International Journal of Business, Human and Social Sciences
ISSN: 2517-9411
Vol:6, No:12, 2012

Distributional Impacts of Changes in Value Added Tax Rates in the Czech Republic

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***Abstract*—**The paper evaluates the ongoing reform of VAT in the Czech Republic in terms of impacts on individual households. The main objective is to analyse the impact of given changes on individual households. The adopted method is based on the data related to household consumption by individual household quintiles; obtained data are subjected to micro-simulation examining. Results are discussed in terms of vertical tax justice. Results of the analysis reveal that VAT behaves regressively and a sole consolidation of rates at a higher level only increases the regression of this tax in the Czech Republic.

***Keywords*—**Consolidation of rates, household quintiles, tax impact, VAT.

I. Introduction

As goes for the nature of tax system's changes, there are being carried rather uncompromising political battles. These changes tend to be discussed in the media and talked about by the general public since major changes to the tax system directly or indirectly affect every member of the society. In the context of the current world economic development and especially in the area of indebtedness of individual economies, many countries resort to a reduction of their national debts through the revenue side of their state budgets, formed mainly by tax revenues.

Tax reforms are mostly aimed at fulfilling and/or improving one of the three primary functions of taxes. Presently appears as the most important function of taxes the fiscal one. Unfortunately, under ideal conditions taxes should also have a substantial share of redistribution and allocation functions where it is assumed that the state is able to allocate resources more efficiently than the market or it is able to correct market failures, respectively.

The redistribution function is an essential one from the social perspective aiming to transfer a portion of the wealth from the richest to the poorest and thus to maintain social justice in the society. According to the tax theory, there are two types of justice. Horizontal justice occurs when two subjects with the same income are taxed identically. Vertical justice assumes solidarity of wealthier subjects with poorer ones when wealthier subjects should be taxed more.

An ideal tax reform should strengthen all tax functions since all are equally important. Within "*ad hoc*" reform designs adopted by governments under pressure to respond to an unusual situation, there may come to a prioritisation of one particular function, usually the fiscal one, at the expense of the other ones.

A complex tax system provides plentiful options of how to make an "ideal" reform.

The aim of this paper is to analyse potential impacts of the proposed value added tax (VAT) modification in the Czech Republic on individual taxpayers.

The first part is devoted to VAT from the perspective of an administration tool when discussed are being pros and cons of this tax in terms of its construction and possible prediction of future tax revenues.

The second part describes certain specifics of VAT in the Czech Republic from the perspective of taxpayers and describes the planned changes related to the gradual consolidation of its rates.

The final part comprises description and methodology of the data along with an analysis of the impact of the planned consolidation of VAT rates on individual groups of households. Using graphical analysis, quantified and discussed are changes in the average taxation of consumption.

The actual analysis of the observed phenomena was a subject of numerous scientific papers. Svátková et al. [14] examined the incidence of excises and models progressivity of excise duties using regression models. Bayer [1] focuses his research towards the formulation of regression models of tax revenues using macroeconomic variables. Kubátová [9] discusses the principles of tax policy and explains the issue of fair taxation. Dresh et al. [7] examines impacts and relationships between CIT and VAT, concentrating on individual impacts of these taxes and their mutual substitution. Slintáková and Klazar [13] in their research examine the long-term development of the impact of VAT on Czech households as a result of the Czech Republic's accession to the EU based on the method of using consumer baskets and average VAT rates. As source data they use the methodology of consumer baskets based on CZ-COCIOP. Caspersen and Metcalf [4] in the context of their contribution analyse via dynamic consumption functions together with the study of the VAT impact on various household divided not only based on household deciles, but focus also on the measurement of progressivity. Metcalf [10] develops the theory of household deciles based on interpretation of the income-expenditures model. Hossain [8] in the context of his research examines the impact of the introduction of VAT in Bangladesh, Younger et al. [16] examine a similar problem in Madagascar and Sekwati and Mahan [11] examine the impact on poor households in Botswana. Schenk and Oldman [12] in their book describe individual approaches towards the introduction of VAT in the

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world. Beda et al. [2] analyse impacts on European households under the trend of tax increases. Besley and Rosen [3] analyse impacts of the imposition of excise duties in terms of investigation of incidence in prices of common goods. The result of their study is a conclusion that some prices perfectly reflect the tax increase, while other commodities go up in price far more. Tested dataset were prices of goods across U.S. cities.

II. VAT for Reform Purposes

For state administration purposes is VAT a very significant tax. This tax may be classified as a general tax on consumption. Its advantage for the state purposes is a relatively high frequency of advance payments from taxpayers and a difficulty to avoid this tax. From the perspective of a common final consumer it is impossible to evade VAT since s/he is usually not able to apply for a tax deduction on input. Unfortunately, this transfer of tax liability causes certain complications in the taxation of indispensable goods.

Most EU countries apply the principle of linear and differential VAT rates. Differentiation into several tax rates should help to reduce the tax burden on low-income groups. Furthermore, the state administration uses so-called possibility of an exemption of the tax object or a full tax exemption.

Another advantage of VAT is its relative ease of prediction in terms of its future development. Unfortunately, this advantage has its pitfalls. Reference [1] demonstrates a relatively strong positive correlation of the VAT development on the development of GDP. This phenomenon may be further manifested on the theoretical level, when within the decomposition of a four-sector GDP model is the most important part consumption, in the vast majority of cases burdened by this tax.

VAT is also the primary tax with respect to the EU tax coordination and harmonisation. The ultimate objective should be a uniform rate and a uniform tax base across the EU. However, given the overall problem of tax coordination, where each Member State endeavours to ensure for its specific products a reduced rate, this objective is impossible to meet. As an example suffices to mention the agreed two-year transition period related to VAT that already lasts longer than the agreed period, without any serious effort to solve this conflict.

The disadvantage of VAT is a relatively expensive implementation of this tax into the tax system, since proper tax collection requires a well performing tax and customs administration along with development of electronic databases related to international clearances.

III. VAT in the Czech Republic

In the Czech Republic there is still being applied a linear and differential system of tariffs with standard and reduced rates set at 20% and 10%, respectively. The trend in development of rates indicates a gradual effort to consolidate the standard and reduced rates. The following Table I demonstrates this trend.

TABLE I
Development of VAT Rates in the Czech Republic

Period	Standard Rate	Reduced Rate
1.1.1993 – 31.12.1994	23%	5%
1.1.1995 – 30.4.2004	22%	5%
1.5.2004 – 31.12.2007	19%	5%
1.1.2008 – 31.12.2009	19%	9%
since 1.1.2010	20%	10%
since 1.1. 2012	20%	14%
since 1.1. 2013	17.5%	17.5%

Source: Data [6] + modification by the author.

Currently is in the context of governmental austerity measures under discussion further increase of the reduced rate from the present level of 14% with the ultimate aim of introducing a uniform rate that should be set at 17.5%.

According to [15], reasons for the reduced tax rate on goods and services are as follows:

- social – basic necessities such as food, medication and medical supplies, mobility aids for disabled people, social and health services unless not exempt, care services for children, elderly, sick and disabled
- culturally-social – books, newspapers, magazines, tickets to cultural and sport events
- regular public transport

In addition, the reduced tax rate includes the following services:

- water services
- services dealing with communal waste
- accommodation services
- services dealing with reconstructions and repairs of buildings for housing.

Other services may be exempted without entitlement for a deduction and therefore for VAT purposes do not represent a taxable fulfilment. This includes the following services: mail, most financial activities, insurance activities, basic services related to the education of children, certain health services, social assistance, transfer of non-constructional land and real estate properties after three years since approval [15].

IV. Methods

Given the objective of this paper, as preferred was chosen the method based on simulating the tax burden of households.

The main data source was database from the Czech Statistical Office [5], namely the Households of employees and households of pensioners without EA members by level of net income per person. These data describe net monetary expenditures of individual households, divided into household quintiles by net monetary income per person and type of

households, where re common households divided into employees and pensioners households.

The following analytical method is founded on the simulation of a change in the tax liability of individual deciles with a default base set with respect to the 2011 data. This analysis is based on an estimation of individual tax rates for the given consumer items categorized according to CZ-COICOP[1]. Given that the data are in net terms, the tax was calculated for individual product groups using the "tax from bottom" calculation as expressed by the following equation.

$$VAT = TB*r/100 \text{ ,} \quad (1)$$

where VAT = amount of the value added tax,
TB = tax base,
r = tax rate in per cents.

Obtained VAT levies for 2011 with respect to individual quintiles represent a comparative base for the simulation of changes in tax rates.

The result of this method is a set of relative indicators of the average tax burden on consumption for individual quintiles of households, which are in turn discussed.

A theoretical problem of this method represents a relatively difficult assignment of the correct tax rate to a given group of monetary expenditures. Where the CZ-COICOP provided definition of the monitored consumer basket has been determined as imprecise, adopted was the weighted average method to derive the average tax rate. Relative representations of monitored variables were taken as weights. This simplification resulted in a VAT rate that should probably best describe the studied issue.

Applied approach may be considered as a use of micro-simulation on the basis of household quintiles. Naturally it is also possible to apply more advanced methods based on macro-modelling to measure an overall impact of the tax. As a starting point may be used e.g. the total dynamic consumption function of households. This method is mostly applied in the calculation of the overall taxation during the course of a long-term cycle and as such was thus not adopted within this work.

V. Observations and Results

The first interesting fact when considering the impact of planned changes in tax rates of the value added is an analysis of total household expenditures in per cents.

TABLE II
Relative Consumption of Households of Employees

Consumption/quintiles	Lowest 20 %	Second 20 %	Third 20 %	Fourth 20 %	Highest 20 %
Consumptions expenditures	100.0	100.0	100.0	100.0	100.0
Food and non-alcoholic beverages	21.9	19.0	18.1	17.1	14.4
Alcoholic beverages, tobacco	2.5	2.4	2.8	3.1	2.5
Clothing and footwear	5.1	5.6	5.2	5.2	5.3
Housing, water, electricity, gas and other fuels	21.4	19.5	20.0	21.2	19.7
Furnishings, household equipment and routine household maintenance	5.2	5.8	6.7	6.3	7.8
Health	2.0	2.2	2.4	2.3	2.4
Transport	10.4	12.6	11.7	11.5	14.1
Communication	5.1	4.8	4.3	4.6	3.8
Recreation and culture	8.8	10.0	10.1	10.0	11.0
Education	1.0	0.9	0.8	0.4	0.8
Restaurants and hotels	5.6	6.1	6.2	5.6	5.5
Miscellaneous goods and services	11.1	11.1	11.8	12.7	12.8

Source: Data [5]

Table II is focusing on relative consumption within households of employees. Interesting observation is a slightly decreasing trend in percentages of expenditures on basic foodstuffs that have high percentage representation in the majority of households of employees and the highest percentages of expenditures on housing (except the poorest 20 %). This fact is quite fundamental because increasing the reduced rate for foodstuffs brings about a regressive impact of the tax.

Quite interesting is also percentage of expenditures on transport within the second quintile therefore it will skew the estimated tax burden for the entire second quintile, since the major part of this component consists of purchase and operation of motor vehicles, included in the standard VAT rate.

[1] Czech Classification of Individual Consumption According to Purpose

TABLE III
RELATIVE CONSUMPTION OF HOUSEHOLDS OF PENSIONERS IN 2011

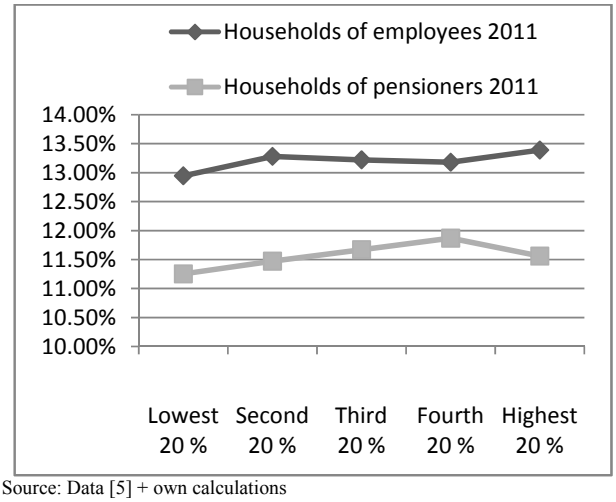
Consumption / quintiles	Lowest 20 %	Second 20 %	Third 20 %	Fourth 20 %	Highest 20 %
Consumptions expenditures	100,0	100,0	100,0	100,0	100,0
Food and non-alcoholic beverages	26,3	23,8	23,8	21,9	19,8
Alcoholic beverages, tobacco	2,9	3,5	3,0	3,1	3,5
Clothing and footwear	3,2	3,1	3,0	2,9	3,0
Housing, water, electricity, gas and other fuels	28,3	30,8	29,2	28,0	29,9
Furnishings, household equipment and routine household maintenance	4,9	5,6	6,7	5,8	5,1
Health	5,6	4,5	4,1	4,0	4,8
Transport	5,6	5,5	6,1	8,0	5,8
Communication	3,6	3,9	4,4	4,1	4,8
Recreation and culture	7,5	8,6	8,5	10,0	10,4
Education	0,2	0,0	0,0	0,0	0,1
Restaurants and hotels	3,3	2,6	2,6	3,0	2,8
Miscellaneous goods and services	8,6	8,1	8,5	9,0	10,0

Source: Data [5]

Table III is focusing on relative consumption of households of pensioners. Interesting observation is higher percentage of necessaries goods against households of employees. This phenomenon could be caused by relatively lower available income of pensioners.

Remarkable fact is relatively high percentage of consumption expenditures on housing in the second quintile. It is probably caused by relatively high rents of households. From VAT view this will have an effect on regressive impact of tax, because energies are taxed by reduced tax rate.

Development of the tax burden in 2011 is analyzed in Fig. 1:



Source: Data [5] + own calculations

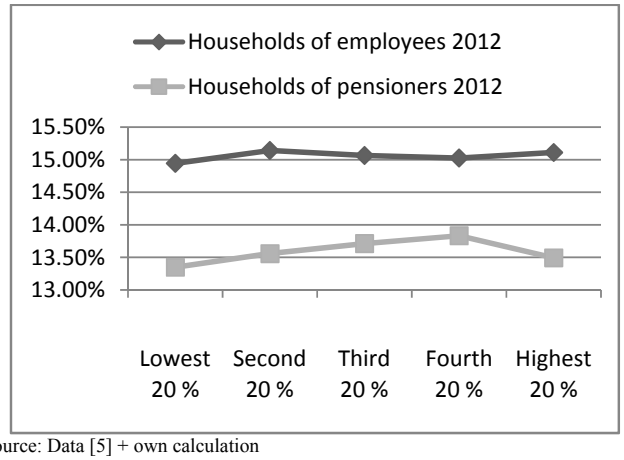
Fig. 1 Average tax burden of households in 2011

The first significant finding is a high value of the tax burden related to the second quintile of households of employees that may be caused by a relatively high proportion of expenses related to transportation or by relatively higher expenditures on consumption of alcoholic and tobacco products.

Developments in the final quintile is caused by a shift of consumption from indispensable goods to luxury goods such as meals and accommodation, alcohol and tobacco products, or expenditures associated with the operation of transport vehicles; all ‘‘luxury” consumption expenditures are taxed at the standard VAT rate.

In case of pensioners households the tax burden is quite progressive, only exemption is the richest quintile. This development could be caused by relative low consumption of luxury goods. Generally could be said that pensioners in Czech Republic after securing theirs needs tend to save quite a lot of income for their children and therefore have a relative low consumption.

Impacts of an increase in the reduced rate from 10% to 14% can be summarised using Fig. 2:



Source: Data [5] + own calculation

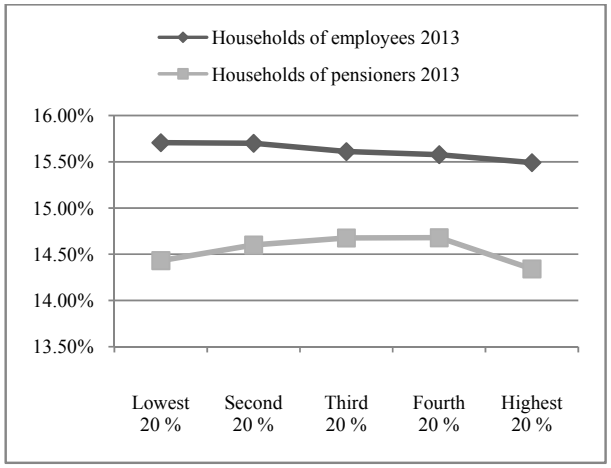
Fig. 2 Average tax burden of households in 2012

An increase in the reduced VAT rate brings about a rather substantial change in the burden of individual household quintiles. Households with lower average income per person are those that are affected by this change the most since the bulk of their consumption is made up of goods and services taxed at the reduced rate. An increase in the average tax burden on consumption of these households is significant as average tax rate is increased.

Main trends in taxation are same as in Fig. 1. There is slight difference in taxation of households of employees, where the tax converges to 15 %. Situation in taxation of pensioner households is changeless, except increase in the overall taxation.

The richest households are minimally affected by this change since most of their consumption is already taxed at the standard rate.

Development of the tax burden following and introduction of a uniform tax rate depicts in Fig. 3:



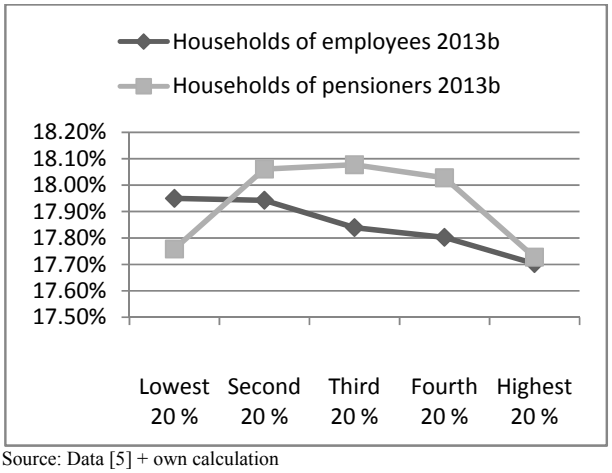
Source: Data [5] + own calculations

Fig. 3 Average tax burden of households in 2013

With respect to the introduction of a uniform tax rate it is evident that the VAT has a nature of a purely regressive tax, since the average amount of consumption taxation may be approximated using a decreasing linear function. This case is caused by a reduction in the taxation of "luxury" goods and a further increase in the taxation of "indispensable" goods.

Provided both rates would be consolidated at 20% (Fig. 4), the situation would be relatively the same, only the gap between the poorest and richest households would enlarge. Another negative trend is, that taxation of pensioner households is higher then employee households, what could be caused by calculating tax burden on income used for consumption, where high tax with low income could cause this deviation.

Interesting is situation after uniform taxation in first quintile of pensioners households. The relative low tax rate is caused by theirs low available income for consumption.



Source: Data [5] + own calculation

Fig. 4 Average tax burden of households assuming 20% uniform VAT rate

VI. Conclusion

Results demonstrate that the planned changes in VAT rates are from the perspective of vertical justice disadvantageous, since the most burdened by the VAT reform will fall onto low-income households. The aim of reforms should be a balance in all the main functions of taxation while the introduced modification serves only to a fulfilment of the fiscal function of taxes at the expense of the redistribution function.

The chosen VAT modifications aiming to stabilise public budgets are rather unfortunate since estimates of future fiscal revenues cannot cover behavioural effects caused by price increases of consumer goods. This phenomenon may shift into the rate of growth of GDP and via GDP into the VAT revenue itself.

In conclusion, the fiscal instability of public finances should be addressed in another way. For example via introduction of progressive income taxes that are generally fairer, although the revenue from a reform of income taxes may not be as high.

It is also possible to focus rather on the expenditure side of the budget that could under an appropriate adjustment reduce the state budget deficit to a similar level as through modification of VAT rates.

Acknowledgment

The paper is based on author previous research andoriginated within solution of the project IGA VŠE F1/30/2010 "Impact of tax and expenditure instruments on microeconomic and macroeconomic efficiency".

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