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MEASURING THE NON-OBSERVED ECONOMY IN NATIONAL ACCOUNTS

ILLEGAL ACTIVITIES

Estimates of illegal activities in Serbia

Note by the Statistical Office of the Republic of Serbia[1]

Summary

The paper presents an overview of estimating the illegal activities in Serbia, namely drugs production and sales, and prostitution. The paper describes the methods to improve the estimates used in phase II of the Eurostat-OECD project on measuring the non-observed economy in the Western Balkan countries.

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I.   INTRODUCTION

1.   The illegal nature of production is not a criterion for exclusion of the activities from the national accounts; according to the SNA 1993 and ESA 1995, the production forbidden by law, e. g. prostitution and manufacture and distribution of narcotics fall within the production boundary.

2.   The problem of measurement of these activities, lack of reliable information and assumptions on which it is based, as well as susceptibility of this matter require detailed analysis and examination of the obtained results from both supply and demand side and also a comparison with other countries.

3.   Referring to the drugs calculations, the priority was put to estimation of the production side, based on the seized amounts, while on the consumption side, the results served to confirm whether the output fits in the accepted intervals of consumption of certain narcotics and calculated number of addicts. Related to prostitution, the very rough estimation was done from the supply side, based on the total number of prostitutes, number of working days and average prices.

4.   In Phase II, the Statistical Office of the Republic of Serbia (SORS) has concentrated on improving previous estimates. We continued with investigation and examination of the available data sources and necessary information, provided by authorized institutions, professional teams and experts involved in this matter. Meanwhile, we have also assembled new data sources and new respondents, supplying us with additional information for the period 2003 – 2006, so that we could construct time series. A lot of efforts has been made to separate the acceptable and useful information from versatile and frequently non-harmonized information, which were sometimes even totally contradictory. Our main aim was approaching the global value and quantitative average that were to be used as national level measure and benchmark estimate. We also endeavored to provide supply side estimates separately from the demand side and then, comparing the obtained results, initial suppositions and applied methods, to determine the final value of the observed phenomenon.

II.   DRUGS

A.   Supply side estimates

5.   Supply side estimate was based on the data provided by criminal and border police, health institutions, other countries' experiences, results of international investigations and recommendations from the Annual report of the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) and The United Nations Office on Drugs and Crime (UNDOC). These reports treat many aspects of the drugs problem and offer international review of various indicators, such as number of addicts in relation to grown – up population aged 15-64, the structure by types of drugs, purity and prices. Contacts and cooperation has been established with the Ministry of the Interior and the Institute of Addictive Disorders (IAD). Information on amounts and rates of drug seizures, import and production, domestic use and transit, street and wholesale prices, purity of drug, number of people that are in the process of drug addiction treatment, kinds and doses of drugs in use were processed. Drugs that are consumed on the

territory of Serbia are mainly imported, although there is also some production (cannabis and ecstasy).

6.   Institute of Addictive Disorders, a specialized institution in Belgrade, annually records 800-1000 new patients from the whole country; however, medical treatment has been lately performed in some private hospitals as well, but such registers are not available. Number of patients who come to repeat the therapy is four times greater than the number of the new registered patients. In the last 20 years, total number of registered patients was about 10000, which was approximately only 10 % of the total number of addicts. It should also be noted that during a certain period, patients from the territories of former Yugoslav Republics were partly included in the registers. 80 % of the patients are heroine addicts and they present the most frequently treated group.

7.   Based on the long – lasting experience in treating the addictive disorders, the existing registers and expert literature, as well as on the international projects and comparisons of the obtained results, the experts of the before mentioned institution helped us determine the interval doses of the consumed drugs and purity intervals.

8.   The fact is that the seized amounts vary in years and they certainly depend on the police actions' efficiency, referring to smuggling prevention and transition channels discontinuation. However, the seized amounts are not firmly connected with the domestic market changes or the number of addicts. Therefore, we decided to use data on average seized amounts in the period 2003 – 2006. Furthermore, while analyzing the synthetic drugs, the extremely huge amount of the seized drugs in 2003 was not considered, as it was the year when a domestic shop for foreign market drugs production was discovered.

9.   First, it was important to distinguish the most frequently used types of drugs on our market. The most widespread are marihuana and heroin, although the number of these drugs addicts stagnates, while the number of cocaine users increases, as well as the number of those who change the synthetic drugs with cocaine. Ecstasy is very popular among young generation and it was also noted that combined narcotics usage was very frequent. Thus, it becomes difficult to determine the number of addicts that exclusively use certain sorts of drugs and to exclude them from the multilevel coverage. Consequently, total number of addicts can only be partially reliable.

10.   Studying all accessible sources and initial information and observing mutual relations of certain categories (e.g. purity, prices and indispensable doses), both on the supply and the demand side, we succeeded in making the selection of basic indicators presented in the table below.

Table 1. Supply side estimates of drugs – basic data, 2006

	Average seized amount (gr or pcs.)	Rate of seizure (%)	Domestic use rate (%)	Purity of imported drugs (%)	Purity of drugs sold in street (%)	Price of imported drugs (EUR per gr/pcs.)	Price of drugs sold in street (EUR per gr/pcs.	Average annual consumption (gr or pcs.)
Drug	**S**	**Szr**	**Dur**	**Pui**	**Pust**	**Pi**	**Pst**	**Cd**
Heroin	442791	10	10	75	17	20	32.5	182.5
Cocaine	9750	1	10	85	50	30	50	45
Cannabis	1908869	30	90	85	50	0.75	2	85
Amphetamines	406067	10	90	40	20	6	11	30
Ecstasy – pcs.	11922	10	100	50	15	1	3	100

11.   When calculating the overall income achieved by narcotics sale on the black market in the Republic of Serbia, the starting point was, as it was previously mentioned, the average seized drugs amount; on the basis of the police estimates of the seized rates and rates for the domestic use, we calculated the amounts for the domestic use (I) as follows:

$$I = S * (1 / Szr - 1) * Dur,$$
Where
S – seized amount
Szr – rate of seizure
Dur – domestic use rate

12.   Further, the quantity-price approach was applied, adjusted by the relation between purity of the imported drugs and drugs in the street, in order to calculate the actual sold (used) drugs amount, that is its retail price value, which should suit the final consumption (**C**), since the imported drugs are weakened before then reach the final consumer. Depending on the number of go-betweens, purity of drugs in the street is even several times less than purity of the imported drugs and it further influences the prices and the amount of drugs in circulation. For example, out of 1 gram of the imported heroine, 4 – 5 grams of the street heroine are gained.

$$C = I * Pst * (Pui / Pust),$$
where
Pst – price of drugs in the street
Pui – purity of the imported drugs
Pust – purity of the drugs in the street

13.   As indicator of the reliability of the initial information and the performed calculation, the number of addicts or more precisely users (N) who used, i.e. paid for the obtained drugs can be determined. This data is also observed from the demand side.

$$N = C / (Pst * Cd)$$
where

Cd - average annual consumption, in doses (grams or pieces.)

14.   Income that is achieved through illegal drugs trade presents, from the production side, the difference between value of amounts sold to final consumers, at retail prices and street purity and, on the other hand, value of imported amounts, at purchasing prices and import purity. The trade margin presents, on average, about 82 % of the value of amounts sold at retail prices, while 18 % of such value refers to purchasing prices. Output is the equivalent of the total income and, supposing that intermediate consumption is negligible, it is equal to the value added that is attributed to trade activities. We calculated the value added by deducting quantities for domestic use, multiplied by import (wholesale) prices, from final consumption.

15.   Accordingly, we have calculated the value - non-exhaustiveness adjustment - type N2 in this activity, amounting to 68.5 million EUR or 0.27% GDP.

Table 2. Estimates of final consumption of drugs and output, 2006

	Number of drugs users	Value of sold drugs – retail prices (mill. EUR)	Value of imported drugs – purchasing prices (mill.EUR)	Output - margin (mill.EUR)	%GDP
Drug	**N**	**C**	**Vi**	**O**	
Heroin	9634	57.1	8.0	49.2	0.19
Cocaine	3647	8.2	2.9	5.3	0.02
Cannabis	80173	13.6	3.0	10.6	0.04
Amphetamines	10007	3.3	0.9	2.4	0.01
Ecstasy – pcs.	3577	1.1	0.1	1.0	0.00
Total:	**107038**	**83.4**	**14.9**	**68.5**	**0.27**

B.   Demand side estimates

16.   Referring to the demand side, estimation has been made independently of supply side and based on the following data: number of drugs users, price of drugs sold in the street and average daily and annual consumption by kinds of drugs and previously accepted from supply side. The average annual expenditure has been estimated for each type of drug. Number of users is determined on the basis of versatile sources: estimates of the Ministry of the Interior, related to the heroine needs of the Belgrade market, the survey conducted among the pupils in Belgrade schools and everyday knowledge about the frequency of taking certain sorts of drugs, on the basis of international comparisons and available estimates of the numbers of problematic drug users and number of occasional users from the EMCDDA or UNODC reports in comparison with number of adult population and their structure by different types of drugs and finally, on the basis of the records of the Institute of Addictive Disorders related to registered patients and estimates of the number of such patients in relation to unregistered users (1:5). Starting from the

data on average daily doses, street prices and street purity of drugs, we calculated the total drugs amounts in domestic use and the value of final consumption for 2006.

Table 3. Demand side estimates of drugs – basic data, 2006

	Heroin	Cocaine	Cannabis	Ecstasy	Ampheta mines	Total
Number of drug users						
Based on EMCDDA report	9358	2611	63013	4458	6401	85840
Based on seizure	9705	4817	79465	2384	12333	108705
Police and medical reports	10112	3612	81000	3421	9367	107512
From supply side	**9634**	**3647**	**80173**	**3577**	**10007**	**107038**
Share in the population (15-64)	0.19	0.07	1.58	0.07	0.20	2.10
Average annual consumption- gr[1]	182.5	45.0	85.0	100	30	
HFCE[2] per users in EUR	5927	2248	170	308	330	779
HFCE in mill. EUR	**57.1**	**8.2**	**13.6**	**1.1**	**3.3**	**83.4**
% GDP	**0.23**	**0.03**	**0.05**	**0.00**	**0.01**	**0.33**

1) For ecstasy in tablets
2) Household final consumption expenditure

17.   Estimations of drugs consumption from both sides gave us the opportunity to check reliability of the obtained results and initial data, such as the number of drug users and daily doses. Demand side estimates are usually taken to be more reliable than supply side estimates, but in case both estimates are calculated independently and they both refer to various sorts of drugs and also in case similar results are obtained, it certainly is not a problem to harmonize and verify them and also to incorporate them in the system of national accounts.

C.   Construction of time series

18.   The obtained 2006 data were used as benchmark estimations for the previous years' series. Moreover, Eurostat also proposes producing of benchmark estimates once in a five – year period and extrapolation between benchmark years, by using the number of drug users and seizures.

19.   On the basis of the annual register of the patients – heroine addicts, who applied for medical treatment in Belgrade for the first time, total number of drugs users was estimated, but necessary average doses, purity and purchasing prices remained unchanged. In case some significant changes on our market happen, or in case EMCDDA survey is conducted in our country, new calculations for 2008 may be performed and used for extrapolation in the forthcoming five – year period.

20.   Even though sold quantities for the domestic use were calculated according to seized amounts and rates obtained by the police, they should be treated with reserve, as they greatly influence the initial elements of calculation from the production side. Besides using average

values and ignoring extremes, it would be more profitable to perform calculations in several variations that would determine intervals in which non-exhaustiveness adjustment can appear.

Table 4. Non-exhaustiveness adjustment for drugs

	2003	2004	2005	2006
Number of drug users				
Heroin	7023	7803	8671	9634
Cocaine	2659	2954	3282	3647
Cannabis	58444	64940	72156	80173
Ecstasy	2608	2897	3219	3577
Amphetamines	7295	8106	9006	10007
Total	**78029**	**86700**	**96334**	**107038**
HFCE in mill. EUR				
Heroin	41.7	46.3	51.4	57.1
Cocaine	6.0	6.6	7.4	8.2
Cannabis	9.9	11.0	12.3	13.6
Ecstasy	0.8	0.9	1.0	1.1
Amphetamines	2.4	2.7	3.0	3.3
Total	**60.8**	**67.5**	**75.0**	**83.4**
HFCE in % of GDP	**0.34**	**0.34**	**0.36**	**0.33**
Output in mill. EUR				
Heroin	35.8	39.8	44.3	49.2
Cocaine	3.9	4.3	4.8	5.3
Cannabis	7.7	8.7	9.4	10.6
Ecstasy	0.7	0.8	0.9	1.0
Amphetamines	1.8	1.9	2.2	2.4
Total	**49.9**	**55.5**	**61.6**	**68.5**
Output in % of GDP	**0.28**	**0.28**	**0.29**	**0.27**

21.   So, the total non-exhaustiveness adjustment – type N2 from production side for narcotics in the observed period amounts to 0.28% of GDP on average. Respective to the previous 2003 calculations (performed in the first phase of the project), the absolute difference can be ignored, while in the relative sense, it is the result of the meanwhile revised GDP, which is now increased, when compared to the previously published data. Non-exhaustiveness adjustment from expenditure side, in the same period, amounts on average to 0.34 % of GDP.

III.   PROSTITUTION

22.   It is fairly difficult to obtain officially supported and reliable data and estimates in this field. We have used all accessible information: the Internet, newspapers, TV programs, surveys of anonymous suppliers and users of services and statements of the respondents, interested in legalization of prostitution. The police office of the city of Belgrade provided the data on the number of registered persons in the last 15 years (1065 persons in relation to 800 in 2003) and submitted charges in 2006 (203 for dealing with prostitution and 25 for intermediation) in the

city of Belgrade. Since the data from the register relate to several – year period and the same person can be charged more than once, we have reached the conclusion that, on average, about 70 of the new registered prostitutes is charged annually and each of them is approximately charged three times and not 210, as it was the number of the charges.

23.   There are several types of prostitution in our country: street, agency or via advertisement, hotel, high – level, covert and via the Internet. They differ according to working hours, prices and realized earnings. Lately, street prostitution has transformed into offering services via advertisements and unregistered massage salons. According to the police sources, relation between street and agency – hotel prostitution is 40:60, while it is supposed that high – level prostitution involves maximum 10% of people included in hotel and agency prostitution.

24.   Being aware of the fact that over 85% of street prostitutes are destitute and with no constant income and according to registered unemployed female population aged 15-45 (street prostitution) and 20-35 (agency prostitution), extrapolation for the whole territory of Serbia has been performed. Experts estimate of the number of daily services or number of clients is 5 (street prostitution), 3 (hotel and agency prostitution), and 1 (high – level prostitution, mostly on weekends). With regard to the number of working days it is estimated that the first group works annually 260 days on average or 5 days a week, the second about 200, high – level about 110 days, and prices are 10-20 EUR per a service (street), 80-100 EUR per an hour (agency) and 500 EUR per a client (high – level prostitution). The output for each of the mentioned types has been calculated as:

$$O = Np * Nwd * P$$
Where
Np - Number of prostitutes
Nwd - Average number of working days
P- Average daily earnings, calculated according to average price per service or client

Table 5. Supply side estimates of prostitution, 2006

Type	Number of prostitutes	Number of working days	Average daily earning, EUR	Total turnover mill. EUR
Street, individuals working	2250	260	60	35.1
Hotels, escort services, advertising	2900	200	200	116.0
High prostitution	258	100	500	12.9
Total	**5408**	**220**	**156**	**164.0**

25.   As data on the number of clients who use the services of this sort were not available, demand side has not been estimated, but the obtained output values fit the expenditures that 5.4% of the male population aged 20-60 would have paid for such services 3 times a month (on average) by the average price of 40 EUR. It is difficult to determine whether it is the right measure or not, and there is no possibility of comparison with other countries.

26.	The benchmark estimation for 2006 was done and the previous years' series were created according to the number of new registered police charges in the period 2003-2006. Unemployment rate of the female population was extrapolated on the whole territory of Serbia. This situation is similar to the situation with narcotics, so it is also adequate to monitor long – term trends, and inclusion of estimates in national accounts is not expected to have a significant effect on GDP growth in a short time period.

Table 6. Non-exhaustiveness adjustment for prostitution

	2003	**2004**	**2005**	**2006**
Number of prostitutes	4048	4494	4885	5408
Street, individuals working	1915	2126	2417	2250
Hotels, escort services, advertising	1961	2177	2269	2900
High prostitution	172	191	199	258
Turnover =Output = HFCE (mill. EUR)	**116.9**	**129.8**	**138.4**	**164.0**
Intermediate consumption – 20%	23.4	26.0	27.7	32.8
Value added (mil. EUR)	**93.5**	**103.8**	**110.7**	**131.2**
GDP (mill. EUR)	18008.7	19723.5	21113.4	25249.5
HFCE in % of GDP	**0.65**	**0.66**	**0.66**	**0.65**
VA in % of GDP	**0.52**	**0.53**	**0.52**	**0.52**

27.	The total non-exhaustiveness adjustment for prostitution is, from production side, about 0.52% of GDP, and from expenditure side, it approximately amounts to 0.66% of GDP.

28.	Finally, the total non-exhaustiveness adjustment – type N2, from production side, for illegal activities in the observed period amounts on average to 0.8% of GDP and from expenditure side, it is about 1% of GDP.

Table 7. Non-exhaustiveness adjustment for illegal activities

	2003	**2004**	**2005**	**2006**
VA in % of GDP – drugs	**0.28**	**0.28**	**0.29**	**0.27**
VA in % of GDP - prostitution	**0.52**	**0.53**	**0.52**	**0.52**
Total supply side in % of GDP	**0.80**	**0.81**	**0.81**	**0.79**
HFCE in % of GDP- drugs	**0.34**	**0.34**	**0.36**	**0.33**
HFCE in % of GDP- prostitution	**0.65**	**0.66**	**0.66**	**0.65**
Total expenditure side in % of GDP	**0.99**	**1.00**	**1.02**	**0.98**

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