Importance of theoretical value added tax for Croatia's fiscal capacity in the context of the European Union

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Abstract

The main purpose of this article is to assess Croatia's fiscal capacity in 2007 by means of the National Accounts Supply and Use Tables (SUT) approach and its harmonisation with EU regulations. National fiscal capacity is important for assessing an EU member country's contribution to the EU budget. Based on theoretical considerations and EU regulations, Croatia's GDP expenditure components for 2004 were used for the approximation of Croatia's theoretical value added tax (VAT) base and a weighted average VAT rate (WAVR). The harmonisation of Croatia's intermediate VAT base with EU regulations was carried out using cash receipts from the Tax Authority, gross national income (GNI) and WAVR. If the theoretical VAT base of any EU member country is under 50% of GNI then it is used as a base for the calculation of country contribution to EU budget, otherwise it is capped at 50% of GNI. The results of this assessment show that Croatia's harmonised 2007 VAT base is in the zone of capping and that Croatia's WAVR is bigger than those of all but one of the 12 new EU member states, while a comparison of theoretical VAT to VAT net cash receipts indicates that there is room for upward revisions of GDP/GNI.

Keywords: theoretical VAT, weighted average VAT rate, Croatia's fiscal capacity, Croatian contribution base for the EU budget.

1 INTRODUCTION

The main purpose of this article is to assess Croatia's fiscal capacity in 2007 by means of the National Accounts Supply and Use tables (SUT) approach and its harmonisation with EU regulations. The SUT approach was used for assessing Croatia's fiscal capacity in 2007 because it is superior to other often-used national accounts (NA) methods like the aggregate national account approach and sector national accounts approach. The main reason for the superiority of the method used is the commodity flow approach, which introduces the product dimension according to the classification of products by activities (CPA). Commodity groups balanced (within the SUT system) in two dimensions, vertically (by key GDP ESA 95 components, Eurostat 1995) and horizontally (by commodity groups on the Supply and Use sides), are the best weights for the calculation of the weighted average VAT rate (WAVR), the key parameter for assessing fiscal capacity. In this way, the possible weighting bias, present in the two alternative approaches due to a rough (arbitrary) assessment of the weights, is avoided.

The Croatian fiscal capacity in 2007 is estimated in several steps. After the identification and assessment of VAT GDP expenditure components, the VAT base and weighted average VAT rate (WAVR) are calculated for the purpose of dimensioning Croatia's fiscal capacity. The GDP expenditure components used for WAVR estimation are from 2004, the assumption being that the GDP expenditure structure remains relatively constant in the short run. Based on the official GNI data for 2007, which are comparable, reliable and exhaustive (due to the two big methodo-

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logical revisions of GDP/GNI carried out during 2009 and 2010) and using the Tax Authority data on cash receipts and other VAT-relevant transactions, the national VAT intermediate base was determined and subsequently harmonized to obtain the Croatian contribution base for the EU budget. The benefits of this exercise are twofold. It does not only offer a basis for fiscal planning of the national and EU budgets but it can also be used as a tool for improving national accounts, primarily the quality of GDP compilation, where VAT at current and constant prices is used as an outstanding checking point for SUT compilation.

The paper consists of seven sections. After the introductory comments, the second section gives a short insight into VAT within the SUT framework, known as theoretical VAT. The calculation of the theoretical VAT and WAVR is shown in the third section, where special emphasis is given to private and public tax payers with specific VAT treatment. In the fourth section, a brief overview of Croatia's main national account aggregates is given, with the accent on GNI as a crucial macroeconomic aggregate for the calibration of Croatia's fiscal capacity, explained in the fifth section. So, the fifth section sets forth a calculation of Croatia's VAT base in the form of the Croatian contribution base for the EU budget, by following a sequential procedure prescribed for the harmonisation of national tax bases with EU regulations. The following section gives a short comparison of Croatia's mandatory VAT rates, the relative share of the standard rate VAT base in total VAT base and implicit VAT rate (WAVR) as compared to the corresponding figures for the twelve EU member states that joined the EU in 2004 and 2007. The Conclusion gives a summary of the main results of the paper, emphasizing the need for further improvement in GDP/GNI compilation from the point of view of theoretical VAT.

2 CONCEPTS OF THEORETICAL VALUE ADDED TAX

VAT is a "broad-based business tax imposed at each stage of the production and distribution process that, when applied nationally, is typically designed to tax final household consumption" (Tait, 1991), while theoretical VAT can be defined as the net accrued VAT that is payable by all taxpayers who are obliged to pay this type of tax. VAT was originally proposed by von Siemens, a German businessman, in the 1920s (Minh Le, 2007:203). The net accrued VAT is the VAT that is not refundable (reimbursable) to taxpayers in any of the chains in the production and distribution processes. In other words, the true taxpayers who really bear the VAT burden are all those who are not allowed to deduct tax which they have paid at the moment when goods and services are purchased.

The actual tax bases for the net accrued VAT, assuming it accrues to the tax authority, are the values of all purchases realised by participants in production and distribution transactions for which these participants are not allowed to deduct VAT. In terms of the national accounts, VAT is levied on final consumption or intermediate purchases and capital (investment) purchases – depending upon the VAT

status of the taxpayer. In line with the above reasoning, all intermediate consumption and investment purchase transactions (at purchase prices) are VAT exempt if the taxpayers are within the VAT system, and are taxable if the taxpayers are outside the VAT system. All final consumption components are subject to VAT: particularly household final consumption expenditures and general government expenditures on goods and services (Minh Le, 2007:204), under the usual full-scale taxation assumptions (without exemptions and zero rate being applicable exclusively on exports). Gross fixed capital formation (investments) is VAT-exempt, provided that the VAT taxpayer is within the VAT system; if the taxpayer is outside the VAT system, the investments are subject to tax. Exports are VAT exempt.

FIGURE 1

Basic SUT structure

<table>
<tr><td>Industries (NACE)
Products (CPA)</td><td colspan="3">Output of industries (basic prices)</td><td>Imports (CIF)</td><td>Valuation matrix</td><td colspan="3">IC by industry (market prices)</td><td>FC (market prices)</td><td></td></tr>
<tr><td></td><td>Goods</td><td>Market services</td><td>Non-market services</td><td></td><td></td><td>Goods</td><td>Market services</td><td></td><td>Final uses</td><td>Price indices</td></tr>
<tr><td>Goods</td><td colspan="3" rowspan="3">Production (Q)
(Make matrix)
Basic prices</td><td></td><td>TTM + TX</td><td>X/0</td><td>X/0</td><td>X/0</td><td>X/0</td><td></td></tr>
<tr><td>Market services</td><td>Import matrix</td><td>TTM + TX</td><td>X/0</td><td rowspan="3">Use (Matrix IC)
Market prices</td><td>X/0</td><td>X/0</td><td></td></tr>
<tr><td>Non-market services</td><td></td><td>TTM + TX</td><td>X/0</td><td>X/0</td><td>X/0</td><td>X/0</td><td></td></tr>
<tr><td colspan="5"></td><td></td><td>Value added (basic prices)
Other taxes on production, except taxes on products, are implicitly included</td><td></td><td></td><td></td></tr>
<tr><td colspan="5"></td><td>$GDP_P = \sum_{e=1}^{E} va_e$</td><td colspan="3"></td><td>$\sum_{i=1}^{N} f_i = GDP_E$</td><td></td></tr>
</table>

X – VAT inputs content for all subjects (e.g. small taxpayers) outside the VAT system and all subjects who are not allowed to deduct VAT on their (intermediate or final) purchases.
0 – VAT inputs content for all subjects within the VAT system and final consumption VAT content for exempt subjects or subjects who buy commodities from VAT-exempt subjects.
TTM – trade and transport margins, TX – taxes less subsidies on products.

Source: United Nations (1999:29-30 and 65-74).

Once the decision is made on how many commodity flows will be included in the Supply and Use table (SUT), the national statistical agency (NSA) will undertake the balancing of supplies and uses by all commodity flows at current and, if possible, at constant prices. Balancing is undertaken by considering the different valuation bases: basic and producer prices on the supply side and market prices on the use side (Eurostat, 2008). By applying specific VAT rates (in Croatia's case for 2007: 0%, 10%, and 22%) to their congruent commodity flows (on the use side),

theoretical VAT can be calculated. The more commodity flows there are in a SUT system, the more refined the compilation of GDP will be, particularly when considering GDP in terms of constant prices and volume. Due to practical constraints imposed on NSAs during GDP compilation[1], it is necessary to have at least as many commodity flows, as there are specific VAT rates; this enables one-to-one matching between the commodity flows and appropriate VAT tax rates. A general sketch of the Supply and Use Tables (SUT) commodity groups approach, which the theoretical VAT calculation relies on, is given in figure 1.

Amidst the general rigour characteristic of the overall national accounts, expressed in the words of the prominent French economist Edmond Malinvaud: "National accounts are a presentation, in a rigorous accounting framework, of all the quantitative information relating to the nation's economic activity" (Lequiller and Blades, 2006:266), SUT rigour comes to its climax. Specifically, every commodity (good or service) domestically produced (Make matrix) or imported (Import matrix) should be used either as Intermediate Input or in the form of Final Consumption (FC).

The balancing of SUT, where the theoretical VAT plays an especially important role, assures full consistency of gross domestic product (GDP) across all the three approaches: production, expenditure and income. The balancing of these three GDP dimensions follows equation 1:

$$\sum_{i=1}^{N}\sum_{e=1}^{E} Q_{ie} + \sum_{i=1}^{N} M_i = \sum_{i=1}^{N}\sum_{e=1}^{E} IC_{ie} + \sum_{i=1}^{N} f_i = \sum_{e=1}^{E}\sum_{i=1}^{N} IC_{ei} + \sum_{e=1}^{E} va_e \qquad (1)$$

where:

$\sum_{i=1}^{N}\sum_{e=1}^{E} Q_{ie}$ = total domestic production (output) by E establishments and N commodity groups

$\sum_{i=1}^{N} M_i$ = total imports by N commodity groups

$\sum_{i=1}^{N}\sum_{e=1}^{E} IC_{ie}$ = total intermediate consumption by E establishments and N commodity groups

$\sum_{i=1}^{N} f_i$ = total consumption by N commodity groups

$\sum_{e=1}^{E}\sum_{i=1}^{N} IC_{ei}$ = total intermediate consumption by N commodity groups and E establishments

[1] In Croatia's case, this implies the obsolescence of the SUTs due to big delays in their compilation, after the first rough GDP estimation outside the SUT system, and the insufficiently refined structure of intermediate consumption of exempt subjects and the general government, together with non-profit institutions' consumption by commodity groups.

$\sum_{e=1}^{E} va_e$ = value added by E establishments.

Cancelling $\sum_{i=1}^{N}\sum_{e=1}^{E} IC_{ie}$ in the middle (second) term of equation (1) and $\sum_{e=1}^{E}\sum_{i=1}^{N} IC_{ei}$ in the rightmost (third) term of the same equation, these two terms are – following the rule of double-inverse summation – identical, one gets the following:

$$\sum_{e=1}^{E} va_e = \sum_{i=1}^{N} f_i \qquad (2)$$

i.e. GDP_P (gross domestic product – production approach) is equal to GDP_E (gross domestic product – expenditure approach). Equation (2) establishes the well-known identity between GDP_P and GDP_E noticing: value added is calculated at the establishment (local kind of activity unit, LKAU) levels, while GDP_E is calculated at the commodity levels. A mixture of dimensions, industries (establishments) times commodities, gives to SUT and IO[2] special analytical features[3] (see text below).

The balancing according to equation (2) has to be achieved in the two valuation bases: basic (points of production) prices and market (points of consumption) prices. In practice, balancing is a two way procedure: (1) from left to right – upwards from basic to market prices, and (2) from right to left – downwards from market to basic prices. The first, left-right, loop is done by summing up Supply at basic prices (Make matrix plus Import matrix) and Valuation matrix[4] – by rows. The second, right-left loop is done by subtracting Trade and transport margins and Taxes less subsidies on products matrices from Use matrix at market prices– by columns, Eurostat (2008:197).

The above described downside split of the Use matrix at market prices, in order to arrive at basic prices, explicitly highlights, in the form of Taxes less subsidies in the products matrix, the role of VAT and other taxes on products in the SUT context. As the theoretical VAT is the last mark-up item added in the left-right loop of the balancing process, it is also the first item deducted in the right-left loop from market prices applying commodity flow-specific VAT rates (see section 3), i.e. the VAT base is TTM inclusive of all items of TX (except VAT), which offers additional opportunities (checking points) to SUT compilers in down-up and top-down balancing.

[2] IO - Symmetric (square) input output tables derived from SUT system (for the description of this conversion, see Eurostat (2008:269-330) and United Nations (1999:75-103).

[3] Among these advantageous analytical features, the most important is the possibility to calculate VAT and other taxes on products, at constant prices (Eurostat, 2008:248-249 and United Nations, 1999:234-235), and in volume terms. Specifically, the constancy of VAT share compared to its base – at base period prices, in the short and medium terms, according to Leontief's non-substitution theorem (Dorfman, Samuelson and Sollow, 1958:224-227 and 248-252) enables one to check the correctness of the theoretical VAT calculation.

[4] This matrix consists of TTM (trade and transport margins) and TX (taxes less subsidies on products). The latter (TX) consists of VAT, excises, customs and customs duties less subsidies.

At this point, specific administrative VAT arrangements, i.e. VAT exemptions and zero rates, have to be conceptually introduced. Depending upon the specific treatment of different producers and distributors: (1) VAT either appears in the cells of the Use and Final Consumption matrices (X in figure 1) or (2) it does not appear (zeros in the same matrices). In figure 1, zeroes (0) always appear in the Use matrix in cells where Intermediate consumption of producers and distributors incorporated into the VAT system have been regularly accounted for, while non-zero (X) VAT appears in the cells in which Intermediate consumption of the exempt producers and distributors (i.e. all those outside the VAT system) has been accounted for. With regard to the Final Consumption matrix (figure 1) zeroes (0) appear three times: (1) in the Exports column (which is usual in almost all countries across the world), (2) in the columns where exempted commodity flows appear, and (3) in the columns where zero-rated commodity flows appear.

Total theoretical VAT revenues (R) can be formally described using the slightly modified Minh Le (2007:205) equation:

$$R = \left[\sum_{i=1} C_i \rho_i + \sum_{j=1} IC_j + \sum_{k=1} GFCI_k \right] \sum_{i=1} \beta_m t_m \qquad (3)$$

where:

C_i = before-VAT final expenditures (household and non-wage government consumptions) of i-th commodity groups

ρ_i = proportion of commodity group i, which ends up in final consumption (net of proportion of exempt or zero-rated commodities and services) – taxable proportions

IC_j = intermediary purchases of j-th commodity group by exempt sectors (industries) in Use matrix

$GFCI_k$ = investment expenditure on k-th capital commodity groups by exempt sectors (industries) in Final consumption matrix

β_m = proportions of the final consumption (adjusted by a taxable proportions) of commodities subject to positive VAT rates t_m

t_m = positive different statutory rates (including base rate) according to the current national legislation.

Different terms in equation (3) reflect different forms of the legislative treatment of VAT, exemptions and zero-ratings. The first term $\sum_{i=1} C_i \rho_i \sum_{i=1} \beta_m t_m$ reflects zero ratings and exemptions in the last production-distribution chain. If goods and services delivered for final consumption are taxed at a zero rate, final consumers are totally free of any VAT burden (bearing in mind that the VAT burden accumulates upstream of the production-distribution chain). The application of a zero rate, on any prior-to-the-last chain, is invariant to the final VAT collection. This invariance stems from diagonal cancelling of output VAT (in the previous chain)

and input VAT (in the next chain), where the VAT chain is not broken at any VAT point. Thus, the ultimate VAT – a maximum of all output or input VATs from all chains – is of the same value, irrespective of whether positive figures (non-zero rates in the previous chains) or zeros (zero rates in the previous chains) appear on the VAT output-input diagonals. This is illustrated in table 1.

Table 1

Alternative VAT scenarios (without and with zero rates) in the VAT chains prior to the last one

Production/ distribution phase	Scenario I: VAT mechanism without zero rates			Scenario II: VAT mechanism with zero rates in the second and third chain		
	VAT			VAT		
	Output	Input	Net	Output	Input	Net
1	a	0	A	a	0	a
2	b	a	b-a	0	a	-a
3	c	b	c-b	0	0	0
4	d	c	d-c	d	0	d
	Total VAT receipts		d	Total VAT receipts		d

Source: The authors.

Due to successive cancelling of diagonally arranged figures, the final VAT receipts amount to *d* under both scenarios.

The second term $\sum_{j=1} IC_j \sum_{i=1} \beta_m t_m$ reflects cascading effects in any prior-to-the-last chain (the last chain being the one that delivers its goods or services for final consumption or to sectors that are not allowed to deduct). This type of exemption, assuming a non-competitive market situation, resulting in a full-scale tax shift onto the final consumer or non-deductible producer, gives bigger VAT revenues than the exemption applicable to the last chain. In this case, total VAT revenues are bigger, by the sum of the input VAT in one of the intermediate production/distribution chain links prior to and the net tax of the last chain link, than in the case of the exemption applicable to the last chain link (Jenkins, Kuo and Shukla, 2000:121).

The first type of exemption is part of the term $\sum_{j=1} IC_j \sum_{i=1} \beta_m t_m$, while the second one is implicitly part of $\sum_{i=1} C_i \rho_i \sum_{i=1} \beta_m t_m$ term (contained in adjustments of C_i applying $(1 - \rho_i)$ factor, adjustment = $C_{i^*} (1 - \rho_i)$).

The third term $\sum_{k=1} GFCI_k \sum_{i=1} \beta_m t_m$ refers to investment goods sent, according to the national accounts (NA) convention, directly for final expenditure. Whether a gross fixed capital formation (GFCF) flow will be in the VAT tax base or out of it,

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depends on the VAT status of the investor, i.e. (1) if the investor is within the VAT system, the GFCF flow is excluded from the VAT base because the investor is allowed to deduct VAT on its investment purchases, and (2) if the investor is VAT exempt its investment purchases are in the VAT tax base.

Although VAT is the prime concern of this article, we also provide a short description of all other taxes within the national accounts framework. Taxes on production are explicitly part of the SUT system while their share in the national fiscal capacity is smaller than that of taxes on products, which, as many authors point out, may be considered as main generators of fiscal revenues (Minh Le, 2007:203). Income and property taxes are implicit parts of the SUT system and they will be described in section 4 in the context of sector accounts as explicit parts of the secondary distribution of income account and capital account.

According to NA classification, other taxes on production, with the exception of taxes on products, are part of the Use matrix. The positions of these types of taxes in GDP income structure are shown in table 2.

Table 2
Conventional GDP income split

Items	GDP income components	Prime factor being remunerated
1	Compensation of employees (gross wages, including imputed wages in kind)	Labour
2	Gross operating surplus and mixed income (gross rental)	Capital
3 = 1 + 2	GDP at factor costs	
4	Other taxes on production except taxes on products	State
5 = 3 + 4	GDP at basic price	
6	Taxes on products less subsidies	State
7 = 5 + 6	GDP at market price	

Source: The authors, according to the ESA 95, Eurostat (1995).

VAT indirectly measures the overall net volume (sales minus purchases) of all consolidated production-distribution transactions (in the form of GDP), while at the same time, and through the system of invoice-credit mechanisms, it measures the gross volume of all transactions within the national economy on which all other taxes are levied. Consequently, it could be ascertained that there is a close correlation (or more precisely, co-integration) among VAT and all other types of taxes.

Based on the theoretical considerations expressed in table 1 and equation 3, theoretical VAT for 2007 in Croatia is calculated in this section. The calculation of

weighted average VAT rate (WAVR) is also shown and used subsequently for the estimation of intermediate and final harmonised (CHB_{VAT}) VAT bases (section 5). Table 1 and equation 3 are theoretical fundamentals of the EU Council Regulation (EEC, EUROATOM) No. 1553/89, of 29 May 1989 on the definitive uniform arrangements for the collection of own resources accruing from value added. Article 4 of this Regulation precisely specifies the following items that must be taken into account in calculating the theoretical VAT and WAVR:

- final consumption of private households, including farm consumption by flat rate farmers and their direct sales to final consumers,
- intermediate consumption of private non-profit institutions and general government,
- intermediate consumption of other VAT exempted sectors,
- gross fixed capital formation of private non-profit institutions and general government,
- gross fixed capital formation of other VAT exempted sectors,
- improved and unimproved building land, as defined in Article 4(3)(b) of Directive 77/388/EEC,
- transactions involving gold other than gold for industrial use.

3 CALCULATION OF THEORETICAL VALUE ADDED TAX FOR 2007 IN CROATIA

The calculation of theoretical VAT and WAVR for 2007 in Croatia, shown in this paper, goes through the following phases: (1) calculation of intermediate tables for eight components of VAT base drawn from the SUT system, (2) compilation of main GDP aggregates, and (3) calculation of theoretical VAT and WAVR.

In a bottom-up approach, detailed Intermediate tables, broken down by VAT exempt and VAT taxed commodity groups (by mandatory either zero or positive VAT rates), are drawn up from the SUT system for all components relevant for the theoretical VAT and WAVR calculations. The most important intermediate table among them is the Household final consumption table, broken down by 12 of the highest COICOP[5] categories[6] and two types of VAT transactions (VAT exempted[7] and VAT taxed by the above-specified mandatory rates). This intermediate table, expressed in market prices, is shown in table 3.

In table 3, drawn from the 2004 Use Table, household consumption subject to VAT is estimated at the amount of 123.9 billion kuna. This figure is calculated subtracting 29.4 billion kuna, which is the value of VAT-exempt transactions, from 153.3 billion kuna of overall household consumption. In the second next to the bottom

[5] COICOP – Classification of individual consumption by purpose.
[6] The original SUT system household consumption table is broken down into very many CPA (Classification of products by activities) items, which are, for the purpose of writing a VAT own resources base statement for 2007, aggregated into 12 COICOP categories displayed in table 2.
[7] These types of exemptions apparently belong to the VAT exemptions applied to the last, before the final consumption, production-distribution chain – already described in section 2.

row, theoretical VAT is shown in the amount of 20.1 billion kuna, calculated according to equation (4):

$$TVAT_i = \frac{C_i^M t_i}{1 + t_i} \quad i = 1,..,3 \tag{4}$$

where:
C_i^M = final expenditures in market prices (VAT included)
t_i = VAT rates.

Deducting the theoretical VAT calculated, by all the three mandatory rates, from final expenditures at market prices, one arrives at the VAT tax bases in the last row of table 3 (VAT base). The WAVR for households' consumption is calculated by dividing the theoretical VAT (20.1 billion kuna) by the total VAT base (103.8 billion kuna), which amounts to 19.3%[8]. The same types of calculation, such as those in table 3, have been performed for all components included in the VAT base-WAVR calculation, but for simplicity of presentation, none of them is shown in this paper. Aggregate results for all these tables, shown in table 4, are VAT bases at market prices broken down by the three mandatory rates.

A calculation of overall WAVR for all taxable transactions is depicted in table 5. The same type of calculation as in the last three rows of table 3 (GDP aggregates at market prices minus theoretical VATs equals VAT bases, at all mandatory rates) is made for all GDP Use components. All VAT bases are gathered together in the matrix form in table 5, while theoretical VAT is summed up across all GDP components and shown in the last row of table 5, in a vector-row form. By dividing total theoretical VAT (29.2 billion kuna) by total VAT base (149.2 billion kuna) the overall WAVR for the Croatian national VAT system in 2007 is obtained, and it amounts to 19.6%.[9] The overall WAVR is used for the assessment of Croatia's fiscal capacity in 2007 (section 5).

[8] This approach to calculating WAR for household consumption is equivalent to the approach where one uses the shares of VAT bases, by the three mandatory rates, in the total VAT household consumption base for weighting mandatory rates per se. This is where the term Weighted average rate (WAR) comes from.
[9] The approach to calculating the overall WAR for the entire national economy is equivalent to the approach where one uses the shares of VAT bases, by the three mandatory rates. As WARs by all GDP use components are available in the Intermediate tables, the overall WAR can be calculated alternatively by weighting all components' specific WARs by the shares of all components' specific VAT bases in the total VAT base.

TABLE 3

VAT base "households final consumption", 2007 (n-3), in million kuna*

	VAT base "households final consumption"	Current prices	VAT exempted transactions		VAT exempted transactions		
01	Food and non- alcoholic beverages	34,448.2	7,095.1	27,353.2	4,908.9	0	22,444.3
02	Alcoholic beverages and tobacco	6,506.6	0	6,506.6	0	0	6,506.6
03	Clothing and footwear	8,096.0	0	8,096.0	0	0	8,096.0
04	Housing, water, electricity, gas and other fuels	25,891.0	13,008.3	12,882.7	0	341.1	12,541.6
05	Furnishing, household equipment, and routine maintenance of the house	13,040.4	413.1	12,627.3	0	0	12,627.3
06	Health	6,099.2	2,706.0	3,393.2	3,353.6	0	39.6
07	Transport	16,639.7	125.3	16,514.3	0	0	16,514.3
08	Communications	5,563.3	0	5,563.3	0	0	5,563.3
09	Recreation and culture	12,708.6	1,246.6	11,461.9	1,343.1	833.4	9,285.4
10	Education	3,228.5	3,228.5	0	0	0	0
11	Hotels and restaurants	13,245.6	0	13,245.6	0	5,085.7	8,159.9
12	Miscellaneous goods and services	7,852.0	1,422.7	6,429.2	0	0	6,429.2
	Total households domestic consumption	153,319.0	29,245.7	124,073.4	9,605.6	6,260.2	108,207.6
	Adjustment item for small exempted firms	0	0	0	0	0.0	0
	With turnover between 73.251,31 – 85.000,00 kuna	0	200.5	-200.5	-16.3	-18.3	-166.0
	Total households taxable transactions	153,319.0	29,446.2	123,872.9	9,589.4	6,241.9	108,041.6
	VAT	0	0	20,050.4	0	567.4	19,482.9

VAT base "households final consumption"	Current prices	VAT exempted transactions	VAT exempted transactions			
VAT base	0	0	103,822.5	9,589.4	5,674.5	88,558.7
Weighted tax rate for households consumption (%)			19.3	0	10	22

**VAT simulation for 2007, based on the 2004 SUT.*

TABLE 4

Main national aggregates and categories, by mandatory rates, 2007 (n-3), in million kuna

	Values	VAT exempted transactions	VAT transactions (%)			
			Total	0	10	22
1) Household final consumption – domestic concept	153,319.0	29,446.2	123,872.9	9,589.4	6,241.9	108,041.6
2) Intermediate consumption of general government	16,382.5	1,944.6	14,437.9	990.7	72.7	13,374.5
3) Transfers in kind of general government to households	3,377.8	0	3,377.8	2,187.6	0	1,190.2
4) Intermediate consumption of NPISH's	961.9	114.2	847.7	58.2	4.2	785.3
5) GFCF of general government S.13	12,269.8	0	12,269.8	0	0	12,269.8
6) GFCF of NPISH's	110.2	0	110.2	0	0	110.2
7) Intermediate consumption of other VAT exempted sectors	16,625.4	2,578.3	14,047.1	537.0	171.6	13,338.5
8) GFCF of other VAT exempted sectors	9,443.7	0	9,443.7	0	0	9,443.7
Total	212,490.4	34,083.3	178,407.1	13,362.9	6,490.4	158,553.8

Source: Ministry of Finance (2008).

TABLE 5
Weighted average VAT rate 2007 (n-3), in million kuna

		VAT base (%)		
	Total	**0**	**10**	**22**
1) Households final domestic consumption	103,822.5	9,589.4	5,674.5	88,558.7
2) Intermediate consumption of general government	12,019.5	990.7	66.1	10,962.7
3) Transfers in kind of market products by general government to households	3,163.2	2,187.6	0	975.6
4) Intermediate consumption of NPISHs	705.7	58.2	3.8	643.7
5) GFCF of general government	10,057.2	0	0	10,057.2
6) GFCF of NPISHs	90.3	0	0	90.3
7) Intermediate consumption of other VAT-exempted sectors	11,626.2	537.0	156.0	10,933.2
8) GFCF of other VAT/exempted sectors	7,740.8	0	0	7,740.8
Total VAT base	149,225.4	13,362.9	5,900.4	129,962.1
VAT	29,181.7	0	590.0	28,591.7
Weighted average rate (%)	19.6	0	10	22

Source: Ministry of Finance (2008).

4 CROATIA'S GROSS NATIONAL INCOME WITHIN THE SECTOR ACCOUNTS FRAMEWORK

The European Union estimates a country's fiscal capacity by comparing its final VAT base to gross national income (GNI), to which capping is applied if the VAT base exceeds 50% of GNI.[10]

Gross national income (formerly gross national product) constitutes the basis for allocating the GNI-based "fourth" resource. Together with the GNI Committee, Eurostat verifies the reliability, comparability and exhaustiveness of the data provided each year by countries.

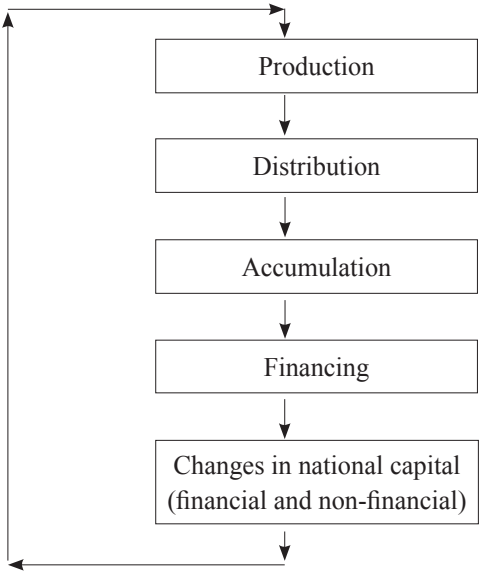
The VAT-based and GNI-based resources jointly represent about 80% of EU budget receipts.

[10] The administrative (statistical) procedure applied by the European Commission and its statistical office Eurostat is described concisely by the following quotation (Eurostat, 2004:114): "In connection with the VAT-based 'third resource' Member States' VAT receipts are adjusted using detailed national accounts data to correct for the fact countries do not apply the harmonised EU VAT rules properly, having different rates and coverage by products. Member States provide every year a detailed VAT declaration including the calculation of several adjustment factors based on national accounts. In conjunction with DG Budgets, Eurostat makes a detailed verification of the figures and the calculations".

Since in the above citation GNI was considered as a macroeconomic variable not included in the GDP calculation, a brief description of the sector national accounts, which embody the circular flow of every national economy will be given in this section, for at least two reasons: to define the GNI, and to pinpoint critical places where different forms of taxation occur on the transaction loops among different institutional sectors, Jenkins (Kuo and Shukla, 2000, p. 17, figure 2-1)[11].

The sequence of all relevant flows in any economy can be presented by the following flow chart (figure 2):

Figure 2
Circularity of National Accounts



Sources: United Nations et al., 2009; and Eurostat, 1995.

If ideally compiled within the SUT framework, GDP must be appropriately reclassified (by institutional sectors and transactions) to form the first two sector accounts: Production and Generation[12] of Income account[13] (box "Production" in figure 2). Distributional accounts (figure 2, second box from the top), Primary and Secondary distribution of income accounts, show how market mechanism *per se* and the State, through the fiscal system, distribute and redistribute incomes among different sectors. In the open economy model, assuming that all distributional

[11] In numerous macroeconomic textbooks institutional sectors are recognised in the three following groups of subjects: households, government and firms (enterprises). A good illustration of a typical circular flow is given in Stiglitz and Walsh (2002:91).
[12] Production account is in fact a mirror image of the SUT "account" because Production, IC and Value added (from figure 1) are on the opposite sides: in the SUT system, Production is on the Uses side and the remaining two variables are on the Resources side, while in the Production accounts they change their (resources-uses) sides.
[13] In the Generation of Income account transactions are the same as those in table 2.

transactions within the national economy have been consolidated, GNI is calculated according to equation 5[14]:

$$GNI = GDP + NFI \tag{5}$$

where:
GNI = gross national income
GDP = gross domestic product
NFI = net factor incomes between national economy and rest of the world.

Net factor incomes are defined as factor incomes received by residents from abroad minus factor incomes paid by non-residents (active on domestic territory) to abroad. In other words, GNI consists of primary incomes generated by all residents irrespective of whether they have been produced in the domestic territory or abroad. As GNI encompasses all incomes created by resident units via production or market (financial) distribution, GNI seems to be a better measure of the overall national fiscal capacity than GDP, i.e. it better shows how big the tax base is for tax collection by the tax authorities.

The transition from GDP to GNI for the reference year (2007) in Croatia is shown in table 6.

TABLE 6
Croatia's main national accounts aggregates for 2007, current prices, in million kuna

Gross domestic product	318.308
Plus: Net primary incomes from the rest of the world	-6.796
Primary incomes receivable from the rest of the world	9.978
Compensation of employees	4.398
Property income, receivable interest	1.793
Other property income	3.786
Primary incomes payable to the rest of the world	16.773
Compensation of employees	289
Property income, receivable interest	8.869
Other property income	7.616
Gross national income	311.512

Source: The Central Bureau of Statistics' web site: www.dzs.hr, First release No. 12.1.5. Revision of annual gross domestic product, 1995-2007.

[14] The EU legislation (Article 1, subsection 3 of the Council Regulation (EEC, EUROATOM) No. 1287/2003, of 15 July 2003 on the harmonisation of gross national income at market prices (GNI Regulation), defines GNI as: "total primary income receivable by resident institutional units: compensation of employees, taxes on production and imports less subsidies, property income (receivable less payable), gross operating surplus and gross mixed income. GNI equals GDP minus primary incomes payable by residents to non-resident units plus primary incomes receivable by resident units from the rest of the world".

The amounts of Croatia's GDP and GNI in 2007, in order to be comparable, reliable and exhaustive, have been adjusted for non-exhaustiveness through a methodological revision of GNI during 2009. That revision was focused primarily on the upward correction of GDP/GNI time series for all types of transactions, which were not captured by the statistical system although they certainly occurred and consequently had to be part of GDP/GNI. A detailed list of different types of transaction, which were not, but should have been, entered in GDP/GNI (according to Eurostat's tabular approach), is shown in table 7.

TABLE 7
GDP adjustments for non-exhaustiveness, 2007

Type of exhaustiveness	In million kuna	Structure (%)	% of GDP*
N1 Non-registered (underground) producers	549.3	2.6	0.2
N2 Non-registered illegal producers	1,553.8	7.4	0.5
N3 Producers not obliged to register	1,320.4	6.3	0.4
N4 Registered legal person not surveyed	0	0	0
N5 Registered unincorporated enterprises not surveyed	1,132.6	5.4	0.4
N6 Inaccurate reporting by producers	15,939.7	75.6	5.0
N7 Statistical data deficiencies	598.8	2.8	0.2
Total	21,094.70	100.0	6.6
Types of exhaustiveness that is part of the GDP**	19,540.4	92.6	6.1

** GDP for Croatia in 2007 – 318.3 billion kuna (table 6).*
*** Non-registered illegal producers (N2) and NACE Section: Activities of households as employers as a part Statistical data deficiencies (N7).*
Source: CBS, National Accounts Database.

In 2007, GNI (311.5 billion kuna) was 6.8 billion kuna lower than GDP (318.3 billion kuna), due to their financial assets of foreign (non-resident) investors in Croatia being bigger than those of domestic investors abroad. Net outflows of capital property incomes reduced Croatia's GNI-based fiscal capacity ("the fourth resources") by just this amount.

5 HARMONISATION OF CROATIA'S VALUE ADDED TAX BASE WITH EUROPEAN UNION RULES AND A COMPARISON

This section sets out the determination of the Croatian contribution base for the EU budget (CCB_{EU}). The CCB_{EU} is defined according to the equation $CCB_{EU} = min\{CHB_{VAT}, 1/2\ GNI\}$, which states that CCB_{EU} is Croatia's harmonised VAT base (CHB_{VAT}) or, if CHB_{VAT} is higher than 50% of GNI, the capping is applied (i.e. CCB_{EU} equals 50% of GNI).

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The calculation of Croatia's harmonised VAT base (CHB_{VAT}) for 2007 is given in table 8, which consists of two blocks: the first one, which refers to the intermediate base calculation and the second one, which refers to the final harmonised VAT base (CHB_{VAT}). The first step in calculating the intermediate VAT base is the correction of gross cash receipts, by applying positive and negative adjustments in order to obtain net cash receipts. The second step is the division of net cash receipts by VAT WAVR (calculated in section 2) that results in the intermediate VAT *i* base.

The intermediate VAT base is further harmonised by applying positive and negative compensations, which results in Croatia's harmonised VAT base (CHB_{VAT}). The purpose of this harmonisation is to put the Croatian VAT based on the national legislation on an EU legislative footing.

TABLE 8

Determination of the VAT own resources base in kuna

Code		Negative	Positive
Gross receipts			
R.1	Gross receipts		37,748.0
R.2	Fines and interest payment	395.3	
R.3	Collection expenses and recovery charges		0
R.4	Corrections for small firms which are being taxed (revenues<10,000 euro)	5.4	
R.5.1	Any other correction (+)		25.4
R.5.2	Any other correction (-)	0	
R.6	Graduated tax relief		0
R.7	Flat rate farmers (+)		0
R.8	Net receipts		37,372.8
W	VAT WAR (in %)		19.6
IB	Intermediate base		191,111.3
Financial compensations			
	Exempted small firms>10 000 euro	0	
SE.1	Exempted small firms (+)	0	112.9
SE.2	Exempted small firms (-)	0	
Directive X, part of A Directive 2006/112/EC		0	
XA.1	The supply of services by dental technicians	0	
XA.2	The activities of public radio and televisions bodies other than those of a commercial nature	0	
XA.3	The supply of buildings or parts thereof by persons entitled to deduction of VAT	0	
XA.4	The supply of the services of travel agents (outside EU)	0	
XA.T	Total Annex C, Part A		
Directive X, part of B Directive 2006/112/EC			
XB.1	Admission to sporting events		0
XB.2	The supply of services by authors, artist, perfo-rmers, lawyers and other members of the liberal professions		93.9

Code		Negative	Positive
XB.3	The supply of telecommunications services by public postal services		0
XB.4	The supply of services by undertakers and cremation services		0
XB.5	Transactions carried out by blind persons or by workshops for the blind		0
XB.6	The supply of goods and services to official bodies responsible for commemorating the war dead		0
XB.7	Transactions carried out by hospitals not governed by public law		0
XB.8	The supply of water by a body governed by public law		0
XB.9	The supply of buildings and building lands before first occupation		1,033.5
XB.10	The transport of passengers		75.4
XB.11	Aircrafts used by state institutions		0
XB.12	Fighting ships		0
XB.13	The supply of the services of travel agents (inside EU)		0
XB.T	Total Annex X, Part B		1,202.8
Restrictions of the right to deduct			
LD.C	Automobiles	0	0
LD.P	Fuels	0	0
Other compensations			
OC.1	(+)		242.1
OC.2	(-)	0	
C.T	Total compensations	0	1,557.8
Final harmonised 2007 VAT base (CHB_{VAT})			192,669.1
VAT base as percentage of GNI			0
Estimated 2007 GNI (in million kuna)			311,512

Source: Ministry of Finance (2008).

In the case of Croatia, three adjustments are necessary to transit from gross cash receipts to net cash receipts. Negative adjustments relate to fines and interest payments (notably, the fines and payments imposed by the Tax Authority on tax liabilities overdue), because these types of transactions are not taxes and corrections for small firms, which are subject to tax with respect to revenues below 10,000 euro. The reason for the said corrections is that, according to the Croatian legislation, this group of subjects is VAT exempt, but part of them are voluntarily in the VAT system (the Croatian legislation provides for this option)[15], while, according to the EU legislation, they should be VAT-exempt. The correction is negative, and it is equal to output VAT on deliveries for final consumption minus input VAT on intermediate inputs used for producing these deliveries. This correction was calculated on the basis of combined Central Bureau of Statistic and Tax Authority data sources, according to table 9.

[15] Croatian legislation exempts firms with revenues, after deduction of the value of VAT-exempt deliveries, below 85,000 kuna (11,600 euro), but there is a provision that these firms can voluntarily register for VAT. These corrections refer specifically to such firms.

Table 9

Corrections for small firms which are subject to tax (revenues<10,000 euro), in million kuna

1)	VAT on output of small firms	101.7
2)	Share of final consumption in total output of small firms (%)	75
3)	VAT on final consumption output (= 1 x 2)	76.3
4)	Small firms' input VAT	70.9
5)	Negative correction amount (= 3 – 4)	5.4

Source: Ministry of Finance (2008). 2007 VAT own resources base statement, www.circa.europa.eu.

The intermediate base calculation is positively corrected only for VAT refunds prescribed by Croatian legislation, which is not allowed under the EU legislation. Therefore, in harmonising Croatia's VAT base with its EU counterpart, the intermediate base is raised. This item, which amounts to a total of 25.4 million kuna, consists of the following two sub-items: the refund of VAT for the procurement of equipment for fire service (13.9 million kuna) and refund of VAT paid on imported and domestically produced equipment for technological research and scientific projects (11.5 million kuna).

In the part of table 8 that relates to compensation, the first positive compensation refers to small firms, whose national legislative income threshold of 85,000 kuna for inclusion in the VAT system, is above that of its EU counterparts (amounting to 10,000 euro or 73,251 kuna). The calculation of this compensation is iterative and it is performed in three steps. The first step is the calculation of this compensation (see the last three rows of table 10.2), neglecting the cascade effect of VAT on the value of final consumption, so the compensation resulting from the first iteration amounts to 144.5 million kuna (=200.5 million kuna – 56.0 million kuna). Specifically, as 75% of the output (267.3 million kuna) is delivered for final consumption, it gives the aforementioned 200.5 million kuna.

VAT inclusive purchases (GFCF + intermediaries) amounts to 66.8 million kuna (=13.4 million kuna in GFCF + 53.5 million kuna in intermediate consumption) minus VAT on these purchases (= 2.4 million VAT 22% + 243 thousand kuna VAT 10% + 8.2 million kuna VAT 22%) in the amount of 10.8 million kuna gives total purchases without VAT amounting to 56 million kuna (table 10.1). Output delivered for final consumption in the amount of 200.5 million kuna minus 56 million kuna of total purchases without VAT results in the first step positive compensation of 144.5 million kuna.

Assuming that these firms operate in an approximately competitive market[16], the so-called German method was used to compensate for the cascading impact on final consumption in the second and third steps (Eggermont, 2002:19-20). In the second step, the same amount of 10.8 million kuna (VAT on purchases) is ex-

[16] By implicit assumption, these firms are not able to shift their input VAT onto final consumers, and therefore they are not able to keep their profit margins unaffected by VAT, but due to VAT imposed on their inputs they sacrifice part of their profit margins.

cluded from final consumption, reducing it from 200.5 million kuna to 189.6 million kuna. In the third step, the consumption output is reduced from 189.6 million kuna to 168.9 million kuna (table 10.2) so that the difference between positive compensations and the base, from the first to the last step, corresponds (see the last row in table 10.2) to the total final consumers' VAT (31.6 million kuna = 1.7 million kuna + 29.9 million kuna) from table 10.1.

In addition, three positive compensations had to be calculated according to Directive 2006/112/EC, part B. Under the legislation valid in 2007, Croatian authorities did not charge tax on: (1) the supplies of services by authors, artists, performers, etc. with a turnover less than 85,000 kuna (93.9 million kuna); (2) the supply of buildings and building land before first occupation (one billion kuna); and (3) the transport of passengers on domestic parts of travelling routs (75.4 billion kuna). As these transactions will be subject to tax once Croatia joins the EU, they have to be included in the intermediate base. All the three compensations contribute to the final harmonised 2007 base (CHB_{VAT}) in the amount of 1.2 billion kuna.

Table 10.1

Exempted small firms (2007) with turnovers between 73,251 and 85,000 kuna, in million kuna

Number of firms	Turnover (VAT base)	GFCF (with VAT base 22%)	Intermediate consumption (all the three mandatory rates)	VAT on inputs				Final consumers VAT (%)		
				GFCF (VAT 22%)	Intermediate consumption, VAT (%)					
					0	10	22	0	10	22
3,339	267.3	13.4	53.5	2.4	0	0.2	8.2	0	1.7	29.9

Source: Ministry of Finance (2008).

Table 10.2

Calculation of positive compensation, in kuna

	Aggregates values	1st step	2nd step	3rd step
Output	267.3	267.3	256.5	235.7
Final consumers	200.5	200.5	189.6	168.9
Taxpayers	66.8	66.8	66.8	66.8
Intermediate consumption	53.5	45.0	45.0	45.0
Value added	213.9	222.3	211.4	190.7
GFCF	13.4	11.1	11.1	11.1
Residuals	200.5	211.2	200.3	179.6
Positive compensation to the base		200.5	189.6	168.9
Negative compensation to the base		56.0	56.0	56.0
Positive compensation to the base		144.5	133.7	112.9

Source: Ministry of Finance (2008).

The last group of compensations appearing in the calculation of Croatia's 2007 CHB_{VAT} is "other compensations". In 2007, these compensations consisted primarily of the values of transactions not mentioned in the Council Directive 2006/112/EC, which were not taxed by the Croatian authorities at that time, although they should have been taxed according to EU rules. All these transactions amount to 242.1 million kuna.

The described adjustments and compensations result in a final harmonised 2007 base (CHB_{VAT}) in the amount of 192.7 billion kuna. As CHB_{VAT} amounts to 61.85% of Croatia's 2007 GNI, capping is applied and the Croatian contribution base for the EU budget (CCB_{EU}) is put at 155.8 billion kuna (= 50% of 2007 GNI).

In 2007, Croatia and Poland had higher standard VAT rates than any (other) of the 12 new EU member states (table 11). With respect to the percentage share of the volume of transactions taxed at the standard rate in total VAT transactions, Croatia ranked 6th among the analysed EU member states, with Bulgaria having the highest share of the standard rate VAT base (99.4%).

TABLE 11

Croatian VAT regime compared to new European Union member states in 2007*

Country	VAT rates (%)		Relative VAT base for standard rate (% of all taxed transactions)**	Implicit VAT rates (WAVR) (%)
	Standard	Reduced		
Bulgaria	20	7	99.4	19.9
Croatia	22	0/10	87.1	19.6
Cyprus	15	0/5/8	70.3	11.6
Czech R.	19	5	66.4	14.3
Estonia	18	0/5	92.3	17.0
Hungary	20	5	93.3	18.8
Latvia	18	5	84.9	16.1
Lithuania	18	5/9	86.5	16.3
Malta	18	0/5	68.9	12.9
Poland	22	0/3/7	58.8	15.1
Romania	19	9	98.1	18.8
Slovak R.	19	10	90.2	18.9
Slovenia	20	8.5	66.9	16.0

**States that joined the EU in 2004 and 2007.*
*** Exempted transactions are outside this item.*
Source: Ministry of Finance (2008).

Bulgaria had the highest and Croatia the second highest WAVR among 12 new EU member states (table 11). Cyprus had the lowest implicit rate, followed by Malta and Czech Republic.

7 CONCLUSION

The paper offers an overview of how the national accounts' SUT system, as superior to the other two NA approaches, the aggregate national accounts and the sector accounts approaches, was used to determine Croatia's fiscal capacity, expressed as the Croatian contribution base for the EU budget (CCB_E), in the EU context in 2007. Using an iterative, sequential procedure, the CCB_E for 2007 was derived in the amount of 155.8 billion kuna, which is, according to the EU capping rule, 50% of the fully exhaustive Croatian GNI, as CHB_{VAT} amounts to 61.85% (table 8).

The CCB_E calculation is based on two prime data sources: the national accounts SUT system and the Tax Authority's databases. The first and the most demanding step is the calculation of WAVR, together with the theoretical VAT base, because these two have been produced in parallel. In 2007, these variables amounted to 19.56% and 149.2 billion kuna respectively (table 5). As regards Croatia's 2007 theoretical VAT base, it has to be pointed out that it is calculated on the pre-revision 2007 GDP (the two revisions were carried out in 2009 and 2010), which means that it is underestimated mostly due to the non-inclusion of non-exhaustive components of GDP according to the tabular approach. A recalculation of the 2007 GDP on a new (fully exhaustive) base would surely result in a higher figure, as in 2004, the year from which SUTs were used, non-exhaustiveness amounted to 7.4% of the 2004 GDP at market prices and 8.6% of GDP at basic prices (the so called gross value added) (CBS, 2009:191).

Despite obvious undervaluation of Croatia's theoretical VAT base in 2004, the calculated WAVR, as a relative measure (assuming that subsequent revisions will not affect it substantially) was used for determining the VAT own resources (fiscal capacity) of Croatia in 2007 (table 8).

The starting points for assessing the fiscal capacity of any EU member state are the country's gross cash receipts. In Croatia, they stood at 37.7 billion kuna in 2007. After adjusting gross cash receipts for the corrections described in section 5, net cash receipts were derived. By dividing the net cash receipts by WAVR (which shows the fraction of each kuna of VAT taxable transactions that goes to the state budget in the form of VAT receipts), the intermediate base was arrived at.

In order properly to determine the Croatian contribution to the EU budget, in the form of CCB_E, the intermediate base was harmonised, applying the above described compensations, in order to align Croatian VAT regulations with the EU VAT Council directives, among which Council Directive 2006/112/EC is one of the most important.

ln the end, the GDP VAT, i.e. VAT on the accrual principle included in Croatia's official GDP for 2007, amounts to 37.3 billion kuna, and is very close to the gross cash receipts on a cash basis (table 8) amounting to 37.7 billion kuna. This indicates that there is even more room for upward revisions of the theoretical (accrued) VAT, because it has to be higher than its cash counterpart, due to inadequate compliance with the Croatian VAT system (low tax collection rate).

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