.5	18.8
7	Textile	0.0	9.0	1565.3	55.5	16.8
8	Leather	0.0	7.0	86.8	3.1	11.6
9	Wood	0.0	2.4	19.2	2.2	16.0
10	Paper	0.0	0.9	16.8	2.7	22.0
11	Publishing and printing	–0.1	0.9	19.8	0.8	5.1
12	Petrol	35.7	126.2	66.5	4.1	21.1
13	Chemicals	–0.1	1.6	32.0	0.7	8.9
14	Rubber and plastic	0.1	2.0	19.3	4.8	22.0
15	Other non-metallic	0.0	1.5	16.7	8.9	12.7
16	Metal	0.0	2.4	9.0	0.8	21.2
17	Metal products	0.0	2.7	13.3	4.2	15.5
18	Machines	0.0	1.4	10.0	0.6	16.1
19	Office machines and computers	0.0	1.1	19.5	2.4	22.0
20	Electric machines	0.0	1.4	12.4	1.4	22.0
21	Radio and TV devices	0.0	2.2	23.5	1.4	16.9
22	Medical and optical devices	0.0	2.5	7.4	2.5	11.4
23	Motor vehicles	2.1	9.4	17.7	0.8	19.7
24	Other transport equipment	0.0	1.7	12.1	0.8	7.8
25	Furniture and other goods	0.0	4.8	30.3	4.0	7.0
26	Recycling of materials	0.0	0.0	0.0	1.5	22.0
27	Electricity, gas, water	0.0	2.3	0.5	0.0	3.0
28	Construction	0.0	0.0	0.0	0.0	6.8
29	Hotels and restaurants	–0.1	0.0	0.0	0.0	11.5
30	Financial services	0.0	0.0	0.0	0.0	0.1
31	Business and real estate services	–0.5	–0.3	0.0	0.0	11.6
32	Public administration and defence	0.0	0.0	0.0	0.0	0.0
33	Education	0.0	0.0	0.0	0.0	0.0
34	Health care and social security	0.0	0.0	0.0	0.0	0.0
35	Other services	–1.1	–0.9	0.0	0.0	3.1
36	Repair	0.0	0.0	0.0	0.0	14.5
37	Transport, storage, communication	–1.4	–1.4	0.0	0.0	10.6

S o u r c e: Own calculation.

– indirect taxes are divided into only three exclusive categories: the first category is VAT, the second – indirect taxes on domestic products excluding VAT (mainly excise), the third – indirect taxes on imported products excluding VAT (mainly duties, import charges and excise),

– all three categories of taxes are treated as *ad valorem* taxes with fixed rates,

– tax rates are treated as average nominal rates for groups of products and services net of subsidies,

– the same average rate is used to evaluate tax for all purchases of products or services falling into a given group, which means assuming that either the objective composition of those purchases is similar for all transactions across a row of the input–output table (within a categorical group there may be products taxed at different rates) or the group of products is homogenous in the sense of tax rates.

The above assumptions can be considered rather unavoidable as far as practical application of model (18) is concerned. However, in the situation of data shortage, the issue of the greatest concern is how to determine h_{ij} coefficients as well as differentiate imports from the domestic production ($z_{ij}^{(d)}$ and $z_{ij}^{(m)}$). Solution of these problems is fairly ambiguous and, consequently, they are not embodied in the formulation of model (18). Thus, that formulation is independent of the chosen decomposition method.

In this analysis it was assumed that for each type of products there is a fixed proportion between domestic and imported goods, identical for all intermediate inputs of products of this type. Coefficients h_{ij} were assumed to be constant within a group of products i, with an exception for inputs going into sectors fully exempted from VAT – in those cases values of h_{ij} clearly equal 1 (meaning that full VAT amount is recorded in the given input). However, detailed discussion of how model parameters are obtained, due to complexity of the problem, requires a framework of a separate paper. In table 1 tax and margin rates resulting from the proposed decomposition are presented.

4. Simulation assumptions and results

The point of the planned VAT rate adaptation is limiting the range of reduced and zero rates (e.g. in construction and agriculture). Basing on reports of the Committee of European Integration and Basing and the Centre for European Integration, table 2 presents the most important changes in VAT rates. In the analysis it is assumed that those changes are introduced immediately, i.e. without their spreading in time. In fact, for certain commodities adaptation periods were agreed in negotiations (e.g. for

construction services), however in most cases they are not utilized due to current needs of the Polish state budget.

Table 2. Most important changes of VAT rates

Products and services	Current (%)	New (%)
Agriculture	3	7
Means of agriculture production	3	7
Construction services	7	22
Construction materials	7	22
Books, newspapers	0	3

S o u r c e: As same as Tab. 1.

Categories of products and services in table 2 do not strictly conform with SNA categories used in the input-output table'2000. Therefore, changes of VAT rates had to be recalculated in order to be consistent with that classification of commodities. For example a change of VAT rate for books and newspapers which equals 3 percentage points is reflected in the model as the 2.3 percentage points change of average nominal VAT rate for products of publishing and printing (see Tab. 3). The difference comes from the fact that 'books and newspapers' make only a part of wider SNA category named 'publishing and printing'. Proper weights were found basing on detailed data on global supply of products and services.

As can be seen in the results in table 3, price changes are predominated by direct effects seen in final prices. However, a slight reaction of basic prices can also be observed – generally being at the level of approximately 0.1%. For products and services fully exempted from VAT this reaction is reasonably stronger. Growth of basic prices of fishery products exceeds 1%. As far as public administration, education and health care services are concerned, basic prices go up by 0.3% to 0.4%. Thus, it can be considered as a rule that VAT rate changes mostly affect the costs in public sectors. This effect – unfavourable for the state budget – is certainly neutralised by a proportionally greater increase of tax revenues.

As far as final prices are concerned, it is prices of construction services, 'other non-metallic' materials and agriculture products that exhibit the highest price increase. It is worth noticing that agriculture prices practically do not affect prices of food. It can be explained by the fact that food producers usually deduct the whole amount of VAT paid on inputs coming from agriculture. In many cases percentage changes of final prices prove to be lower than changes of basic prices. It is the consequence of the existence of a wide range of subsidies, especially for services.

Table 3. Simulation results – rates of growth of basic and final prices (in %)

i	Products and services	Δt_i	basic prices	final prices
1	Agriculture and forestry	7.00	0.04	6.99
2	Fishery	0.00	1.11	0.78
3	Mining	0.00	0.07	0.04
4	Food	0.00	0.06	0.05
5	Tobacco	0.00	0.14	0.13
6	Fabrics	0.00	0.02	0.01
7	Textile	0.00	0.03	–0.12
8	Leather	0.00	0.05	0.03
9	Wood	4.31	0.06	3.77
10	Paper	0.00	0.03	0.01
11	Publishing and printing	2.30	0.52	2.68
12	Petrol	0.00	0.04	0.03
13	Chemicals	0.06	0.04	0.07
14	Rubber and plastic	0.00	0.04	0.02
15	Other non-metallic	9.28	0.08	8.30
16	Metal	0.81	0.06	0.70
17	Metal products	6.48	0.15	5.72
18	Machines	0.51	0.12	0.49
19	Office machines and computers	0.00	0.01	0.00
20	Electric machines	0.00	0.09	0.04
21	Radio and TV devices	0.00	0.03	0.00
22	Medical and optical devices	0.00	0.07	0.05
23	Motor vehicles	0.00	0.14	0.03
24	Other transport equipment	0.00	0.08	0.06
25	Furniture and other goods	0.26	0.08	0.30
26	Recycling of materials	0.00	0.06	0.06
27	Electricity, gas, water	0.00	0.04	0.04
28	Construction	15.00	0.11	14.16
29	Hotels and restaurants	0.00	0.03	0.03
30	Financial services	0.00	0.18	0.13
31	Business and real estate services	0.00	0.08	0.07
32	Public administration and defence	0.00	0.40	0.40
33	Education	0.00	0.38	0.38
34	Health care and social security	0.00	0.34	0.34
35	Other services	0.00	0.05	0.05
36	Repair	0.00	0.04	0.04
37	Transport, storage, communication	0.00	0.04	0.03

S o u r c e: As same as Tab. 1.

5. Concluding remarks

It can be said that in the case of increase of the considered VAT rates (agriculture products, construction services, materials for agriculture, materials for construction, books and newspapers), the role of indirect cost-push effects in price formation proved rather insignificant. It leads to a conclusion that to forecast price changes evoked by those particular regulations simpler methods can be used with little error. However, it must be underlined that these are particular results – in a general case (i.e. if VAT rates for other groups of products are changed), the role of non-deductible VAT can be much more distinct, making the use of the extended input-output price model indispensable.

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OSZACOWANIE CENOWYCH EFEKTÓW DOSTOSOWANIA STAWEK PODATKU VAT I AKCYZY DO NORM UNII EUROPEJSKIEJ

Wśród spodziewanych ekonomicznych skutków przystąpienia Polski do Unii Europejskiej istotne miejsce zajmują zmiany poziomu i relacji cen. Raport Urzędu Komitetu Integracji Europejskiej na temat korzyści i kosztów akcesji wymienia dwie grupy źródeł tego efektu. Po pierwsze, są to czynniki o charakterze makroekonomicznym, takie jak wzrost konkurencji i zwiększony napływ transferów zewnętrznych. Po drugie, potencjalne źródło efektów inflacyjnych stanowią dostosowania niektórych regulacji do prawa wspólnotowego, zwłaszcza w

obszarach dotyczących standardów ochrony środowiska, polityki rolnej oraz podatków pośrednich. Przedmiotem opracowania jest ostatni z wymienionych aspektów, tj. wpływ zmian w stawkach podatków pośrednich na ceny.

Planowane dostosowania obejmują stawki podatku od towarów i usług (VAT) oraz stawki podatku akcyzowego. W odniesieniu do podatku VAT zmiany polegają przede wszystkim na ograniczeniu zakresu stosowania stawki obniżonej bądź zerowej (m. in. w budownictwie i rolnictwie), zaś w odniesieniu do podatku akcyzowego – na dostosowaniu do minimalnej stawki obowiązującej w UE lub na likwidacji ulg (dot. m.in. akcyzy na papierosy i paliwa ekologiczne). Bezpośrednim efektem tych regulacji są zmiany cen płaconych przez ostatecznych odbiorców towarów i usług. Ponadto podatek VAT, w przypadku stosowania różnego rodzaju ograniczeń w pomniejszaniu podatku należnego o podatek naliczony, obciąża dodatkowo koszty działalności i w ten sposób wpływa na tzw. ceny bazowe, tj. ceny nie zawierające podatków od produktów. Zatem w skali gospodarki występują także pośrednie efekty cenowe spowodowane zmianami kosztów. Do oszacowania skali obu opisywanych zjawisk stosowany jest model cen typu input-output, rozszerzony o elementy podatków pośrednich. Wyniki symulacji przedstawione są w przekroju rodzajów dóbr i usług oraz według kategorii spożycia finalnego.