

places Croatia below the NMS-8 country average. In terms of the Maastricht convergence criteria, the underground economy inclusion procedure does not affect the fact that the criteria are not met. The inclusion of the underground economy influences two indicators: proportion of the government sector deficit in GDP and the proportion of the public debt in GDP. The inclusion of the underground economy does not influence on fulfilling the criteria concerning the government sector deficit. The criteria concerning the size of public debt are fulfilled by Croatia even without the inclusion of the underground economy. Inflation criteria and the size of long-term interest rates criteria are not directly linked to the GDP value.

Keywords: Maastricht criteria, underground economy, Croatia

JEL classification: E01, E26, E61

macroeconomic movements in Croatia are not entirely comparable with the data on this group of countries.

The first part of this paper gives an overview of literature dealing with the consequences of development of underground economy. The second part presents methods for estimation of underground economy, with a focus on Eurostat's Exhaustiveness programme designed specially for candidate countries. According to this programme, all countries are obliged to correct their official GDP figure by an average of 12.1 percent before EU accession. The results of the application of the Eurostat method on Croatia are presented in the third part, while the last part deals with the effect which the inclusion of underground economy into official GDP figure for Croatia would have on basic macroeconomic indicators in the context of comparison with the new EU member states.

2 Consequences of Development of Underground Economy

In addition to direct consequences of development of underground economy, which primarily manifest themselves in a loss of tax revenues, indirect consequences can sometimes be equally important. This primarily refers to distortions of the system of statistical information of an economy, which can have serious consequences for the formulation of economic policies.

The increased share of underground economy has a direct impact on reduction of state revenues. If the government sector expenses can be reduced as a result of this, the deficit in revenues will be reflected in the reduction of total government services provided to the rest of the economy. If, what is more usual, the expenditures cannot be reduced, the growth of the unofficial part of the economy will cause a budget deficit with all its negative side effects.

In the attempts to establish a desired level of government consumption, tax authorities usually react by compensating for the loss of tax revenues caused by the increase in underground economy by increasing taxes. This, in turn, additionally

spent in the official economy. Bhattacharyya (1999) establishes a significant effect of underground economy on personal consumption in Great Britain. Underground economy has a positive effect on the consumption of perishable (non-durable) goods and services, but an even more important one on the consumption of consumer durables. Similar empirical conclusions on mutual influence of the official and unofficial economy are given by Tanzi (1999). Although some authors include the function of a social shock-absorber among positive sides of underground economy in transitional countries, alleviating negative impacts of transition, this opinion is also criticized by authors who believe that underground economy cannot be considered a social shock-absorber alleviating the problem of unemployment.²

From statistical point of view, underground economy is also related to the possibility of comparison among countries in time and space. Without a good estimate of underground economy, comparisons among countries may lead to wrong conclusions on the relative welfare of a country. Membership fees in international associations are frequently linked to the average per capita income, and the financial participation of countries can be disproportionately allocated if countries have differently sized unofficial sector of economy.

A good system of statistical information is necessary for economic analyses, but also for monitoring the economy and designing macroeconomic policies. On the basis of incomplete or even false data, analyses can lead to wrong conclusions, which can result in serious consequences if they are subsequently used for determining economic policies.

This paper explores, on the example of Croatian economy, whether the use of a distorted statistical information system based on the use of official GDP figures can influence the speed of fulfilment of the Maastricht criteria, and the introduction of the euro as the official currency.

² For the social role of underground economy in Croatian economy see Karajić (2002) and Bejaković (1997).

3 Various Methods for Measuring Underground Economy – A Comparison of Results

There are various methods for estimating underground economy. The optimum method for a country depends on the features of its economy, and its tax and legal system. Based on some common features, the methods can be classified in the following way:³

- a) Direct methods:
 - surveys,
 - tax audit.
- b) Indirect methods:
 - tax statistics and national accounts difference,
 - income-expenditure difference – a macro-approach,
 - income-expenditure difference – a micro-approach,
 - labour market,
 - cash in circulation,
 - the transaction method,
 - the input method.
- c) Causal models:
 - cash demand,
 - determinants/indicators.

3.1 Underground Economy in Developed Market Economies

The interdependence of results, as well as systematic overestimation or underestimation resulting from individual methods of calculation of underground economy, are best demonstrated as a comparison of results on a homogeneous group of countries over a longer period of time. One such comparison is given in Table 1.

³ See e.g. *Schneider (2002)*.

Table 1 Comparison of Underground Economy Estimates for Five OECD Countries, Using Nine Different Methods, for the Period 1970-1990					
Size of underground economy (in % of GDP)					
Method	Canada	Germany	Great Britain	Italy	USA
Household survey	1.3	-	-	-	5.6
Tax audit	2.9	-	-	5.4	8.2
Income-expenditure diff.	-	13.4	4.2	5.6	6.1
Employment data	-	34.0	-	18.4	-
Input method	11.2	14.5	13.2	19.3	8.8
Tanzi method	8.1	8.3	7.9	15.8	4.7
Gutmann method	14.9	-	9.1	26.6	11.5
Transaction approach (Feige)	21.1	25.0	15.3	26.5	20.9
MIMIC	8.7	6.7	8.0	10.5	8.2

Source: Schneider and Enste (2000).

It has been empirically found for the monetary approach that the Feige method gives a higher estimate of underground economy than the Gutmann method, which in turn gives a higher estimate than the Tanzi method.

As for the method based on the discrepancy in national accounts, there is a lack of longer series for any country showing the proportion of underground economy based on this method. The reason for this is that the usual practice of statistical offices for national accounts is to harmonise the GDP according to various approaches before publication, resulting from the tendency to have a single published official GDP figure for the reference period.

Already a superficial comparison will lead to the conclusion that the estimated level of underground economy based on the analysis of differences in the national accounts is much lower than the one obtained on the basis of monetary methods. The reason for this is that this method records only the difference between two independent approaches to GDP estimation, where the two approaches do not necessarily have to encompass the entire economic activity, so a part of underground economy can still remain excluded in the application of this method.

3.2.1 The Input Method (Electricity Consumption) and Underground Economy in Transition

Although some authors used input data to estimate underground economy even earlier, the application of the electricity method developed relatively late. In order to measure the total economic activity of an economy Kaufmann and Kaliberda (1996), as well as Lacko (1998), postulated that electricity consumption is the best physical indicator. The total (official) economic activity, as well as electricity consumption, are generally known for all countries in the world. The authors assume that the growth of electricity consumption is an indicator describing the movements of the total GDP as well, because short-term elasticity equals 1. They therefore attribute the difference between the total electricity consumption growth rate and the official GDP growth rate to the phenomenon of underground economy.

Table 2 **Share of Underground Economy in GDP for Selected Countries According to Various Estimation Methods**

Country	Average – all methods	Johnson – Electrical energy input method	DYMIMIC	Kaufmann-Kaliberda	Lacko
		1994/1995	2000/2001	1995	1998
Bulgaria	34.5	32.7	36.4	-	34.5
Czech Republic	16.4	14.5	18.4	12.7	19.9
Estonia	29.9	38.5	39.1	13.4	28.7
Croatia	31.3	28.5	32.4	-	32.9
Latvia	42.5	34.8	39.6	54.6	40.8
Lithuania	28.7	25.2	29.4	27.6	32.5
Hungary	28.6	28.4	24.4	40.8	20.8
Poland	17.3	13.9	27.4	14.4	13.4
Romania	16.8	28.3	33.4	23.6	30.0
Slovakia	23.0	15.2	18.3	-	17.0
Slovenia	16.4	23.9	26.7	-	18.4
Average	26.0	24.8	28.4	27.3	24.9

Note: Table shows most recent data available.

Source: Lacko (1998) for the Lacko and Kaufmann-Kaliberda method, Schneider (2003) for the Johnson method and DYMIMIC.

In the field of harmonisation of exhaustiveness of candidate country's national account, as one of the most important target areas, two projects have been implemented. One was implemented in the period 1998-2000, and the other in the period 2002-2003. The first project defined the methodology and standard tables for the so called Tabular Approach for candidate countries, and the other worked out the details of this approach.

3.3.2 Non-exhaustiveness Types in the National Accounts (N1-N7): The Production Approach – A Detailed Description

The classification of non-exhaustiveness types in the national accounts is based on various characteristics of the producer, i.e. the way in which the data are obtained from producers. The classification of non-exhaustiveness types in the national accounts is presented in Figure 1. Regardless of the mutual exclusivity of individual forms, in practice there can also be cases in which individual types of non-exhaustiveness in the national accounts overlap. So, for example, there can be some overlapping between types N1 and N2, as well as between types N1 and N6.

The analysis of individual non-exhaustiveness types aims at insuring a completely exhaustive non-overlapping reporting, which leads towards the ultimate goal of accuracy and exhaustiveness of GDP figures. The analysis of non-exhaustiveness types is not a final aim, and neither is the allocation of individual sources of underground economy of crucial importance. What is important is for countries to follow a consistent set of procedures in order for the obtained data to be directly comparable.

Figure 1 Description of Non-Exhaustiveness Types in the National Accounts (N1 – N7) – Sources of Underground Economy		
N1	Producer should have registered (underground producer)	<ul style="list-style-type: none"> ➤ Producer fails to register in order to avoid tax & social security obligations. These are often small producers with turnovers which exceed the thresholds above which they should register their income. ➤ Producers that fail to register because they are involved in illegal activities that fall under N2, rather than N1. ➤ Type N1 does not include all underground activities, some of which are associated with type N6.

N2	Illegal producer that fails to register	<ul style="list-style-type: none"> ➤ N2 covers activities of producers that avoid registration entirely. ➤ N2 excludes illegal activities by registered legal entities or entrepreneurs that report (or misreport) their activities under legal activity codes.
N3	Producer is not obliged to register	<ul style="list-style-type: none"> ➤ Producer is not required to register because it has no market output. Typically, these are non-market household producers involved in: (a) production of goods for own consumption or for own fixed capital formation, and (b) construction of and repairs to dwellings. ➤ Producer has some market output but it is below the level at which the producer is expected to register as an entrepreneur.
N4	Registered legal person is not included in statistics	<ul style="list-style-type: none"> ➤ The legal person may not be included in the statistics for a variety of reasons. E.g., the business register is out of date or updating procedures are inadequate; the classification data (activity, size or geographic codes) are incorrect; the legal person is excluded from the survey frame because its size is below a certain threshold; etc.
N5	Registered entrepreneur is not included in statistics	<ul style="list-style-type: none"> ➤ A registered entrepreneur may not be included in the statistics for many reasons. E.g., the administrative source with lists of registered entrepreneurs may not always pass on complete or up to date lists to the statistical office. ➤ Even if there is a regular flow of accurate and comprehensive information from the administrative source to the statistical office, the registered entrepreneur may not be included in the business register for several reasons (see those given under N4).
N6	Mis-reporting by the producer	<ul style="list-style-type: none"> ➤ Mis-reporting invariably means that gross output is under-reported and intermediate consumption is over-reported in order to evade (or reduce) income tax, value added tax or social security contributions. ➤ Mis-reporting often involves: the maintenance of two sets of books; payments of <i>envelope salaries</i> which are recorded as intermediate consumption; payments in cash without receipts; and VAT fraud.
N7	Statistical deficiencies in the data	<ul style="list-style-type: none"> ➤ Type N7 is sub-divided between N7a - data that is incomplete, not collected or not directly collectable, and N7b - data that is incorrectly handled, processed or compiled by statisticians. This distinction is useful because it helps one to better understand the huge variety of possible statistical deficiencies. However, in practice, N7a and N7b cannot always be easily separated. ➤ Statistical deficiencies: the following list is not comprehensive but these topics should be investigated for non-exhaustiveness:- <ul style="list-style-type: none"> • Handling of non-response; • Production for own final use by market producers; • Tips; • Wages & salaries in kind; • Secondary activities. ➤ Clearly, not all statistical deficiencies result in the under-estimation of GDP. (The focus here has been to identify and target those areas which are likely to lead to non-exhaustiveness in the NA.)

3.3.3 Total Size of Underground Economy in Transition Countries According to the Results of Eurostat's Exhaustiveness Programme

Table 3 shows data on the adjustment of exhaustiveness (of underground economy) as a percentage of GDP of new EU member states. All data refer to the year 2000, except for the Czech Republic and Slovenia, for which the reference year is 2002.

Czech Republic	Estonia	Latvia	Lithuania	Malta	Hungary	Poland	Slovakia	Slovenia	Average
2002	2000	2000	2000	2000	2000	2000	2000	2002	2000
6.8	11.2	15.1	18.9	5.8	11.9	14.7	14.8	8.1	12.1

Source: Eurostat.

The average proportion of non-exhaustiveness adjustment of national accounts as a percentage of GDP for the new EU member states was 12.1 percent. Malta and the Czech Republic had the lowest share of adjustments. Slovenia, Estonia and Hungary also had an under-average size of adjustment. The highest adjustments were recorded in two Baltic countries, Lithuania (19 percent) and Latvia (15 percent).

4 **Results of Estimation of Total Underground Economy (Unofficial Economy) in Croatia in the Period 1998-2002**

The total size of underground economy in Croatia is presented in two ways. The first is a sum of individual types of underground economy according to the Eurostat approach (N1-N7). Since this is a conservative approach, the results obtained by this method can be considered the lower limit value of underground economy which is going to be included into official Croatian GDP. The second option, based on results obtained by other methods (the input method, DYMIMIC method) and the average difference between the results obtained by other methods

give results of estimation of the total underground economy for the period 1998-2002.

Activities according to NACE		1998	1999	2000	2001	2002
A	Agriculture, hunting and forestry	1,165,650	1,132,127	1,278,390	1,146,476	1,274,328
B	Fishing	47,293	22,309	45,710	81,399	106,477
C	Mining and quarrying	24,632	26,064	24,339	29,117	34,330
D	Manufacturing	1,848,512	2,933,550	3,725,331	3,389,270	4,100,407
E	Electricity, gas and water supply	35,709	69,101	57,051	57,347	80,580
F	Construction	1,307,618	1,024,286	1,497,279	1,991,014	1,852,528
G	Wholesale and retail trade	3,573,821	3,273,015	3,473,635	4,197,848	3,503,781
H	Hotels and restaurants	1,011,792	889,395	1,247,638	1,563,399	1,775,336
I	Transport, storage and communication	1,953,164	1,344,103	986,275	1,064,102	1,037,006
J	Financial intermediation	227,588	414,363	256,247	125,302	395,050
K	Real estate, renting and business activities	2,736,504	1,317,304	2,220,630	2,362,057	2,642,839
L	Public administration	38,588	35,684	38,573	35,991	35,221
M	Education	166,446	193,783	127,823	35,418	118,456
N	Health and social work	528,288	495,013	365,516	256,153	366,909
O	Other community, social and personal service activities	997,442	713,957	1,050,197	774,721	948,964
	Illegal activities	1,403,558	1,444,106	1,555,692	1,689,523	1,829,778
	TOTAL	17,028,019	15,328,161	17,950,327	18,799,137	20,101,991

Total underground economy (N1-N7) in Croatia in 2002 amounted to HRK 20.1 billion with illegal activities included, i.e. HRK 18.3 billion without illegal activities (Table 4). With the exception of the year 1999, this amount increased every year. The data for 1998 are based on a labour force survey, which at that time did not encompass the whole territory of Croatia, but was estimated for some parts of the country. This influenced the structure, rather than the total figure of employed persons. Because of this the data on the structure of underground economy for the year 1998 are not entirely reliable, but are still included since the

presented statistical data do not distort the figure for the economy as a whole. Significant changes in the proportion of underground economy, for example in the manufacturing sector (a share of 11.8 percent in 1998 which increased to 21.1 percent in 1999), are therefore more a consequence of more exhaustive statistical coverage than a real change

Table 5 Proportion of Individual Activities in Total Underground Economy of Croatia (Without Illegal Activities - N2), in %

Activities according to NACE		1998	1999	2000	2001	2002
A	Agriculture, hunting and forestry	7.4	8.2	7.8	6.7	7.0
B	Fishing	0.3	0.2	0.3	0.5	0.6
C	Mining and quarrying	0.2	0.2	0.1	0.2	0.2
D	Manufacturing	11.8	21.1	22.7	19.8	22.4
E	Electricity, gas and water supply	0.2	0.5	0.3	0.3	0.4
F	Construction	8.3	7.4	9.1	11.6	10.1
G	Wholesale and retail trade	22.8	23.6	21.2	24.5	19.2
H	Hotels and restaurants	6.5	6.4	7.6	9.1	9.7
I	Transport, storage and communication	12.5	9.7	6.0	6.2	5.7
J	Financial intermediation	1.5	3.0	1.6	0.7	2.2
K	Real estate, renting and business activities	17.5	9.5	13.5	13.8	14.5
L	Public administration	0.2	0.3	0.2	0.2	0.2
M	Education	1.1	1.4	0.8	0.2	0.6
N	Health and social work	3.4	3.6	2.2	1.5	2.0
O	Other community, social and personal service activities	6.4	5.1	6.4	4.5	5.2
TOTAL		100.0	100.0	100.0	100.0	100.0

A major part of underground economy in 2002 consisted of underground economy in the manufacturing sector (HRK 4.1 billion, i.e. 22.4 percent, Table 5), followed by wholesale and retail trade, which decreased slightly in its proportion in underground economy – from HRK 3.6 billion (22.8 percent of underground economy) in 1998, to HRK 3.5 billion, or 19.2 percent of total underground economy. A decrease in underground economy was also recorded in transportation, real-estate and business activities, public administration, health work, education and personal service activities. For all other activities the value of

underground economy increased in the period 1998-2002, measured in current prices.

The average proportion of underground economy in total gross value added (GVA) of the Croatian economy in the observed period is declining. From the initial 15.4 percent of GVA (12.4 percent of GDP) in 1998, it decreased to 13.9 percent of GVA (11.2 percent of GDP) in 2002 (Table 6). If illegal activities are excluded from the total figure, the proportion of underground economy in GDP in 1998 is over 11.4 percent, i.e. 10.2 percent in 2002.

Activities according to NACE		1998	1999	2000	2001	2002
A	Agriculture, hunting and forestry	10.9	10.1	11.7	9.4	10.1
B	Fishing	19.8	7.7	15.8	28.6	26.7
C	Mining and quarrying	3.8	4.3	2.9	3.1	2.9
D	Manufacturing	7.5	12.0	13.9	11.7	13.8
E	Electricity, gas and water supply	0.9	1.6	1.5	1.5	1.9
F	Construction	16.9	16.1	25.5	29.1	21.7
G	Wholesale and retail trade	25.9	27.5	26.4	26.3	19.1
H	Hotels and restaurants	28.3	24.6	29.6	32.8	33.7
I	Transport, storage and communication	20.0	13.0	7.9	7.7	6.6
J	Financial intermediation	4.6	7.3	4.5	1.9	4.8
K	Real estate, renting and business activities	49.3	23.0	35.3	32.8	31.7
L	Public administration	0.3	0.3	0.3	0.3	0.3
M	Education	3.4	3.4	2.0	0.5	1.7
N	Health and social work	9.3	7.4	5.1	3.5	4.8
O	Other service activities	37.1	20.6	28.0	18.0	19.9
	TOTAL, including N2 (as % of GVA)	15.4	13.5	14.9	14.3	13.9
	TOTAL, including N2 (as % of GDP)	12.4	10.8	11.8	11.3	11.2
	TOTAL, without N2 (as % of GDP)	11.4	9.8	10.7	10.3	10.2

room for improvement of statistical exhaustiveness to include data still amounting to as much as 13.5 percent of total underground economy in Croatia.

Table 7 Underground Economy in Croatia by Type (N1-N7), in Thousand HRK

Type of underground economy		1998	1999	2000	2001	2002
N1	Non-registered (underground) producers	7,701,002	6,988,430	6,538,261	6,013,777	5,636,012
N2	Non-registered illegal producers	1,403,558	1,444,106	1,555,692	1,689,523	1,829,778
N3	Producer is not obliged to register	117,571	114,429	180,508	259,448	291,366
N4	Registered legal person is not included in statistics					
N5	Registered entrepreneur is not included in statistics	380,200	421,200	476,714	523,548	631,730
N6	Mis-reporting by the producer	4,863,038	4,375,293	6,447,203	7,532,944	9,007,633
N7	Statistical deficiencies in the data	2,601,238	1,984,703	2,751,949	2,779,896	2,705,473
TOTAL		17,028,019	15,328,161	17,950,327	18,799,137	20,101,991

Table 8 Proportion of Individual Types of Underground Economy in Total Underground Economy in Croatia, in %

Type of underground economy		1998	1999	2000	2001	2002
N1	Non-registered (underground) producers	45.2	45.6	36.4	32.0	28.0
N2	Non-registered illegal producers	8.2	9.4	8.7	9.0	9.1
N3	Producer is not obliged to register	0.7	0.7	1.0	1.4	1.4
N4	Registered legal person is not included in statistics	0.0	0.0	0.0	0.0	0.0
N5	Registered entrepreneur is not included in statistics	2.2	2.7	2.7	2.8	3.1
N6	Mis-reporting by the producer	28.5	28.5	35.9	40.1	44.8
N7	Statistical deficiencies in the data	15.2	12.9	15.3	14.8	13.5
TOTAL		100.0	100.0	100.0	100.0	100.0

Table 9 shows the proportion of individual types of underground economy in GVA. At the national level this proportion decreased from 15.4 percent in 1998 to 13.9 percent in 2002.

Type of underground economy		1998	1999	2000	2001	2002
N1	Non-registered (underground) producers	7.0	6.2	5.4	4.6	3.9
N2	Non-registered illegal producers	1.3	1.3	1.3	1.3	1.3
N3	Producer is not obliged to register	0.1	0.1	0.1	0.2	0.2
N4	Registered legal person is not included in statistics	0.0	0.0	0.0	0.0	0.0
N5	Registered entrepreneur is not included in statistics	0.3	0.4	0.4	0.4	0.4
N6	Mis-reporting by the producer	4.4	3.9	5.3	5.7	6.3
N7	Statistical deficiencies in the data	2.4	1.7	2.3	2.1	1.9
TOTAL		15.4	13.5	14.9	14.3	13.9

In addition to the above types of underground economy, the official GDP in Croatia is under-estimated also with regard to the calculation of the imputed dwelling rents. This refers to the Eurostat request that the calculation of the imputed dwelling rents should also include the imputed net operating surplus, which is not included in the existing methodology of calculation in Croatia.⁷ The alternative method for calculating the value of dwelling rents, the so called cost method recommended by the Eurostat for countries with less than 10 percent of the total dwelling stock on the renting market, gives the amount of correction for the present value of dwelling rents in GDP. The present value of imputed dwelling rents, under the assumption of net operating surplus of 2 percent of the value of total dwelling stock, must be corrected by between HRK 6.4 billion in 1998 and HRK 8.2 billion in 2002. With the new alternative calculation of dwelling rents, the participation of dwelling rents after inclusion of underground economy into the GDP comes to between 8.6 percent in 1998 and 8.9 percent in 2002. This indicates that relative prices of real estate grew faster than the general GDP deflator, which places Croatia among other EU countries and countries in transition. However, it must be noted here that this is still a conservative estimate,

⁷ *More in Lovrinčević and Mikulić (2005).*

because most new EU member states use the estimated operating surplus of 2.5 percent, instead of 2 percent of the total value of the dwelling stock used in this calculation.

Table 10 shows the necessary total corrections of Croatian GDP (lower limit value of estimation), and the analysis by type of underground economy. After the inclusion of underground economy into official GDP figures, new total GDP values should be as follows: 161.0 billion HRK in 1998, 163.8 billion HRK in 1999, 177.8 billion HRK in 2000, 192.4 billion HRK in 2001, and 209.6 billion HRK in 2002.

- 12.4 percent without changing the methodology of calculation of dwelling rents, i.e. 17.0 percent including the change in calculation of the dwelling rents (in 1998),
- 10.8 percent without changing the methodology of calculation of dwelling rents, i.e. 15.7 percent including the change in the calculation of dwelling rents (in 1999),
- 11.8 percent without changing the methodology of calculation of dwelling rents, i.e. 16.6 including the change in the calculation of dwelling rents (in 2000),
- 11.3 percent without changing the methodology of calculation of dwelling rents, i.e. 16.1 percent including the change in the calculation of dwelling rents (in 2001),
- 11.1 percent without changing the methodology of calculation of dwelling rents, i.e. 15.6 percent including the change in the calculation of dwelling rents (in 2002).

	1998	1999	2000	2001	2002
Table 10 Total Corrections of GDP due to Inclusion of Underground Economy and Change in Calculation of the Dwelling Rents, Lower Limit Value of Estimation, Current Prices in Thousand HRK					
Official GDP	137,603,708	141,579,068	152,518,827	165,639,462	181,231,000
Underground economy (NI-N7)	17,028,019	15,328,161	17,950,327	18,799,137	20,101,991
Methodology changes in calculation of dwelling rents	6,390,756	6,862,893	7,359,173	7,918,378	8,241,756
Total corrections	23,418,775	22,191,054	25,309,500	26,717,515	28,343,747
Total corrected GDP	161,022,483	163,770,122	177,828,327	192,356,977	209,574,747
Share of corrections (NI-N7), in %	12.4	10.8	11.8	11.3	11.1
Share of total corrections including the dwelling rents, in %	17.0	15.7	16.6	16.1	15.6

4.2 Total Underground Economy in Croatia Compared to Average of Other Methods – Upper Estimated Limit Value

The upper limit value of underground economy in Croatia is based on results obtained by application of other methods. In estimation of the upper limit value of underground economy, a comparison with estimated values of underground economy for the new member states is used. It is necessary to establish a ratio between average results obtained by all other methods (Table 2) and the conservative approach based on the Eurostat approach. The results are shown in Table 11.

Country/Method	Eurostat method 2000	Average of other methods (Table 2)	Ratio other methods / Eurostat
Czech Republic	6.8*	16.4	2.4
Estonia	11.2	29.9	2.7
Latvia	15.1	42.5	2.8
Lithuania	18.9	28.7	1.5
Malta	5.8	n.a.	n.a.
Hungary	11.9	28.6	2.4
Poland	14.7	17.3	1.2
Slovakia	14.8	16.8	1.1
Slovenia	8.1*	23.0	2.8
Average	12.1	26.0	2.15
Croatia	15.8*	34.0	2.15

* Data for 2002.

Source: Eurostat (2004).

Table 11 shows that the average size of underground economy according to the Eurostat approach was 12.1 percent for the group of new EU member states. The average result of all other methods (electricity input, DYMIMIC) was 2.15 times higher than the results obtained by the Eurostat method. If we multiply the estimated underground economy figures for Croatia obtained by the Eurostat method (15.6 percent of GDP) with the average ratio for the other countries (2.15) we get the estimated upper limit value of underground economy in Croatia (33.6 percent of GDP) for 2002 (Table 12).

	1998	1999	2000	2001	2002
Official GDP	137,603,708	141,579,068	152,518,827	165,639,462	181,231,000
Total underground economy (lower limit value)	23,418,775	22,191,054	25,309,500	26,717,515	28,343,747
Total underground economy (upper limit value)	50,265,156	47,762,459	54,402,583	57,303,040	60,903,646
Total corrected GDP (lower limit value)	161,022,483	163,770,122	177,828,327	192,356,977	209,574,747
Total corrected GDP (upper limit value)	187,868,864	189,341,527	206,921,410	222,942,502	242,134,646
Share of underground economy in GDP (lower limit value), in %	17.0	15.7	16.6	16.1	15.6
Share of underground economy in GDP (upper limit value), in %	36.5	33.7	35.7	34.6	33.6

5 The Impact of Inclusion of Underground Economy on Basic Macroeconomic Indicators in Croatia

This chapter shows what the basic macroeconomic indicators would be like if Croatia's GDP was corrected by the estimated size of underground economy. The Eurostat approach was used as the lower estimated limit value for correction of the Croatian GDP in near future. All types of underground economy are included (N1-N7), as well as a methodological correction of calculation of imputed dwelling rents.

A comparison has been made with transition countries which became full EU members in 2004 and with the remaining candidate countries (Bulgaria and Romania). The period encompassed is 1999 to 2003, in which all the above countries included estimated values of underground economy from the Exhaustiveness programme into their official GDP figures. Figures for Croatia are presented both with the official GDP figures and with the correction for the size of underground economy. The estimated value of underground economy for the period 1998-2002 is presented in the previous chapter, whereas the year 2003 is estimated on the basis of results from the previous period. Since 2003 had a faster growth of activities with a significant share in underground economy, a slight increase of the total proportion of underground economy can be expected in this year.

5.1 Croatia's Level of Development Measured by per Capita GDP

Per capita GDP is usually used as the overall development indicator of a country. At the EU level, a better comparison of levels of development has been ensured through the project of comparison of purchase power, since here GDP is corrected by the difference in price levels.

Table 13 shows that according to the official per capita GDP, measured according to the purchasing power parity, in 2003 Croatia lagged behind all other transition

countries which acceded the EU in 2004 except for Latvia, Lithuania and Poland, while Bulgaria and Romania were significantly behind Croatia and other analysed countries.

If underground economy is included into the official GDP figures, as has been done for other candidate countries, according to this indicator Croatia would be economically more developed than Estonia and Slovakia, while Slovenia, the Czech Republic and Hungary would still be ahead. However, on the other side, the inclusion of underground economy does not significantly change the growth of per capita GDP measured according to purchasing power parity in the period 1999-2003. Namely, the total per capita GDP (with underground economy included) has in this period grown only 0.2 percent faster than the official GDP figures. According to the indicator of the average growth rate of per capita GDP, measured according to purchasing power parity, Croatia is still placed in the middle of the group of analysed countries. The highest cumulative growth has been recorded in the Baltic countries, Hungary, Bulgaria and Romania.

	1999	2000	2001	2002	2003	Index 2003/1999	Index EU-25=100
Czech Republic	12,139	12,761	13,474	14,258	14,661	120.8	68.3
Hungary	9,707	10,507	11,501	12,349	12,768	131.5	59.5
Poland	8,432	9,014	9,251	9,622	9,801	116.2	45.7
Slovakia	8,717	9,428	10,010	10,836	11,139	127.8	51.9
Slovenia	13,649	14,409	15,230	15,868	16,339	119.7	76.2
Estonia	7,616	8,568	9,138	9,848	10,337	135.7	48.2
Latvia	6,325	6,981	7,626	8,216	8,721	137.9	40.6
Lithuania	6,961	7,581	8,305	8,939	9,744	140.0	45.4
Bulgaria	4,881	5,305	5,821	6,073	6,341	129.9	29.6
Romania	4,745	4,987	5,440	6,041	6,332	133.4	29.5
Croatia	7,425	8,081	8,602	9,350	9,951	134.0	46.4
Croatia (underground economy included)	8,591	9,422	9,987	10,827	11,532	134.2	53.8

Source: WIIW, Eurostat.

Per capita GDP measured according to purchasing power parity based on data for formal economy would in 2003 amount to about 46.4 percent of the average GDP for all EU countries (Table 14). This is below the level of transition countries which acceded the EU in 2004 (NMS-8) by about 8 percentage points. However, with the correction for underground economy this gap would be significantly reduced and show a more realistic level of development of Croatian economy.

5.2 Indicators of the State of Public Finances in Croatia

Table 14 shows general government income and expenditure. According to official data, the proportion of general government expenditure in 2003 in Croatia (48.2 percent of GDP) is higher than the average for transition countries which became the new EU member states (44.7 percent of GDP in NMS-8⁸). This is a very heterogeneous indicator for the above group of countries, ranging between 34.1 for Lithuania and 53.2 for the Czech Republic. However, with the inclusion of underground economy in Croatia, the proportion of general government expenditure in GDP decreases to 41.5 percent, which is below the NMS-8 average. On the other hand, general government income, which exceeds the average for the group of analysed countries (43.7 percent in Croatia compared to 40.9 percent for the NMS-8 group), decreases to 37.7 percent of GDP with the inclusion of underground economy, which is, with the exception of Lithuania and Latvia, lower than the level of the new EU member states. With all these new moments, the real challenge for public finances in Croatia – even more than the need to reduce the proportion of public consumption – becomes the improvement of the structure of public consumption within the predefined proportion of government expenditure in GDP on one hand, i.e. a more efficient collection of taxes and other state income on the other.

⁸ NMS-8: *the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia*

Country	1999	2000	2001	2002	2003
Czech Republic	-3.7	-3.7	-5.9	-6.7	-11.6
Hungary		-2.3	-3.7	-8.5	-6.2
Poland	-1.9	-1.6	-3.9	-3.6	-4.5
Slovakia	-7.1	-12.3	-6.0	-5.7	-3.7
Slovenia		-3.5	-2.7	-2.3	-2.0
Estonia	-3.7	-0.6	0.3	1.3	3.1
Latvia	-4.9	-2.7	-2.1	-2.7	-1.5
Lithuania	-5.5	-2.5	-2.0	-1.5	-1.9
Bulgaria	-0.9	-0.6	-0.6	-0.7	0.0
Romania		-4.0	-3.2	-2.5	-2.3
Croatia	-8.2	-6.5	-6.8	-4.8	-6.1
Croatia (underground economy included)	-7.1	-5.6	-5.9	-4.1	-5.3

Source: WIIW, IFS.

Country	1999	2000	2001	2002	2003
Czech Republic	14.0	18.2	27.2	30.7	38.3
Hungary	61.2	55.4	52.2	55.5	56.9
Poland	40.3	36.8	36.7	41.2	45.4
Slovakia	43.8	49.9	48.7	43.3	42.6
Slovenia	25.1	27.4	28.1	29.5	29.4
Estonia	6.5	4.7	4.4	5.3	5.3
Latvia	13.7	12.9	14.9	14.1	14.4
Lithuania	23.4	23.8	22.9	22.4	21.4
Bulgaria	79.3	73.6	66.2	53.2	46.2
Romania	24.0	23.9	23.2	23.3	21.3
Croatia	47.2	48.9	50.3	49.9	50.3
Croatia (underground economy included)	40.8	41.9	43.3	43.1	43.4

Source: WIIW, IFS.

5.3 Influence on Balance of Payments and Foreign Debt Indicators

After the inclusion of underground economy, the proportion of foreign debt as a percentage of GDP in Croatia decreased from 75.5 percent to 65.2 percent (Table 17) in 2003. Even after the inclusion of underground economy, along with Hungary, Croatia is still the country with the largest proportion of foreign debt in GDP, which has a significant influence on the credit rating of country.

Country	1999	2000	2001	2002	2003
Czech Republic	41.6	42.0	39.1	37.8	38.3
Hungary	60.8	64.8	64.0	61.4	67.1
Poland	42.2	44.1	39.2	43.5	50.0
Slovakia	52.1	54.9	54.0	55.7	51.2
Slovenia	26.9	32.8	34.4	40.0	58.3
Bulgaria	84.3	88.9	78.1	70.3	63.1
Romania	24.6	27.8	29.7	33.3	33.6
Croatia	54.1	60.6	60.7	61.6	75.5
Croatia (underground economy included)	46.8	52.0	52.3	53.2	65.2

Source: WIIW, IFS.

5.4 The Maastricht Criteria and the Inclusion of Underground Economy in Croatia

Finally, Table 18 shows the influence of inclusion of underground economy on basic macroeconomic indicators relating to the Maastricht criteria. It can be seen that general government proportion in GDP has decreased from -6.1 percent to -5.3 percent, and of public debt from 50.3 to 43.4 percent of GDP. However, the inclusion of underground economy has no effect on the remaining two indicators - inflation and long-term interest rates.

Country, group of countries	General government deficit, in % of GDP, 2003	Public debt, in % of GDP, 2003	Inflation	Long-term interest rates
Croatia	-6.1	50.3	1.8	5 approximately*
Croatia (underground economy included)	-5.3	43.4	1.8	5 approximately*
Maastricht criteria	-3.0	60	2.6 (average of 3 EU member states with lowest inflation + 1.5 percentage point)	6.13 (long-term interest rates average of 3 EU member states with lowest inflation rate + 2 percentage points)
New EU member states and candidate countries fulfilling all criteria				
Estonia	+ 3.1	5.3	1.1	4.9
Lithuania	- 1.9	21.4	-0.9	5.2
Countries fulfilling three of the criteria				
Slovenia	-2.0	29.4	5.2	6.1
Latvia	-1.5	14.4	3.3	5.0
Czech Republic	-11.6	38.3	0.4	4.2
Poland	-4.5	45.4	0.9	6.0
Croatia	-6.1	50.3	1.8	5 approximately*
Croatia (underground economy included)	-5.3	43.4	1.8	5 approximately*
Countries fulfilling only two of the criteria				
Malta	-9.7	72.0	2.1	4.9
Slovakia	-3.7	42.6	8.6	5.0
Countries fulfilling only one criterion				
Hungary	-6.2	56.9	5.0	7.2
Cyprus	-6.3	72.2	3.4	4.7

Note: Bold figures indicate fulfilment of the convergence criterion.

Source: WIIW based on European Commission estimates, Spring 2004. "Economic Forecasts, European Commission", p. 134. * not entirely compatible with the Maastricht criterion of reference long-term interest rate (more at <http://europa.eu.int/comm/eurostat/newcronos/reference/sdds>).

various income and expenditure sources are not methodologically coordinated among countries. Finally, two remaining approaches are used by various authors for determining the size of underground economy in transition countries. The first is based on the so called *input approach*, where data on electricity consumption are used as indicator, and the second is the Eurostat approach, used in the Exhaustiveness programme for candidate countries.

The Eurostat method for estimating the size of underground economy is the most conservative of all methods and always gives the lower limit value of estimated underground economy. Estimates of underground economy obtained by other methods (the input method, econometric points) are in average 2.15 times higher (Table 11) than the Eurostat method.

This paper gives an estimate of underground economy for the period 1998-2002 based on the Eurostat approach. According to this estimate, underground economy (including a correction of calculation method of the imputed dwelling rents) in Croatia amounts to between 15.7 percent (1999) and 17.0 percent (1998). On the basis of data regarding the changes of the structure of GDP in 2003, showing a growth of service sector activities which have a higher proportion of underground economy, it is estimated that the proportion of underground economy in GDP has grown slightly and that in 2003 it amounted to 15.6 percent of GDP. This means that the upper limit value of estimated underground economy for Croatia obtained by other methods would amount to 33.6 percent of GDP for 2003.

Table 19 shows the influence of the official Croatian GDP figure corrected by the estimated amount of underground economy based on the Eurostat method on basic macroeconomic indicators.

Literature

Adam, Marcus C. and Victor Ginsburgh, 1985, "The effects of irregular markets on macroeconomic policy: Some estimates for Belgium", *European Economic Review*, 29(1), pp. 15-33.

Asea, Patrick K., 1996, "The Informal Sector: Baby or Bath Water?", Carnegie-Rochester Conference Series on Public Policy, 45, pp. 163-171.

Bhattacharyya, Dilip K., 1999, "On the Economic Rationale of Estimating the Hidden Economy", *The Economic Journal*, 109(456), pp. 348-359.

Bejaković, Predrag, 1997, "Procjena veličine neslužbenog gospodarstva u izabranim zemljama", *Financijska praksa*, 21(5-6), pp. 91-124.

Državni zavod za statistiku, *Mjesečna izvješća*, (Central Bureau of Statistics, Republic of Croatia, Monthly Reports, various issues)

European Regional Statistics – Reference Guide, 2003,

[http://www.eu-](http://www.eu-datashop.de/download/DE/klassifi/ncronos/thema1/reg_guid.pdf)

[datashop.de/download/DE/klassifi/ncronos/thema1/reg_guid.pdf](http://www.eu-datashop.de/download/DE/klassifi/ncronos/thema1/reg_guid.pdf)

EUROSTAT, *European System of account - ESA 1995*.

Feige, Edgar L., 1989, *The underground economies: Tax evasion and information distortion*, Cambridge: Cambridge University Press.

Feige, Edgar L., 1990, "Defining and Estimating Underground and Informal Economies: The New Institutional Approach", *World Development*, 18(7), pp. 989-1002.

Fichtenbaum, Ronald, 1989, "The productivity slowdown and the underground economy", *Quarterly Journal of Business and Economics*, 28(3), pp. 78-90.

Johnson, Simon, Kaufman, Daniel i Andrei Shleifer, 1997, "The Unofficial Economy in Transition", *Brookings Paper on Economic Activity*, 2, Spring, pp. 159-221.

Schneider, Friedrich, 2003, "Veličina i razvoj sive ekonomije i radne snage u sivoj ekonomiji u 22 tranzicijske zemlje i 21 zemlji OECD-a: Što doista znamo?", *Financijska teorija i praksa*, 27(1), pp. 1-29.

Tanzi, Vito, 1999, "Uses and Abuses of Estimates of the Underground Economy", *The Economic Journal*, 109(456), pp. 338-340.

Weeks, John, 1975, "Policies for expanding employment in the informal sector of developing economies", *International Labor Review*, 111(1), pp. 1-14.