EQUITY ASPECTS OF VAT IN EMERGING EUROPEAN ECONOMIES: THE CASE STUDY OF SERBIA

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Studies of VAT incidence in developed European economies reveal a regressive distribution in any particular year, but mildly progressive lifetime incidence. Micro-simulation analysis of Serbian expenditure survey data yields similar conclusions. However it is important to clearly recognize two distinctive features of emerging European economies when analyzing the VAT incidence. Firstly, we show that significant presence of own-source small farming production in many emerging European countries, including Serbia, presents an additional progressivity-enhancing buffer compared to VAT incidence in developed economies. Secondly, the high level of shadow economy and evasion of direct income taxes in many emerging European countries suggests that household expenditures are a more meaningful indicator of the living standard and ability to pay taxes than the registered income. Overall, we conclude that common beliefs of regressive VAT taxation, often encountered in the general public, are vastly overstated and poorly founded in economic reality of emerging European countries.

Introduction

Tax systems around the world are continuously changing in response to economic, political and administrative developments. Rapid globalization during the last couple of decades introduced unprecedented international mobility of capital, goods and services, and (to a certain extent) labor, consequently causing a world-wide trend of reducing custom duties, corporate income taxes and tax wedges on labor. Significant reductions in corporate and personal tax rates on capital and labor incomes have been especially stark in emerging European countries, which experienced a fierce (income) tax competition during the last decade in order to attract foreign investors – the so called "race to bottom" phenomenon.

Faced with reduced revenues from other sources, EU countries are increasingly relying on consumption taxation. European Commission (2009) notes that reliance on consumption taxes, and VAT in particular, has been continually increasing in EU member states in the 2000-07 period. Policy importance of consumption taxation is also highlighted by the renewed attention to the optimal tax-mix issues, due to strong theoretical and empirical evidence that consumption taxes are less disruptive to economic growth than direct income taxes (Johansson *et al.*, 2008). Some European countries have already implemented efficiency-driven tax reforms which shift the burden from income to consumption taxation – Germany in 2007 and Hungary in 2008 being the most obvious examples, with France and Croatia being the most recent ones. Similar efficiency-driven tax reforms are being analyzed in other European countries, both developed (Belgium, Netherlands) and emerging ones (Serbia, Czech Republic).

Implementing aforementioned reforms which shift the burden from income to consumption taxation is challenging in practice due to political considerations and common (mis)belief in the general public that VAT is a regressive tax that causes adverse distributional effects by creating disproportionate tax burden on the poor households. Public perception of regressive consumption taxation has been reinforced by the early empirical tax incidence analysis, including the classical work of Pechman (1985). However, more recent research has unambiguously shown that much of

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the estimated extremely regressive incidence of consumption taxes against annual income originates from measurement errors inherent in expenditure surveys. Furthermore, the theoretical basis for assessing the VAT incidence against annual income instead of annual expenditures or lifetime income is rather weak (Caspersen and Metcalf, 1994; Creedy, 1998). Recent empirical estimates in EU member states, based on the lifetime tax incidence approach, reveal slightly progressive VAT incidence (DeCoster *et al.*, 2010).

We will use micro-level data for Serbia to investigate equity aspects of value added taxation in a typical emerging European country. Compared to developed European countries, many emerging European countries, especially Poland, Romania and Serbia, feature a significant presence of own-source small farming production and associated in-kind consumption. As we will show, this feature tangibly enhances the progressivity of VAT systems in these countries. Furthermore, significant presence of shadow economy and evasion of direct income taxes in many emerging European countries suggests that household expenditures are a more meaningful indicator of the living standard and ability to pay taxes than the registered income. We conclude that common beliefs of regressive VAT taxation, often encountered in the general public, are vastly overstated and poorly founded in economic reality of emerging European countries.

This paper is organized as follows: Section 1 presents basic results from the existing literature, highlighting the difference between annual and lifetime tax incidence analysis and noting the inherent presence of income measurement errors in expenditure surveys. Section 2 describes features of the existing Serbian VAT system and explains the estimation methodology used in our analysis. Section 3 presents empirical estimates of annual and lifetime VAT incidence in Serbia. Section 4 quantifies the poor redistributive performance of the reduced VAT rate mechanism and highlights the fact that government transfer policies are the optimal tool for achieving social redistribution goals. Section 5 simulates three alternative approaches to increasing the VAT burden and compares their distributional effects. Concluding remarks are presented in Section 6.

1   Theoretical background and literature survey

Consumption taxes, and VAT in particular, are often deemed to be inherently regressive by the general public. Throughout the years, this point of view has been shared by a tangible number of economic practitioners and tax experts. The argument most often quoted in the general public in support of the regressive consumption taxation hypothesis is the observation/belief that poor individuals spend most or all of their incomes, while rich individuals are able to save significant shares of their income. Thus, one is led to believe that consumption taxation is inherently regressive – since it burdens poor individuals more heavily than it does the rich ones.

1.1   *Empirical evidence*

Early empirical evidence, such as the seminal study of Pechman(1985), seemed to be fully supportive of the general public beliefs. Namely, using annual income and expenditure data from a survey of US households, Pechman shows the sales tax incidence to be distinctively regressive, representing a higher share of income for poor households that for the rich ones. Similar results, based on annual data from expenditure surveys, have been obtained in many countries throughout the years. The most recent analysis with respect to EU member states is Decoster et al (2010), which also confirms the belief that VAT incidence is regressive, when measured against annual income.

When conducting empirical analysis of VAT incidence, *ex ante* one would expect to obtain results such that the effective VAT rate faced by any household lies in the range from 0 per cent to

Effective VAT Rates in Selected EU Member States Across Annual Income Deciles

Decile	Belgium	Hungary	UK	Greece	Ireland
Poorest	26.7%	28.2%	16.1%	33.2%	46.4%
2	13.4%	20.2%	11.2%	22.1%	16.6%
3	13.0%	18.1%	10.3%	19.6%	13.6%
4	12.4%	17.1%	9.4%	18.5%	11.6%
5	12.0%	16.0%	8.8%	18.5%	12.2%
6	11.2%	15.6%	8.2%	16.7%	11.4%
7	11.0%	15.2%	8.2%	15.3%	10.3%
8	10.3%	14.7%	7.5%	15.1%	9.5%
9	10.1%	14.3%	7.1%	13.4%	8.5%
Richest	8.8%	12.5%	5.8%	11.6%	6.3%
Legal VAT rate	21%	25%	17.50%	19%	21%

Source: Rearranged from Decoster *et al.* (2010) by the authors.

the (standard) legal VAT rate. Namely, very rich households might be able to save most or virtually all of their annual income – thus facing an effective VAT rate of 0 per cent in a given year. On the other extreme, a poor household that is forced to spend all of its annual income on goods and services taxed at the standard VAT rate would face the maximum possible effective VAT rate, which equals the legally prescribed standard VAT rate in a given country. However, existing empirical studies most often present VAT burden as a percentage of (disposable) income across different deciles, ie on the tax-inclusive basis. Since VAT is legally charged on the tax-exclusive, we believe it is more meaningful to present VAT incidence results on the tax-exclusive basis. The two approaches of representing research results are completely equivalent, but representing results on the tax-exclusive basis clearly shows the effective VAT rates and allows us to easily validate our *ex ante* research expectations – that estimated effective VAT rates should lie in the range from 0 per cent to the legal VAT rate.[1]

Empirical evidence from five EU member states in Table 1 seems to confirm the entrenched belief in the general public that VAT is regressive – effective VAT rates faced by the poor households in lower income deciles are significantly higher than the effective tax rates faced by the rich households in higher income decile. However, it should be stressed that in four out of five countries analyzed – the estimated effective VAT faced by the poorest households in the lowest decile are significantly higher than the legally prescribed standard VAT in respective countries. These results are opposite to our *ex ante* research expectations! Extraordinarily high estimates of effective VAT rates in the lowest income deciles are encountered in most empirical studies based on annual income and expenditure data. For example, O'Donoghue *et al.* (2004) investigate VAT

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[1] If VAT burden is estimated to equal *x* per cent of disposable household income, than effective VAT rate on the tax-exclusive basis is easily calculated as $y = x / (1–x)$.

<div align="right">**Table 2**</div>

Saving Rates and Estimated VAT Rates Excluding the Dissaving Effect

Decile	Belgium		Hungary		Greece	
	Saving	Corrected VAT rate	Saving	Corrected VAT rate	Saving	Corrected VAT rate
Poorest	−63.4%	16.4%	−50.4%	18.8%	−117.3%	15.3%
2	−17.5%	11.4%	−14.3%	17.7%	−62.8%	13.6%
3	−8.1%	12.0%	−3.9%	17.4%	−36.3%	14.4%
4	−2.1%	12.1%	1.6%	17.1%	−3.2%	17.9%
5	3.8%	12.0%	6.4%	16.0%	−26.2%	14.6%
6	9.3%	11.2%	10.1%	15.6%	−14.3%	14.6%
7	13.3%	11.0%	12.1%	15.2%	−8.5%	14.1%
8	18.0%	10.3%	14.4%	14.7%	−5.0%	14.4%
9	22.7%	10.1%	17.6%	14.3%	1.6%	13.4%
Richest	33.3%	8.8%	27.1%	12.5%	15.8%	11.6%

Source: Rearranged from Decoster *et al.* (2010) and expanded by the authors.

incidence in twelve EU member states and their estimates of effective VAT rate in the lowest income deciles are tangibly higher than the legally prescribed VAT rates in ten out of the twelve countries being analyzed.[2]

Unrealistically high effective VAT rate estimates in most countries are caused by the extremely high dissaving rates estimated from expenditure survey data. Decoster et al (2010) describe the dissaving rates in the lowest deciles in Table 2 as "unbelievably high" and resulting from under-reporting bias of income data – a phenomenon reported by most authors dealing with data from expenditure surveys, including Sebelhaus and Groen (2000) and Meyer and Sullivan (2003). If we correct for unrealistically high dissaving rates by assuming that incomes in the lowest deciles have to equal the recorded expenditures, we can observe that estimated VAT incidence in Table 2 is still regressive, but significantly less than the estimates in Table 1 imply.[3]

Overall, we can conclude that the abundance of empirical evidence from many countries over the years, which shows extremely regressive VAT incidence over annual income deciles – only partially supports the general public's beliefs regarding the inherently regressive VAT taxation. Namely, while general public beliefs are driven by regressive incidence of saving, the empirical results are mostly driven by the regressive incidence of dissaving, stemming from measurement errors and under-reporting of income bias inherent in expenditure surveys.

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[2]   Interestingly enough, while Decoster *et al.* (2010) estimate effective VAT rate for the lowest decile to be lower than standard VAT rate in UK, O'Donoghue *et al.* (2004) estimate the opposite situation – effective VAT rate for the lowest decile was higher than standard VAT rate in this study. This points to the instability of empirical results that underlie common belief that VAT is a regressive tax.

[3]   VAT estimates corrected for dissaving in Table 2 are obtained by dividing estimates in Table 1 *by (1 – the dissaving rate rate)*, for deciles which exhibiting the dissaving behavior.

1.2 Theoretical considerations

Correcting for income measurement errors significantly reduces the regressive character of VAT incidence estimates, but they remain invariably regressive when compared against annual income. However, one can rightfully question whether annual income represents the relevant measure of well-being against which VAT incidence should be assessed? In their seminal paper, Caspersen and Metcalf (1994) explain that low-annual-income households may include four very different kinds of individuals: those with volatile annual income who merely had a bad year, those that are young and just beginning a high-income career, those that are old and have just finished a high-income career, and those who are truly long-term poor. The identification of households that are truly poor requires that we look at the longer time horizon – moving from annual income framework to the entire lifetime income framework.

Permanent income theory (Friedman, 1957) suggests that annual income is not the relevant measure of well-being when assessing the VAT incidence, since households engage in consumption smoothing over their lifetime, saving temporary incomes in "good" years and dissaving accumulated funds in "bad" years. Similarly, the *lifecycle hypothesis* (Modigliani, 1986) implies that a typical individual moves from one income group to another during his lifetime, dissaving in youth and old-age and saving in the most productive middle-ages.[4] As a result, a typical individual is expected to face high VAT burden against annual income in some years, but low VAT burden in others. Overall, if we exclude the effects of inheritances and bequests, the average VAT rate an individual faces throughout his lifetime is exactly equal to the legally prescribed VAT rate – since the individual is assumed to spend all his lifetime earnings, although with certain temporal reallocations.[5] Thus, based on this theoretical consideration, one would expect consumption taxation (at uniform rate) to have proportional lifetime incidence. Furthermore, since most European VAT systems feature reduced VAT rates applicable to basic necessities, we could even expect to observe a degree of progressivity when analyzing lifetime incidence. This indeed is the case, as most research undertaken in the last couple of decades suggests somewhat progressive lifetime VAT incidence estimates, for example Caspersen and Metcalf (1994) for the United States and Decoster *et al.* (2010) for selected EU member states.

Empirical studies mostly support the lifecycle hypothesis and permanent income theory. Two approaches are most often relied upon when estimating lifetime VAT incidence – either using panel data to estimate the lifetime income (Fullerton and Rogers, 1991, Caspersen and Metcalf, 1994) or using current household consumption as a proxy for appropriate lifetime income (Caspersen and Metcalf, 1994; Decoster *et al.*, 2010; Slintakova and Klazar, 2010). Due to lack of appropriate panel data in most countries other than the United States, most of the research on VAT incidence in Europe thus far has relied on approximating the lifetime income with some form of non-durable household expenditures from expenditure surveys.[6] This is the approach we will follow in this study.

2   Data and methodological background

Serbian VAT system broadly follows the "EU model" and requirements laid-out in the

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[4] Lifetime income represents the present value of all incomes earned throughout individual's life plus any inheritance (s)he might receive.

[5] Caspersen and Metcalf (1994) explain that empirical evidence suggests bequests to be U-shaped with respect to lifetime income. Thus, ignoring inheritances and bequests has the effect of overestimating progressivity for the richest households and underestimating progressivity for the majority of poor and medium-income households.

[6] Current (non-durable) expenditures share many characteristics with the permanent or lifetime income, being rather stable from year to year, unlike current income which is very volatile over the years.

European Commission Sixth Directive. Standard VAT rate equals 18 per cent while the reduced rate is 8 per cent. Financial, postal, health and education services are tax-exempt, without the right to deduct the input-VAT (VAT Law Article 25). No domestic turnover of goods and services is zero-rated and basically only exports and services related to international trade and travel are zero-rated with the right to deduct the input-VAT (VAT Law Article 24). The list of goods subject to the reduced VAT rate (VAT Law Article 23) is somewhat long compared to best international practices, and includes food, medicines, utilities, textbooks, newspapers, hotel accommodation, fertilizers, firewood, natural gas, computer equipment, newly built apartments, utility services and tickets for cultural events (detailed list is given in the Appendix).

In order to estimate VAT incidence in Serbia, we will use the annual 2009 data from the Serbian Statistics Office Household Budget Survey (HBS). HBS is conducted in line with practices suggested by EuroStat, and the data from this source can be considered comparable to data obtained from expenditure surveys in other European countries. HBS 2009 data contains detailed expenditure information on 4592 representative households. HBS information is detailed enough so that particular households' expenditures can be identified as being subject to standard VAT rate, reduced VAT rate, being exempt from VAT or representing natural in-kind consumption due to own-source farming production. However, there are two limitations to be noted when using HBS data to estimate the VAT incidence:

1) Sale of food (fruit, vegetables, meat) on greenmarkets is legally exempt from VAT in Serbia. However, HBS data (and most expenditure surveys in general) does not allow differentiating between purchases of food on greenmarkets (VAT exempt) and purchases of food in grocery stores (subject to reduced VAT rate). Since poor households purchase more food from greenmarkets than rich households, using HBS data as the basis of VAT incidence overstates the actual VAT burden for the poor households.[7]

2) HBS surveys in general cover household consumption and don't include purchases of newly built apartments, which formally represent investment spending. However, since purchases of newly built apartments are subject to VAT, HBS data understates VAT incidence of rich households – which save for many years in order to afford one-time high cost of buying an apartment.

Aforementioned limitations of the HBS data cause a systematic regressivity-bias in VAT incidence estimates, by overstating the actual regressivity or understating the actual progressivity. These limitations should be kept in mind when discussing empirical VAT incidence estimates.

In what follows, we will assume full forward-shifting of VAT to consumer prices and will use HBS data to conduct a micro-simulation static analysis of VAT incidence (which assumes no behavioral responses). Although rather restrictive, these assumptions and this modeling framework are most often utilized when assessing incidence of consumption taxes in practice.[8]

We will analyze VAT incidence of the existing system and perspective reforms based on the estimated average effective VAT rate by income and expenditure groups (deciles). Average effective VAT rate in income group i is calculated as the ratio of total estimated VAT burden and total income for the income group i. In particular, average effective VAT rate in income group i ($i = 1, 2 \ldots 10$) will be calculated as the weighted average of tax rates t_j ($j = 1, 2, 3, 4$) which

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[7] Jenkins *et al.* (2006) argue that "in developing countries the commodities on which poor households spend most of their income, even if they are included in the legal tax base, are administratively impractical to tax." Based on the detailed information on expenditure patterns and types of establishments from which items are purchased, they estimate effective (annual) VAT burden in the Dominican Republic to be progressive. Similar detailed information is not available for Serbia, but one should keep in mind this source of tangible regressivity-bias in our estimates.

[8] Warren (2008) states some of the drawbacks of this approach and recommends use of input-output tables as the preferred approach to modeling incidence of consumption taxes. However, he notes that only a handful of most developed OECD countries are currently able to provide comprehensive information required to properly calibrate this type of models.

correspond to four different legal VAT rates present in the Serbian system – standard rate, reduced rate, exempt services and natural in-kind consumption due to own-source farming production. Weighting will be done according to the structure of consumption in each income group. Thus, we will use the formula:

$$\bar{t}_i = \sum_{j=1}^{4} t_j C_j \tag{1}$$

where t_j stands for four different tax rates possible under the Serbian VAT system and C_j represents the share of consumption in income group i subject to the tax rate t_j. Alternatively, average effective tax rates will also be estimated for different groups according to the expenditure ranking.

Average effective VAT rates by income and expenditure groups informally indicate whether the system is progressive or regressive. However, we will compliment these statistics with formal global progressiveness indices. Gini coefficient is the most often quoted index with respect to the (in)equality of income and expenditure distributions:

$$G = \frac{\sum_{i=1}^{n}\sum_{r=1}^{n}|y_i - y_r|}{2n^2\bar{y}} \tag{2}$$

where $\bar{y} = \frac{1}{n}\sum_{i=1}^{n} y_i$, n is number of individual households in the sample, y_i is the income of the individual household i, and y_r is the income of individual household r. We will be measuring the difference between inequality of income distribution before and after taxation by the difference of respective Gini coefficients (also known as the Reynolds-Smolensky index).

The Gini coefficient is focused on the middle portion of the distribution, mostly ignoring the developments in the tails of the distribution. Thus, it is usefully to complement the Gini statistics with General Entropy statistics that can assign higher weight to any particular portion of a distribution (Litcfield, 1999):

$$GE(\alpha) = \frac{1}{\alpha^2 - \alpha}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{y_i}{\bar{y}}\right)^{\alpha} - 1\right] \tag{3}$$

We will calculate General Entropy index with the alpha parameter 0.2 to investigate the behavior in the lower distribution tail and General Entropy index with alpha parameter 2.0 to investigate developments in the upper tail of income and expenditure distributions.[9] We will be investigating how Gini and General Entropy statistics change after imposing the VAT burden on before-tax distributions. Lower values of these statistics associated with after-tax distributions indicate progressive VAT incidence, while higher values of Gini and General Entropy statistics indicate regressive VAT incidence.

3 Estimates of VAT incidence in Serbia

This section estimates annual and lifetime VAT incidence in Serbia and compares the results with the existing literature on VAT incidence in other countries. Due to the lack of any relevant

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[9] Both Gini and General Entropy statistics with a value of 0 indicate perfectly equal distribution of income, while increasing values of these statistics indicate increasingly unequal income distribution.

Table 3

Cross-referencing Annual and Lifetime Income Rankings
(percent)

		Deciles by Expenditure Ranking									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Deciles by Income Ranking	1	**41.8**	16.1	10.5	8.9	7.4	4.6	2.2	3.5	3.1	2.0
	2	23.1	**21.8**	13.7	11.1	8.9	7.4	5.9	3.7	2.8	1.5
	3	12.6	16.6	**18.3**	14.6	9.4	7.8	7.6	5.7	4.4	3.1
	4	10.5	16.6	13.5	**15.3**	10.5	6.5	10.5	7.8	4.6	4.4
	5	5.0	12.2	15.3	11.3	**12.9**	14.4	10.0	9.8	6.3	2.8
	6	2.6	5.4	10.9	15.0	15.5	**14.4**	12.0	10.5	8.9	4.8
	7	2.0	5.0	5.9	9.4	15.0	13.5	**14.4**	13.7	11.8	9.4
	8	0.7	2.8	5.4	7.6	11.5	15.3	14.6	**15.5**	15.7	10.9
	9	0.7	2.8	5.0	4.1	6.3	8.9	13.3	17.0	**21.4**	20.5
	10	1.1	0.7	1.5	2.6	2.6	7.2	9.6	12.9	21.1	**41.2**

panel data on household income and consumption behavior over time, VAT incidence analysis for Serbia will be based on annual income and expenditure data from the HBS. Annual income data will be used as the relevant measure of living standard in assessing the annual VAT incidence. We will use annual expenditure data as a proxy for permanent income in assessing the lifetime VAT incidence. Since Serbian HBS basically ignores household investment expenditures, we will use total recorded expenditures as a proxy for current (non-durable) household expenditures.[10] Annual income and expenditure rankings of households are cross-referenced in Table 3 in order to investigate how different are the results from these two alternative indicators of the living standard and ability-to-pay taxes.

We can observe that only about 42 per cent of households in the lowest decile by income ranking are also classified in the lowest decile according to expenditure ranking. On average, 21.7 per cent of households (along the main diagonal) are given the same ranking according to income and expenditure criteria. Information in Table 3 closely resembles original calculations by Caspersen and Metcalf (1994), although the data for Serbia in 2009 seems to be more dispersed than the original data for United States in 1988. Both cross-reference tables imply a significant difference between income and expenditure rankings, ie between annual and lifetime VAT incidence.

We have used HBS data to divide total expenditures of each representative household into four categories – expenditures subject to the standard VAT rate, those subject to reduced VAT rate, expenditures that are VAT exempt and expenditures due to natural in-kind consumption of

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[10] In order to check the robustness of our results, we have also performed simulations which exclude vehicle purchases from total expenditures, in line with the Caspersen and Metcalf (1994) modeling approach. The results obtained were virtually identical and thus we have opted for the simplest approach of using total household expenditures – which facilities simple cross-country comparison of our results.

own-source farming production. Households were then sorted according to the two alternative indicators of the living standard: registered income and registered expenditures. In both cases, OECD equivalence scale was used to account for different sizes of households.[11] Summary results, by income and expenditure deciles, are presented in Tables 4a and 4b.

We can observe that existing VAT system in Serbia creates a tangibly progressive structure of the tax burden, especially when we consider expenditure ranking of households. Namely, reduced rate goods represent a higher share of expenditures in case of poor households than for the rich households. The progressive structure is somewhat diminished by regressive incidence of VAT exempt services. Besides the well known issue of exempting financial services, Serbian VAT system (like most other European systems) exempts health and education services. Due to the existence of public health and education system, mostly rich households can afford additional expenditures on these services – thus yielding a distinctively regressive incidence.[12]

It is important to note that natural in-kind consumption due to own-source farming production significantly increases the effective progressive layout of the Serbian VAT system by providing a tangible VAT-exempt buffer to poor households. This is a distinctive characteristic of VAT incidence in Serbia compared to other developed European countries where agricultural production and small scale own-source farming is only marginally present. Namely, agricultural production accounts for only 1.3 per cent of GDP in the European Union, while it accounts for 13 per cent of GDP in Serbia. Furthermore, agricultural employment accounts for 20 per cent of total employment in Serbia – compared to about 5 per cent in the European Union. As mentioned, own-source small farming production is also tangibly present in other emerging European countries, foremost Poland and Romania, where agricultural employment also accounts for 20 per cent of the overall employment.

In order to estimate average effective VAT burden for each household, we apply appropriate tax rates to each expenditure category. Effective 0 per cent VAT rate is applied to VAT exempt and natural in-kind consumption categories.[13] The results of annual and lifetime VAT incidence estimates are given in Tables 5a and 5b.

Despite broadly progressive structure of the Serbian VAT system in Tables 4a and 4b, we can see that annual VAT incidence in Table 5a is distinctively regressive, especially in the lower tail of income distribution. As in other countries, this is caused by the distinctively regressive estimated incidence of household (dis)saving. The estimated effective VAT rate in the lowest decile of 21.2 per cent is tangibly higher than the legally prescribed VAT rate of 18 per cent, indicating that under-reporting of income bias is present in the Serbian HBS data, as is the case in virtually all expenditure surveys analyzed in the existing literature.[14] After correcting for unrealistically high dissaving rates in the lowest deciles, which we know not to be realistic nor sustainable in economic reality, we can observe that regressive character of annual VAT incidence is significantly reduced.

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[11] Since Serbia is significantly less developed than OECD countries, using OECD equivalence scale might not be a most suitable choice. For a detailed discussion on this topic, and alternative approaches to measuring income inequality in Serbia, see Jovičić and Milojević (2010).

[12] Possible legal improvements in this area are limited by the EU Sixth Directive which prescribes that VAT cannot be charged on publicly provided health and education services. However, taxing private provision of these services is not forbidden, which could, if introduced, eliminate a significant portion of these regressive effects.

[13] Although most VAT incidence studies assume 0 per cent rate for VAT exempt services, this is not a completely appropriate assumption since VAT exempt entities do bear a certain tax burden due to inability to reclaim VAT on business inputs. For this reason, a sensitivity analysis has been conducted by assuming different non-zero tax rates on VAT exempt services in Serbia. Main conclusions of the study remained valid even after assuming non-zero rate on exempt services.

[14] In fact, if we also recognize that 17.8 per cent of income in the first decile represents implicit in-kind income which can not possibly be saved, since it corresponds to in-kind consumption of own-source small farming production, we can conclude that effective VAT rate on monetary income equals 27 per cent in the first decile.

Expenditure Patterns by Annual Income Deciles
(percent)

Decile	Standard VAT Rate	Reduced VAT Rate	VAT Exempt	Natural Consumption
Poorest	46.4	40.8	2.4	10.3
2	48.7	39.0	2.6	9.7
3	49.5	40.3	2.1	8.1
4	50.0	38.9	2.1	9.0
5	51.4	39.5	2.0	7.1
6	51.7	39.8	2.0	6.5
7	54.5	39.1	2.2	4.3
8	52.9	39.7	3.5	4.0
9	55.5	36.9	3.8	3.9
Richest	58.1	34.6	3.4	3.9

Expenditure Patterns by Annual Expenditure Deciles

Decile	Standard VAT Rate	Reduced VAT Rate	VAT Exempt	Natural Consumption
Poorest	43.5	42.5	0.6	13.4
2	48.6	38.5	1.0	11.8
3	48.2	39.6	1.0	11.2
4	49.3	41.6	1.4	7.8
5	49.1	41.6	1.4	7.9
6	51.5	40.4	1.9	6.2
7	51.7	40.5	2.6	5.2
8	52.8	38.8	3.1	5.3
9	54.7	38.6	3.0	3.7
Richest	59.5	32.5	5.4	2.5

Table 5a

Annual VAT Incidence and VAT Incidence Excluding the Dissaving Effects

Decile	Effective VAT Rate	Saving	Corrected VAT Rate
Poorest	21.2%	−73.1%	12.3%
2	14.9%	−25.5%	11.9%
3	13.9%	−15.8%	12.0%
4	12.3%	−4.0%	11.8%
5	11.2%	6.7%	11.2%
6	11.0%	8.6%	11.0%
7	11.2%	9.9%	11.2%
8	10.0%	17.3%	10.0%
9	9.5%	22.4%	9.5%
Richest	7.9%	36.0%	7.9%
Global Progressiveness Indices			
	Before Tax	**After Tax**	**Difference**
Gini Coeff.	0.299338368	0.312989058	0.045602873
GE(0.2)	0.154817719	0.205870445	0.329760219
GE(2.0)	0.182480671	0.212404149	0.163981633

Table 5b

Lifetime VAT Incidence Statistics

Decile	Effective VAT Rate		
Poorest	10.8%		
2	11.5%		
3	11.5%		
4	11.8%		
5	11.8%		
6	12.2%		
7	12.2%		
8	12.3%		
9	12.6%		
Richest	13.0%		
Global Progressiveness Indices			
	Before Tax	**After Tax**	**Difference**
Gini Coeff.	0.27899635	0.27636354	−0.00263281
GE(0.2)	0.12826570	0.12590617	−0.00235953
GE(2.0)	0.16318280	0.16008532	−0.00309748

Information in Table 5b indicates a slightly progressive lifetime VAT incidence.[15] Global progressiveness indices indicate that lifetime VAT effects seem to be more progressive in the tails of the distribution than in the middle portion. Our estimate of lifetime VAT incidence in Serbia is in line with other empirical studies that indicate slightly progressive lifetime VAT incidence in other European countries (Decoster *et al.*, 2010). We can also notice that within the lifetime framework, estimated effective VAT rates are in the 10 to 13 per cent range, which is in line with our *ex-ante* expectation of the results that a VAT incidence study should yield.

We can notice from table 5b that the Gini coefficient associated with after-tax distribution of expenditures is lower than the Gini coefficient associated with the before-tax distribution of expenditures, which confirms progressive lifetime VAT incidence. It is instructive to decompose this total reduction in the Gini coefficient of 0.26328 per cent into two components – the effect of the structure of the VAT system itself and the effect due to significant presence of small scale own-source farming production in the Serbian economy. Our estimates show that the structure of the Serbian VAT system, which features taxation of necessities under the reduced VAT rate, is responsible for reducing the Gini coefficient by 0.11935 per cent. On the other hand, progressive incidence of own-source farming production reduces the Gini coefficient by 0.14375 per cent. Thus, we can conclude that more significant redistribution effects are achieved due to the presence of own-source farming production than due to the introduction of reduced VAT rate for taxing necessities.[16]

In order to reach the definite answer whether effective VAT incidence is regressive or mildly progressive, one needs to decide what is the most reliable indicator of the standard of living in Serbia – is it household annual income, or household expenditures? It is our belief that one should opt for household expenditures, both on theoretical and practical grounds. From theoretical point of view, it is widely recognized that household engage in consumption smoothing over the lifetime, implying that the lifetime VAT incidence, which can be decently approximated using annual household expenditures, represents a more suitable framework than the annual tax incidence analysis. Furthermore, Creedy (1998) explains that when analyzing distributional effects of consumption taxes in isolation, ignoring the remaining tax and benefit system – one should not mix apples and oranges and assess the incidence of consumption taxes against household incomes, but against their prescribed tax base – the household expenditures.

From practical point of view, it should be stressed that the transition process in emerging European countries has been accompanied with a large surge in shadow economy and tax evasion. In particular, Schneider(2005) approximates that shadow economy averages about 16.3 per cent of GDP in developed OECD countries, compared to 40.1 per cent of GDP in transitional European countries. He estimates the shadow economy in Serbia to be approximately 39 per cent of GDP in 2003.[17] Tax evasion is most pronounced in the case of direct income taxation, since undeveloped judiciary and tax administration capacities in many emerging European economies limit the possibilities for effective identification and effective prosecution of income tax evasion cases. On the other hand, the VAT system is the best available tool for combating tax evasion – evasion has to be organized throughout the entire production and distribution chain, since identification of unregistered invoices at any stage of production implies the collection of VAT corresponding to the

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[15] Lifetime VAT incidence estimates based on expenditure data in Table 5b basically eliminate the effects of dissaving in lower deciles and saving in upper deciles. Corrected annual VAT rates presented in Table 5a had been obtained by basically correcting only for the dissaving effect in the lowest deciles. Remembering regressivity-bias from Section 2, we can conclude that actual lifetime progressivity of VAT incidence is somewhat higher than observed in Table 5b.

[16] It should be noticed that progressive effects of the reduced VAT rate are diminished by the regressive incidence of VAT-exempt services.

[17] Replacing sales tax with VAT in 2005 reduced the extent of tax evasions and shadow economy in Serbia. However, tax compliance in Serbia seems to have deteriorated as the result of 2008-09 economic crisis.

entire value added since the beginning of the production process.[18] Thus, we believe that in Serbia, and many other emerging European countries, household expenditures represent a more meaningful and more reliable indicator of the standard of living and ability-to-pay taxes.[19] In the remainder of this paper, we will focus on analyzing the (lifetime) VAT incidence against household expenditures.

4   Targeting of reduced rate VAT subsidies

Due to social considerations, VAT systems in basically all European countries feature reduced rates for certain basic necessity goods. The idea behind reduced rates is to try to introduce redistributive social elements into the VAT structure. By subjecting basic necessities, such as food or medicine, to a reduced tax rate – the VAT system basically subsidizes the consumption of these goods by the difference between the standard and the reduced VAT rate. Since these necessities represent a higher share of expenditures for poor households than for rich hoseholds, it is hoped that poor households would capture most of the economic benefit associated with the consumption of goods under the reduced VAT rate. Implicit tax subsidies associated with the reduced VAT rate totaled about one quarter of total VAT revenues actually collected.

Slightly progressive lifetime VAT incidence estimated by Decoster et al (2010) for EU member states is driven by the consumption of goods under the reduced VAT rate. As discussed, progressive VAT incidence in Serbia is further reinforced by the significant presence progressive own-source farming production and in-kind consumption. However, it is important to acknowledge that poor households spend more on necessities in relative terms (relative to their total income or total expenditure), but not in absolute terms. For example, we can see from the Appendix that consumption of bread, milk or medicine products is distinctively progressive across expenditure deciles. Milk and dairy products account for 7.3 per cent of monetary expenditures in the lowest decile and 3.5 per cent of expenditures in the highest decile. However, in absolute terms, monetary expenditures for milk and dairy products are about three times larger in the highest decile than in the lowest decile. Thus, households in the highest expenditure decile are receiving a tax subsidy that is in absolute terms three times larger than the amount of subsidy going to the lowest expenditure decile. This difference is even more pronounced in the case of reduced-rate goods whose consumption pattern is not very progressive, such as meat, hotel accommodation or utility services, see Table 6.

We may ask whether the reduced VAT rate is the most suitable approach for achieving redistribution objectives? It seems that it might be more efficient to have a uniform-rate VAT system and to use additional revenues (from eliminating reduced VAT rate subsidies) to fund government programs that are better targeted at poor households. Ebril *et al.* (2001) stresses this point of poor redistributive performance with reduced VAT rates and highlights that best practice strongly suggests that VAT systems should have a single uniform tax rate – leaving the redistribution role to other segments of the tax and benefit system.[20] However, this is the "first-best" result which assumes government transfer policies are properly targeted and appropriately funded. Unfortunately, this is not the case in many emerging European countries. Thus, in the case of "second-best" result, Bird and Gendron (2007) argue that reduced VAT rate on

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[18]   Jimenez *et al.* (2010) based on empirical data from Latin America economies show that tax evasion in emerging economies is much higher in the area of direct income taxes than with indirect consumption taxes.

[19]   In fact, due to concerns regarding quality of income measurements from sample surveys, poverty levels in developing countries, such as Serbia, are mostly assessed based on expenditure data.

[20]   Atkinson and Stiglitz (1976) show that if utility function is weakly separable in leisure and consumption, preferences for goods do not depend on ability and progressive labor income tax is available, then differential commodity tax cannot improve social welfare, *i.e.*, uniform taxation of final goods is optimal in this case.

Table 6

Annual VAT Subsidies per (Equivalence Scales) Household Across Expenditure Deciles
(dinars)

Deciles	Bread and Baked Products	Milk and Dairy Products	Meat and Fish	Medicines	Utility Services
Poorest	1,237	1,125	1,547	765	325
2	1,375	1,538	2,292	792	641
3	1,355	1,789	2,933	906	832
4	1,496	2,010	3,546	995	1,156
5	1,634	2,264	4,259	1,082	1,188
6	1,637	2,410	4,645	1,272	1,462
7	1,738	2,553	5,290	1,447	1,631
8	1,787	2,736	5,883	1,506	1,759
9	1,802	3,117	7,299	1,835	2,114
Richest	2,097	3,650	9,614	2,350	2,501

certain most basic necessities might serve a useful redistributive purpose in developing countries where welfare transfer programs and progressive income taxation are not well developed.

5   Distributional effects of prospective increase of the VAT burden

Increasing the VAT burden in Serbia could create additional budget revenues that could finance a growth-enhancing (revenue-neutral) tax reform aimed at reducing the tax wedge on labor (Arsić et al., 2010). However, alternative approaches to increasing VAT burden will have different distributional effects. In this section we will use lifetime VAT incidence framework to analyze distributional effects of three alternative approaches that yield same budget revenues.

Existing VAT system in Serbia is structured so that about 40 per cent of taxable consumption is subject to the reduced VAT rate of 8 per cent while 60 per cent of taxable consumption is subject to the standard VAT rate of 18 per cent. This implies that average effective VAT rate in Serbia currently stands at $0.4 * 8\% + 0.6 * 18\% = 14\%$.[21] We will analyze three alternative scenarios that all increase average effective VAT rate to 18 per cent. In revenue terms, this should yield additional tax revenues of about 2.5 per cent of GDP per year.

- Scenario 1: Transferring all goods from the current reduced rate of 8 per cent to the standard VAT rate of 18 per cent and basically introducing a uniform-rate VAT system.

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[21]   14 per cent average VAT rate is not with respect to total household expenditures, but with respect to the taxable portion of expenditures, ie excluding tax-exempt services and in-kind consumption.

Effective VAT Rates Relative Changes Under Alternative Reform Scenarios

Decile	Current System	Relative Changes to Current System		
		Scenario 1	Scenario 2	Scenario 3
Poorest	10.8%	4.6%	3.5%	2.9%
2	11.5%	4.1%	3.6%	3.1%
3	11.5%	4.3%	3.6%	3.3%
4	11.8%	4.5%	3.7%	3.6%
5	11.8%	4.5%	3.7%	3.6%
6	12.2%	4.4%	3.8%	3.6%
7	12.2%	4.4%	3.8%	3.7%
8	12.3%	4.2%	3.8%	3.7%
9	12.6%	4.2%	3.8%	3.8%
Richest	13.0%	3.5%	3.8%	3.6%
Gini Coeff.	0.27636	0.00162	–0.00029	–0.00079
GE(0.2)	0.12591	0.00160	–0.00022	–0.00067
GE(2.0)	0.16009	0.00362	0.00005	0.00004

- Scenario 2: Maintaining the existing VAT structure and increasing the tax rate by 4 per cent – reduced rate from 8 to 12 per cent and standard rate from 18 to 22 per cent.
- Scenario 3: Increasing the VAT rate by 2 per cent (reduced rate to 10 per cent and standard rate to 20 per cent) and transferring certain goods from the reduced rate to the standard rate, so that about 20 per cent of taxable consumption remains subject to the reduced rate, while 80 per cent of taxable consumption becomes subject to the standard rate.[22]

Table 7 presents information on the absolute incidence of the existing VAT system and relative incidence increments for each scenario. Looking at the VAT incidence according to expenditure deciles, we can notice that Scenario 1 causes slightly regressive effects, while Scenarios 2 and 3 cause slightly progressive effects. This conclusion is supported by Gini and General Entropy statistics, which indicate higher income inequality in Scenario 1 and lower income inequality in Scenarios 2 and 3.

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[22] There are many different ways in which Scenario 3 could be designed, depending on which goods are chosen to be transferred from the reduced-rate to standard-rate status. In reality, this process would be driven by social and political preferences, subject to the constraint that only 20 per cent of taxable consumption should be left at the reduced VAT rate. For the purpose of this study, in order to achieve best distributional effects, we have decided to transfer to the standard VAT rate those goods with the least progressive (or even regressive in some cases) consumption patterns. Thus, we have implemented Scenario 3 by transferring fruit, meat, fish, computer equipment, hotel accommodation, firewood, natural gas, utility services and tickets for cultural events from the reduced-rate to standard-rate status.

Ebril *et al.* (2001) recommendation of a single uniform-rate VAT system might not be most suitable for the current Serbian environment characterized with low coverage of major welfare transfer programs (such as material family support or child allowance) and basically proportional system of income taxes. Thus, authors believe that Scenario 1 should be accompanied with progressivity-enhancing reforms in other segments of the tax and benefit system – such as expanding welfare transfer programs or increasing the progressivity of income taxation. Scenarios 2 and 3 do not cause regressive effects and could be implemented as standalone measures. Best distributional effects are achieved with Scenario 3. However, implementing this scenario in practice might be politically challenging since it includes significant tax increase on such basic items as meat or fruit.

6   Concluding remarks

The belief that consumption taxes, and VAT in particular, are inherently regressive is entrenched with a significant number of individuals in the general public. This belief, which seemed to had been supported with strong empirical evidence, presents a significant political challenge to implementing growth-enhancing tax reforms which shift tax burden from income to consumption. However, in their classical public finance textbook, Rosen and Gayer (2007) state that the final verdict on the incidence of consumption taxes and VAT is still undecided, despite seemingly strong empirical evidence from annual incidence studies.

We have shown that existing results from annual incidence studies only partially confirm the common belief regarding consumption taxation, since most of the estimated regressive VAT incidence stems from measurement errors and not from regressive savings incidence. From theoretical point of view, the annual VAT incidence approach suffers from many drawbacks and it is thus more meaningful to analyze lifetime tax incidence. When analyzing the VAT incidence in isolation, disregarding the other components of the tax and benefit system, it is particularly inappropriate to mix apples and oranges and compare VAT incidence against annual income and not against household expenditures – which is the prescribed tax-base for VAT assessment (Creedy, 1998).

Overall, it is authors' conclusion that claims regarding inequitable and regressive VAT taxation are vastly overstated and poorly founded in theoretical and empirical evidence. Similarly to the demise of common acceptance of the simple Keynesian consumption function few decades ago, the authors believe that contemporary evidence points to the demise of common beliefs regarding regressive consumption taxation. The case for regressive VAT claims is particularly weak in emerging European economies, due to large scale evasion of direct income taxes and significant presence of own-source farming production which enhances the progressive layout of the VAT burden in these countries.

APPENDIX

Following goods and services are currently subject to the reduced VAT rate of 8 per cent: food (bread and other baked products, milk and other dairy products, flour, sugar, eggs, edible oils and fats, honey, fruit, vegetables, meat, fish), medicines, fertilizers, textbooks, newspapers, computer equipment, hotel and motel accommodation, natural gas, firewood, utility services (including water), tickets for cultural events and newly built apartments.

This Appendix shows VAT incidence for reduced-rate goods, except for newly built apartments whose sales are not recorder in the Serbian HBS. VAT incidence is given across expenditure deciles, as a percentage of monetary expenditures. Data on natural consumption of own-source farming production have been purposely excluded, to highlight the fact that natural consumption of food would not be affected if certain food items are transferred from the reduced-rate to the standard-rate status.

Table 8

Incidence of Reduced Rate Goods

(percent of monetary expenditures, by expenditure deciles)

Deciles	Bread and Baked Products	Milk and Dairy Products	Flower, Sugar, Eggs, Oil, Honey	Fruit	Vegetables	Meat & Fish	Medicines
1	7.9	7.3	5.4	1.8	3.9	10.1	4.8
2	6.0	6.8	4.6	2.0	3.6	10.2	3.4
3	5.0	6.7	4.4	2.1	3.5	11.0	3.2
4	4.6	6.3	4.4	2.2	3.3	11.1	3.0
5	4.4	6.2	4.0	2.0	3.2	11.8	2.9
6	3.9	5.8	3.7	2.0	3.1	11.3	2.9
7	3.6	5.4	3.4	1.9	3.1	11.3	2.9
8	3.2	5.0	3.4	2.0	3.1	10.9	2.7
9	2.7	4.7	3.0	1.9	2.7	11.0	2.6
10	2.0	3.5	2.0	1.6	2.2	9.3	2.2

Deciles	Textbooks and Newspapers	Utility Services	Fertilizers	Natural Gas and Firewood	Hotel Accommodation	Tickets for Cultural Events	Computer Equipment
1	0.8	2.0	3.2	1.5	0.3	0.0	0.2
2	1.0	2.7	1.1	1.7	0.4	0.0	0.2
3	1.1	2.9	1.5	2.7	0.5	0.0	0.1
4	1.0	3.3	1.6	3.4	0.6	0.0	0.2
5	1.3	3.0	2.0	3.3	0.7	0.0	0.2
6	1.2	3.3	1.7	2.8	1.1	0.0	0.2
7	1.1	3.2	1.6	4.0	0.7	0.0	0.3
8	1.2	3.0	1.1	4.3	0.8	0.1	0.2
9	1.0	2.9	1.3	3.6	2.1	0.1	0.4
10	1.0	2.2	0.7	3.0	3.0	0.3	0.4

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