Illicit drug market and its economic impact

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Foreword

The research report summarizes results of the Workstream 6 under the EU Project New methodological tools for policy and programme evaluation (JUST/2010/DPIP/AG/1410). The overall goal of the project was increased knowledge of illicit drug market from demand a supply side, behaviours of drug users, and of drug legislation in countries participating in the project, in order to produce effective global indicators to evaluate actions and policies of drug supply and drug demand reduction.

The objectives of the Workstream 6 were to provide models to estimate the impact of the illicit drug market on the economy (in particular in relation to the GDP in terms of its size). Expected results under the Workstream 6 were (i) development of methodology for estimation of drug trade from the demand side, (ii) definition and (iii) identification of suitable indicators for the estimation of drug market with the possibility to include the drug trade into the system of national accounts as a part of illegal economy, (iv) data collection of available indicators and estimation of illicit drug market in project partners countries (Czech Republic, Italy, Portugal, Spain), (v) data collection of labelled public expenditure on drug policy (divided into prevention, harm reduction, treatment, law enforcement) and (vi) estimation of non-labelled public expenditure on drug policy. Finally, economic impact of illicit drug trade on GDP was analysed, and comparison of public expenditures on drug policy with total public expenditures was performed in a time series.

Expected utilizers of the Workstream results are the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) in terms of the list of collected data; and the statistical office of the European Union (Eurostat) in terms of the financial indicators from drug market that should be included in national accounts by the national statistical offices. And of course, the results are available for other experts and policy makers for future research and decisions.

The research report is written with the use of terminology from the field of drug policy makers, same as of national accountants, so that it is comprehensive to both groups of experts.

Summary

Market with illicit drugs seems to bring high revenues to those who chose to take the risks associated with their participation in activities that are prohibited worldwide by the international framework of U.N. treaties. Given that on average, almost one fifth of all Europeans aged 15 – 64 used cannabis (the most commonly used illegal drug) in their lifetime, about 5 % used it in the last year, and close to 1 % uses substantial quantities of cannabis on a daily basis, illegal drug market represents a substantial part of household expenditures.

Despite the unquestionable role illegal drug markets have on national and global economies, their dynamics remains unexplored by statisticians. Since 2005, illicit drug markets are considered a part of non-observed economy in the System of National Accounts by Eurostat. However, the extent to which the drug market contributes to gross domestic product remains difficult to estimate, since no official data can effectively trace economic activities of subjects on illegal market.

In this publication, we estimate the size of the drug market in the Czech Republic and partner countries of the project *New methodological tools for policy and programme evaluation* (JUST/2010/DPIP/AG/1410), namely Italy and Spain. The total value added on the illicit drug market was EUR 3 258 million in Italy, EUR 3 066 million in Spain, and 369 million EUR in the Czech Republic. The estimate is made with a combination of epidemiological data on illicit drug use in general population and in hidden populations, research on quantities of drugs consumed per a use day / use occasion, and police statistics on drug prices and purities. It is, therefore, a demand-based estimation of the size of the drug market. We also present the methodology to estimate expenditures on drug policy.

This report differentiates from pre-existing drug market estimates in two ways. For one, it aims to be a straightforward methodological toolkit for statisticians who aim at illicit drug market estimation, without being experts in drug policy research that often requires trans-disciplinary approach. For two, it follows the System of National Accounts rigorously, and classifies the different drug market estimates according to its standards.

As a result, we show that the illicit drug market ranged between 0.2 and 0.3 % of GDP in 2008/2009 in the countries we observed. It is important to point out that the above mentioned figure represents the value added at the national drug market. It would be misleading to compare, for instance, the total use of illicit drugs, that represented EUR 521 million in the Czech Republic, EUR 4 957 million in Spain, and EUR 5 023 million in Italy, to GDP, since not the entire value of drugs consumed is produced within the borders of the national economy.

Introduction

Illicit drug markets make a substantial part of nowadays national economies. Despite the trade with substances stated as illegal by the U.N. treaties from 1961, 1971 and 1988 remains highly punished in most countries in the world, and penalties for possession of these substances for personal use haven´t been removed in many, supply of drugs continues to meet its demand.

Moreover, the illicit nature of these substances seems to bring high revenues to those who chose to take the associated risks. The baseline of research in the area of drug markets postulated that drug sellers are compensated for the risk of having their goods seized, for the risks of arrest, and also for the risk of suffering violence or homicide. While some chose not to take the risk at all, others, who are rather risk-takers, are taking the profits out of the market (Caulkins & Reuter, 1996; Peter Reuter & Kleiman, 1986; P. Reuter, MacCoun, & Murphy, 1990).

It has been subject to multiple research attempts to estimate what the actual size of the drug market is, in order to compare it with other, legitimate fields of economic activity, but also to enumerate the importance of illicit drug markets in national economies, and finally, to have a good estimate of the size of illegal economy in order to precise the system of national accounts with such estimates. Various institutions have been pursuing efforts in this area.

An annual or semi-annual estimate of the size of illicit drug markets in particular countries is published by UNODC, which relies predominantly on data provided by national governments and partially, their law enforcement agencies (UNODC, 2012). Their most recent figures value the global cocaine market at 85 billion USD (UNODC, 2011b), and the global opiate market at 68 billion USD (UNODC, 2011a). An estimate from 2003 provided wholesale and retail values for all U.N. countries, split by different drug types, the global retail drug market being evaluated at 320 billion USD (UNODC, 2005).

The second major contribution to the body of literature has been a cooperative study of Trimbos Instituut and RAND performed for the European Commission in 2006 (RAND, Trimbos, & EC, 2009). Contrary to UNODC, RAND relied on demand-side data, estimating the drug market based on the amount of drugs consumed in a given period (Kilmer & Pacula, 2009). Their estimate of cannabis market, for

instance, brought less than half of the market value estimated by UNODC (a mid-point estimate of 13.5 billion EUR in Europe by Trimbos and RAND, contrary to 35.2 billion EUR estimated for the same area in 2003 by UNODC).

Neither of the above studies, however, paid great attention into framing this illegal market into the system of national accounts, despite the fact illegal drug markets in general have already been incorporated in both SNA93 and ESA95 (EC, 1996; UN, 1993), and several national states have been active in that matter (Baldassarini & Corea, 2008; Garcia, 2002; Groom & Davies, 1999).

The second part of the financial flows related to illicit drugs arises rather from public budgets than from private spending, and represents the cost of policies that are intended to reduce drug supply, drug use and harms incurred from using them (EMCDDA, 2008; Kopp & Fegnolio, 2003; P. Reuter, 2006). It shall be of interest to decision makers what is the total amount of money spent in drug policies on regional and/or national level, same as what is the balance between drug policy priorities and amounts invested in different drug policy pillars (supply reduction, demand reduction and harm reduction). At any case, adequate methods of estimation shall be used, and at some point, decision makers might want to compare the public and the private resources invested in the issue of illicit drugs, which is the attempt provided in this report.

In this report, we aim at guiding both researchers and national accountants into the basic methodology of estimating the size of illicit drug markets. The main goal is to make the methodology of illicit drug markets estimation as accessible as possible. The authors hope the toolkit they are presenting, with vast examples from their national country, will contribute to initiation and successful publication of as many internationally comparable estimates of illicit drug market size as possible, and to their sensible use.

1

Estimation of illicit drug market

In this chapter, estimation of illicit drug market is provided. The data from the Czech Republic are used as an example, and further implementation in other project participant countries is provided. The chapter describes the methodology that was used, available data sources, market volume of the main drugs consumed in the countries, and financial indicators of the drug market included in the system of national accounts.

1.1. Methods

The estimation of drug consumption can be done from both the supply side and from the demand side. Estimation of drug market from demand side is based on estimation of drug consumption. Estimation of drug consumption from supply side can be described by formula 1 (Mazegger, 1999):

$$C = S \cdot \left(\frac{1}{sr} - 1 \right) \cdot a \cdot \left(\frac{pu_i}{pu_{st}} \right) \cdot P_{st} \qquad (1)$$

where *C*……value of final consumption of drugs,
S……seized quantity,
sr……rate of seizures on total supply,
a…….rate of total supply dedicated for domestic market,
pu_i…..drug purity by import/production,
pu_{st}…..drug purity by final consumption,
P_{st}…..”street” price.

The value of final consumption of drugs calculated with the use of this formula is equal to drug quantity dedicated for domestic market (*I*), multiplied by purity rate and valued by “street” prices. Quantity of import dedicated for domestic market is

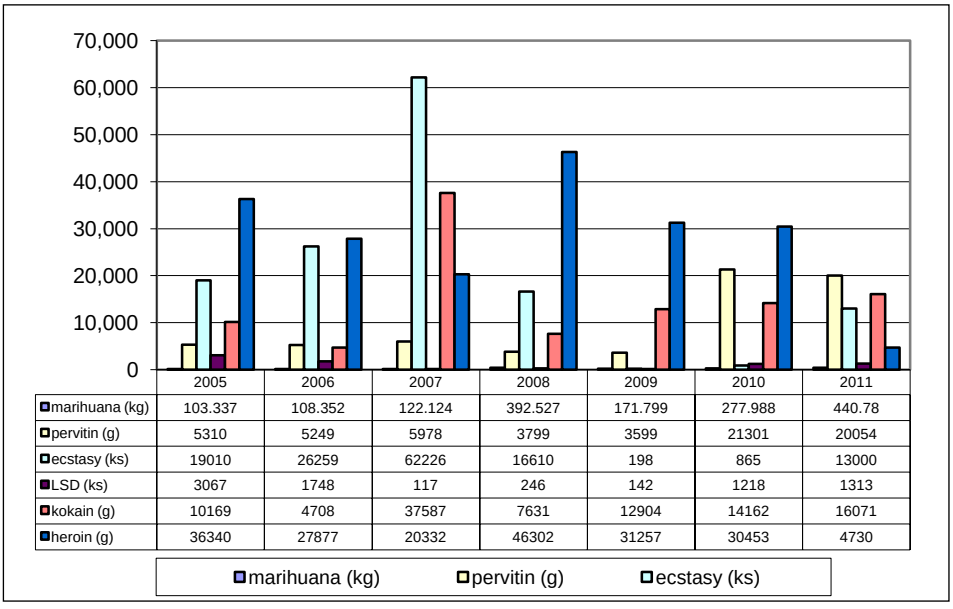
estimated by the formula 2:

$$I = S \cdot \left(\frac{1}{sr} - 1 \right) \cdot a \qquad (2)$$

The estimation contains a number of deficiencies, as for example rate of seizures or rate for domestic market, which are complicated to estimate. Quantities of seized drugs are published annually, but there are big differences between years. The rate of seizures on total supply remains rather unknown. The data explain rather success of police on reduction of drug supply than relevant data for estimation of drug consumption each year.

The Figure 0-1 shows quantities of main illicit drugs seized in the Czech Republic between years 2005 – 2011. There are visible different quantities of drug seizures of individual drug categories between years. Therefore, methodology for estimation of drug consumption from supply side is not feasible for most countries.

Figure 0-1: Quantity of main illicit drugs seized in the Czech Republic in 2005-2011



	2005	2006	2007	2008	2009	2010	2011
marihuana (kg)	103.337	108.352	122.124	392.527	171.799	277.988	440.78
pervitin (g)	5310	5249	5978	3799	3599	21301	20054
ecstasy (ks)	19010	26259	62226	16610	198	865	13000
LSD (ks)	3067	1748	117	246	142	1218	1313
kokain (g)	10169	4708	37587	7631	12904	14162	16071
heroin (g)	36340	27877	20332	46302	31257	30453	4730

Source: National Drug Squad of the Criminal Investigation Service of the Police of the Czech Republic

Estimation of the value of drugs consumed on demand side includes the indicators: number of drug users, their average consumption per a time period, and “street” prices.

The estimation is possible to describe by the formula 3:

$$C = N \cdot Q_a \cdot P_{st} \tag{3}$$

where *C*……value of final consumption of drugs,
N……number of users,
Q_a…..average annual quantity consumed per user,
P_{st}…..”street” prices.

All the indicators are currently available. Estimation of quantity of drugs consumed in each category of drugs based on formula (3) can be described by the formula 4:

$$C_i = N_i \cdot F_i \cdot O_i \tag{4}$$

where C_i……quantity of illicit drug consumed
N_i……number of users
F_i……frequency of drug use during one year
O_i……drug quantity consumed per occasion
i……..illicit drug category

When quantity of drugs consumed is estimated from the demand side, a question arises: “From where the drugs come?” There are two possibilities: the drugs are produced within the borders of the country of concern, or the drugs are imported from other countries. Some drugs could have both origins (e.g. cannabis type drugs). The cannabis type drugs, amphetamines, ecstasy and LSD have European origins. Cocaine is imported into Europe from South America, heroin is imported from Asia (UNODC, 2012).

Several drug categories (amphetamines, cocaine, and heroin) are diluted with other substances by drug dealers. These drugs thus have different purity on wholesale (imported/produced) level and on retail level. Domestic production of drugs could be partially exported. Transit of illicit drugs through country is not included in the model, because it doesn´t have any economic impact on the country per se, and it is not reflected in consumption estimate. However, if purities of diluted drugs change during transit through different countries, the market value of the drug volume increased through the process of dilution shall be considered as domestic production. Drug market size and flows of particular drugs in the drug market are described in the chapter 1.3.3.As the drug trade has wholesale and retail levels, the drug market can be valued both in wholesale and in retail prices. Financial indicators of the drug market and its inclusion into the system of national accounts are

described in the chapter 0. Final estimation of drug market size represents the added value from drug trade, which is an indicator that can be directly compared with the size of GDP.

1.2. Data

This chapter describes different data sources for all indicators that are needed in order to estimate the size of illicit drugs market from demand side (such as prevalence rates of drug use, frequency of drug use, drug purities and prices etc.). The example of the Czech Republic is provided in all cases.

1.2.1. Prevalence of illicit drug use among general population (occasional use)

The General Population Surveys (GPSs) are the main data sources about prevalence rates of drug use among citizens, excluding hidden populations with problem drug use patterns (EMCDDA, 2009a). General population surveys present data on (i) any illicit drug use during the person's life (lifetime prevalence), so-called 'lifetime experience' with illicit drugs, (ii) any illicit drug use in the previous year (last-12-months prevalence), so-called 'recent use' of illicit drugs or 'occasional use', and (iii) any illicit drug use in the previous month (last-30-days prevalence), so-called 'current use' of drugs (EMCDDA, 2007), For the purpose of market size estimates, 'occasional use' ('recent use', use in the last 12 months) is used. The example for the Czech Republic comes out from the GPS 2008[1] (Běláčková, Nechanská, Chomynová, & Horáková, 2012). The most consumed illicit drugs in the Czech Republic are cannabis type drugs, methamphetamine (pervitin), ecstasy, LSD and heroin. The following tables (
Table 0-1 to Table 0-6) show prevalence rates of occasional user of illicit drugs. The tables are cross-tabulations of answers for questions in GPS 2008, presented as a percentage of totals within the age-gender category:

- rows: five-years age category;
- columns: prevalence of illicit drug use (standard EMCDDA indicator of past 12 months prevalence of illicit drug use /split into single and multiple times use in GPS 2008/, and standard EMCDDA indicator of use frequency in the past 30 days), divided by gender

The category 2-11 times in last year represents the share of users that used particular illicit drug more than once in last 12 months year and that didn't use that drug in the last 30 days at the same time. The last column in the following tables (
Table 0-1 to Table 0-6) represents the prevalence of last 12 months use of a particular drug per selected age category (across genders). Last 12 months prevalence of cannabis use in the Czech population (15 – 64 years of age) was 14.8 % in 2008. Last year prevalence of cannabis use in the population 15 – 19 years old was 42.4 %, whereas, for instance, in the population 50 – 54 years old it was 4.7 %.

[1] Actual GPS 2012 was realized in the September/October 2012 and results from the survey are not processed yet.

Table 0-1: Prevalence rates of cannabis type drugs use in CZ in 2008 (in %)

Age groups	Once in the last year		2-11 times in last year		1-3 times in last month		1-2 times in last week		3-4 times in last week		5-7 times in last week		Total
	males	females	Males	females	males	females	Males	females	males	females	Males	females	
15 – 19	**11,7**	**13,4**	**5,4**	**6,5**	**10,8**	**8,2**	**13,3**	**3,4**	**6,7**	**2,2**	**1,7**	**1,3**	**42,4**
20 – 24	**10,5**	**8,4**	**1,6**	**2,4**	**12,5**	**6,0**	**8,2**	**3,2**	**4,3**	**1,6**	**4,3**	**0,8**	**32,2**
25 – 29	**9,7**	**4,7**	**2,3**	**1,8**	**7,7**	**2,9**	**7,0**	**1,8**	**5,3**	**1,1**	**3,0**	**0,7**	**24,3**
30 – 34	**8,3**	**4,9**	**1,8**	**1,2**	**9,0**	**2,0**	**4,0**	**1,6**	**1,4**	**0,4**	**0,7**	**0,0**	**17,9**
35 – 39	**6,9**	**2,1**	**0,5**	**0,5**	**2,3**	**1,5**	**4,6**	**2,1**	**1,4**	**0,0**	**0,9**	**1,0**	**12,0**
40 – 44	**1,6**	**2,9**	**2,7**	**1,4**	**2,7**	**0,5**	**1,6**	**0,5**	0,0	1,0	0,0	0,0	**7,0**
45 – 49	**3,7**	**2,3**	**2,6**	**0,0**	**2,1**	**0,6**	0,0	0,0	0,5	0,0	0,0	0,0	**5,7**
50 – 54	**2,9**	**1,9**	**2,4**	**1,4**	**0,5**	**0,5**	1,0	0,9	0,0	0,0	0,0	0,0	**4,7**
55 – 59	**1,4**	**0,9**	**3,2**	**0,4**	0,0	0,4	0,9	0,0	0,9	0,0	0,5	0,0	**2,9**
60 – 64	0,0	0,5	0,0	0,0	0,5	0,5	0,0	0,0	0,5	0,0	0,0	0,0	**0,0**
Total	**5,8**	**4,0**	**2,2**	**1,5**	**4,9**	**2,1**	**3,9**	**1,2**	**1,9**	**0,5**	**1,1**	**0,4**	**14,8**
	4,9		**1,9**		**3,5**		**2,6**		**1,2**		**0,7**		

Source: NFP (GPS 2008)

Prevalence of methamphetamine use in the last 12 months in the Czech Republic within the population of 15 – 64 years old was 1.8 % in 2008. Last 12 months prevalence of methamphetamine use was the highest in the age group 20 – 24 years old (4.6 %) and 25 - 29 years old (4.3 %).

Table 0-2: Prevalence rates of methamphetamine use in CZ in 2008 (in %)

Age groups	Once in last year		2-11 times in last year		1-3 times in last month		1-2 times in last week		3-4 times in last week		5-7 times in last week		Total
	males	females	males	females	males	females	males	females	males	females	Males	females	
15 – 19	**2,1**	**0,9**	**0,4**	**0,4**	**0,4**	**0,4**	**0,0**	**0,4**	0,8	0,4	0,0	0,0	**2,5**
20 – 24	**2,7**	**1,6**	**2,0**	**0,4**	**1,2**	**0,0**	**1,2**	**0,0**	0,8	0,0	0,0	0,0	**4,6**
25 – 29	**2,7**	**1,1**	**1,7**	**0,4**	**1,0**	**1,1**	**0,7**	**0,0**	1,0	0,7	0,3	0,0	**4,3**
30 – 34	**1,1**	**0,4**	**0,7**	**0,8**	**0,0**	**0,0**	**0,4**	**0,0**	0,0	0,0	0,4	0,4	**1,7**
35 – 39	**0,5**	**0,5**	**0,5**	**0,0**	**0,0**	**0,0**	**0,0**	**1,0**	0,0	0,0	0,0	0,5	**1,2**
40 – 44	**1,1**	**0,5**	**2,2**	**0,5**	**0,0**	**0,0**	0,0	0,0	0,0	0,5	0,0	0,0	**2,1**
45 – 49	**0,5**	**0,6**	**0,0**	**0,0**	**0,5**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	**0,8**
50 – 54	**0,5**	**0,0**	**0,5**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,5**
55 – 59	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
60 – 64	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
Total	**1,1**	**0,5**	**0,8**	**0,3**	**0,3**	**0,2**	**0,2**	**0,1**	**0,0**	**0,0**	**0,0**	**0,0**	**1,8**
	0,8		**0,5**		**0,2**		**0,2**		**0,0**		**0,0**		

Source: NFP (GPS 2008)

Last 12 months prevalence of ecstasy use in the in the Czech Republic within the population of 15 – 64 years old was 3.5 % in 2008. Last 12 months prevalence of ecstasy use was the highest in the age group 15 – 19 years old (11.9 %) and 20 - 24 years old (10.9 %).

Table 0-3: Prevalence rates of ecstasy use in CZ in 2008 (in %)

Age groups	Once in last year		2-11 times in last year		1-3 times in last month		1-2 times in last week		3-4 times in last week		5-7 times in last week		Total
	males	females	males	females	males	females	males	females	males	females	males	females	
15 – 19	**6,3**	**7,3**	**3,3**	**1,3**	**1,3**	**1,3**	**1,7**	**0,4**	**0,8**	**0,0**	0,0	0,0	**11,9**
20 – 24	**7,4**	**4,0**	**2,3**	**0,8**	**2,0**	**2,4**	**2,0**	**0,4**	**0,4**	**0,0**	0,0	0,4	**10,9**
25 – 29	**4,0**	**1,1**	**1,0**	**0,4**	**2,0**	**1,8**	**1,7**	**0,0**	**0,0**	**0,4**	0,0	0,0	**6,2**
30 – 34	**3,6**	**1,6**	**0,0**	**0,4**	**0,7**	**0,4**	**0,7**	**0,4**	0,0	0,0	0,0	0,0	**4,0**
35 – 39	**2,3**	**1,0**	**0,0**	**0,5**	**0,9**	**0,5**	0,0	0,0	0,0	0,0	0,0	0,0	**2,7**
40 – 44	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
45 – 49	1,0	0,6	0,0	0,0	0,0	0,6	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
50 – 54	0,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
55 – 59	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
60 – 64	0,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
Total	**2,4**	**1,4**	**0,6**	**0,3**	**0,7**	**0,6**	**0,6**	**0,1**	**0,1**	**0,0**	**0,0**	**0,0**	**3,5**
	1,9		**0,5**		**0,7**		**0,4**		**0,1**		**0,0**		

Source: NFP (GPS 2008)

Last 12 months prevalence of LSD use in the in the Czech Republic within the population of 15 – 64 years old was 2.1 % in 2008. Last 12 months prevalence of LSD use was the highest in the age group 20 – 24 years old (6.4 %) and 15 - 19 years old (6.4 %).

Table 0-4: Prevalence rates of LSD use in CZ in 2008 (in %)

Age groups	Once in last year		2-11 times in last year		1-3 times in last month		1-2 times in last week		3-4 times in last week		5-7 times in last week		Total
	males	females	males	females	males	females	males	females	males	females	males	females	
15 – 19	**5,0**	**2,6**	**1,7**	**0,9**	**2,1**	**0,4**	0,4	0,4	0,4	0,0	0,0	0,0	**6,4**
20 – 24	**4,7**	**2,0**	**2,3**	**0,0**	**2,3**	**1,6**	0,4	0,4	0,0	0,0	0,4	0,0	**6,6**
25 – 29	**2,7**	**1,8**	**1,7**	**0,7**	**2,0**	**0,4**	0,7	0,7	0,0	0,0	0,0	0,0	**4,7**
30 – 34	**2,2**	**0,0**	**0,0**	**0,0**	0,0	0,0	0,0	0,4	0,0	0,0	0,0	0,0	**1,1**
35 – 39	**2,3**	**1,5**	**0,0**	**1,0**	0,0	0,0	0,0	0,5	0,0	0,0	0,0	0,5	**2,4**
40 – 44	**0,5**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,3**
45 – 49	**0,5**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,3**
50 – 54	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
55 – 59	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
60 – 64	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
Total	**1,8**	**0,8**	**0,6**	**0,3**	**0,6**	**0,2**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**2,1**
	1,3		**0,4**		**0,4**		**0,0**		**0,0**		**0,0**		

Source: NFP (GPS 2008)

Last 12 months prevalence of cocaine use in the in the Czech Republic within the population of 15 – 64 years old was 0.7 % in 2008. Last 12 months prevalence of cocaine use was the highest in the age group 25 – 29 years old (2.2 %) and 20 - 24 years old (2.0 %).

Table 0-5: Prevalence rates of occasional cocaine use in CZ in 2008 (in %)

Age groups	Once in last year		2-11 times in last year		1-3 times in last month		1-2 times in last week		3-4 times in last week		5-7 times in last week		Total
	males	females	males	females	males	females	males	females	males	females	males	females	
15 – 19	**1,7**	**0,0**	**0,4**	**0,0**	**0,0**	**0,0**	**0,8**	0,0	0,4	0,0	0,0	0,0	**1,5**
20 – 24	**1,6**	**0,8**	**0,4**	**0,0**	**0,4**	**0,4**	**0,4**	0,0	0,4	0,0	0,0	0,0	**2,0**
25 – 29	**2,0**	**0,4**	**0,0**	**0,0**	**1,0**	**0,0**	**1,0**	0,0	0,0	0,0	0,0	0,0	**2,2**
30 – 34	**0,7**	**0,4**	**0,4**	**0,0**	**0,0**	**0,4**	0,0	0,0	0,0	0,0	0,0	0,0	**1,1**
35 – 39	**0,0**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
40 – 44	**0,0**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
45 – 49	**0,5**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,3**
50 – 54	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
55 – 59	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
60 – 64	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,0	0,0	0,0	0,0	0,0	**0,0**
Total	**0,7**	**0,2**	**0,1**	**0,0**	**0,2**	**0,1**	**0,2**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,7**
	0,4		**0,1**		**0,1**		**0,1**		**0,0**		**0,0**		

Source: NFP (GPS 2008)

Last 12 months prevalence of heroin use in the in the Czech Republic within the population of 15 – 64 years old was 0.4 % in 2008. Last 12 months prevalence of heroin use was the highest in the age group 20 – 24 years old (1.2 %) and 15 - 19 years old (1.1 %).

Table 0-6: Prevalence rates of heroin use in CZ in 2008 (in %)

Age groups	Once in last year		2-11 times in last year		1-3 times in last month		1-2 times in last week		3-4 times in last week		5-7 times in last week		Total
	males	females	males	females	males	females	males	females	males	females	males	females	
15 – 19	**0,8**	**0,9**	**0,4**	**0,0**	0,0	0,0	0,4	0,0	0,0	0,0	0,0	0,0	**1,1**
20 – 24	**1,2**	**0,8**	**0,4**	**0,0**	0,0	0,0	0,4	0,0	0,0	0,0	0,0	0,0	**1,2**
25 – 29	**0,7**	**0,0**	**0,7**	**0,0**	0,0	0,0	0,3	0,4	0,0	0,0	0,0	0,0	**0,7**
30 – 34	**0,7**	**0,8**	**0,4**	**0,0**	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**1,0**
35 – 39	**0,0**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,0	0,0	0,0	**0,0**
40 – 44	**0,0**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
45 – 49	**0,5**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,3**
50 – 54	**0,5**	**0,0**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,2**
55 – 59	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
60 – 64	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**
Total	**0,4**	**0,2**	**0,2**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,4**
	0,3		**0,1**		**0,0**		**0,0**		**0,0**		**0,0**		

Source: NFP (GPS 2008)

1.2.2. Mid-year population

Mid-year population is an important indicator for calculation of number of "occasional" (last 12 months) illicit drug users from national prevalence rates. The indicator is published by national statistical offices. It represents the "number of inhabitants as balanced on July 1st of the reference year" (ČSÚ 2009). The structure of the data must be same as prevalence rates data (5 years age categories for the population 15-64 years old split by gender).

Table 0-7: Mid-year population by age groups and gender in 2008

Age groups	Mid-year population	
	males	females
15 – 19 years	329 067	313 123
20 – 24 years	363 689	340 364
25 – 29 years	410 785	385 908
30 – 34 years	481 285	456 950
35 – 39 years	395 569	373 381
40 – 44 years	364 169	346 584
45 – 49 years	329 019	319 378
50 – 54 years	368 444	372 990
55 – 59 years	373 369	394 273
60 – 64 years	328 281	367 904

Source: Czech Statistical Office

1.2.3. Problem drug use

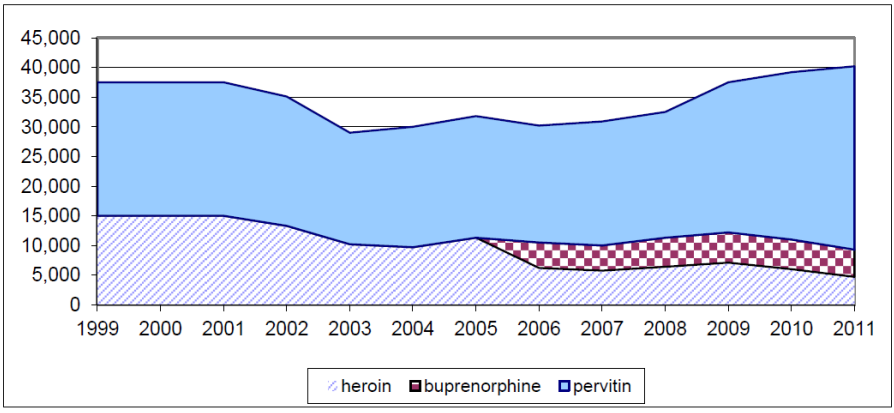
Problem drug use is defined by EMCDDA as "injecting drug use or long-duration/regular use of opioids, cocaine and/or amphetamines" (EMCDDA, 2009b). Problem drug users (PDUs) are not obviously captured by general population surveys, and the size of PDU population is estimated separately, with a combination of two methods (EMCDDA, 2009b; Mravčík, Lejčková, & Korčišová, 2005) :

- Multiplication method (with use of drug treatment data, such as e.g. register of hospitalizations, statistics of low-threshold services clients, number of syringes exchanged etc.);
- Capture-recapture method.

PDU estimates are currently published in the national Annual Reports (Mravčík et al., 2012) and EMCDDA annual reports (EMCDDA, 2012); PDU data are also available on the EMCDDA website.

The number of PDUs in the Czech Republic between the years 1999-2011 is shown in the Figure 0-2. In 2008, there were 6 400 problem heroin users and 21 200 problem methamphetamine (pervitin) users. There was no problem cocaine users reported in the Czech Republic. Another specific of the Czech PDU data is occurrence of problem users of buprenorphine, a prescription drug used for opiate substitution. The statistics is available since 2006; however, problem users of buprenorphine are not included in the estimation of illicit drug trade. Although there is "black" market with buprenorphine, it is a market with controlled (prescribed) substance.

Figure 0-2: Problem drug users in the Czech Republic (1999 – 2011).



Source: NFP

1.2.4. Purities of illicit drugs

Drug purities play an important role in the drug market. Drug dealers add inexpensive substances into illicit drugs in order to achieve a higher quantity of the drugs, and thereby to increase their profits. The main drugs which are diluted by drug dealers are methamphetamine (pervitin), cocaine and heroin.

There are two main levels of the drug trade – wholesale level and retail level. Wholesale level represents illicit drugs at import and at production stage (UNODC, 2012). Retail level represents the stage where illicit drugs are sold to the final consumer.

Table 0-8: Average drug purities in CZ in 2008.

	methamphetamine (pervitin)	**cocaine**	**heroin**
Wholesale level	80.0 %	70.0 %	40.0 %
Retail level	70.0 %	45.0 %	10.0 %

Source: National Drug Squad

When it comes to purity of illicit drugs in the Czech Republic, the information comes from the National Drug Squad of the Criminal Investigation Service of the Police of the Czech Republic (National Drug Squad), which is a specialised police department in the Czech Republic focused on illicit drug trade, and which collects data on enforcement of drug-related laws (NPC, 2009). Drug purities are measured on samples from drug seizures (analyses of active, illicit components in the seized substances are made). Average purity of illicit drugs on wholesale level therefore represents average purity of drugs seized in big quantities. Average purity of illicit drugs on retail level represents average purity of drugs seized in small quantities (intended for sale or sold to the final consumer). Illicit drug purities on wholesale level are always higher than on retail level.

1.2.5. Seizures of illicit drugs

Data about seized quantities are, in general, not feasible for comparison in time. The indicator depends heavily on annual police activities and their success. However, database of drug seizures can provide us with information about the locations of seizures, same as on the direction where the contraband was heading. Drug seizures for the national country are performed inland or on the country´s borders and/or airports. Border and/or airport drug seizures have contraband direction either into country (import), or outside of country (export).

Table 0-9: Share of illicit drugs intended for export in CZ in 2008.

cannabis drugs	methamphetamine
1.0 %	3.0 %

Source: National Drug Squad

1.2.6. Prices of illicit drugs

When it comes to illicit drug prices, they indeed differ on the wholesale and the retail level. Wholesale prices are representative of import and/or of domestic production in large quantities; retail prices are representative of the sale to the final consumer. The information on illicit drug prices in the Czech Republic is published by the National Drug Squad of the Criminal Investigation Service of the Police of the Czech Republic; it stems from illicit drug seizures on both national and regional level. Both mean and modus (most commonly reported) prices of drugs are published in the national Annual Reports on Drug Situation by the National Focal Point - NFP (Mravcik et al., 2010; Mravčík, et al., 2012; Mravčík et al., 2011; Mravčík et al., 2009).

Table 0-10: Prices of illicit drugs (in EUR)

Prices	cannabis type drugs	methamphetamine	ecstasy	LSD	cocaine	heroin
wholesale	5	30	4	6	60	32
retail	7	40	8	8	78	40

Source: National Drug Squad of the Criminal Investigation Service of the Police of the Czech Republic
Current prices of illicit drugs in the Czech Republic are in the national currency Czech Crowns (CZK).

The data in Table 0-10 were recalculated to Euros (EUR), with average exchange rate for 2008: 1 EUR = 24.942 CZK.

The difference between wholesale and retail prices is called trade margin, which in fact represents untaxed profit of drug dealers.

1.3. Results: Estimation of illicit drug market in the Czech Republic

This chapter presents the results of estimation of illicit drug market size with the example for the Czech Republic for the year 2008. It includes estimation of total consumption of main illicit drugs consumed by both occasional and problem drug users, estimation of the overall illicit drug market in the Czech Republic (including domestic production), estimation of import and export of illicit drugs, and finally, financial indicators of the drug trade that are included into the system of national accounts.

1.3.1. Number of occasional drug users

The numbers of occasional (last 12 months) illicit drug users in the Czech Republic was estimated from GPS 2008 prevalence rates (
Table 0-1 to Table 0-6) multiplied by the population size (Table 0-7) in each 5years age category and gender. The results are presented in the following tables (Table 0-11 to Table 0-16).
The number of illicit drug users was calculated for both genders in total.

Table 0-11: Estimation of number of cannabis drug users in the Czech Republic in 2008.

Age groups (in years)	Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week	Total
15 – 19	80 231	38 069	61 293	54 673	28 686	9 533	**272 486**
20 – 24	66 834	13 819	65 802	40 682	21 051	18 339	**226 528**
25 – 29	57 820	16 551	42 639	35 721	26 088	15 110	**193 929**
30 – 34	62 253	14 260	52 725	26 542	8 807	3 475	**168 062**
35 – 39	35 003	3 738	14 859	25 888	5 469	7 475	**92 431**
40 – 44	15 983	14 919	11 570	7 612	0	0	**50 084**
45 – 49	19 486	8 613	8 747	0	0	0	**36 846**
50 – 54	17 499	14 001	3 497	0	0	0	**34 997**
55 – 59	8 682	13 804	0	0	0	0	**22 486**
60 – 64	0	0	0	0	0	0	**0**
Total	**363 791**	**137 774**	**261 132**	**191 118**	**90 102**	**53 933**	**1 097 850**

Source: (Vopravil 2010)

Table 0-12: Estimation of number of occasional methamphetamine (methamphetamine) users in the Czech Republic in 2008.

Age groups (in years)	Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week	Total
15 – 19	9 555	2 721	2 721	1 350	0	0	**16 346**
20 – 24	15 369	8 459	4 262	4 262	0	0	**32 352**
25 – 29	15 134	8 240	8 287	2 739	0	0	**34 399**
30 – 34	7 070	7 190	0	1 737	0	0	**15 998**
35 – 39	3 738	1 823	0	3 830	0	0	**9 390**
40 – 44	5 633	9 591	0	0	0	0	**15 224**
45 – 49	3 579	0	1 723	0	0	0	**5 302**
50 – 54	1 754	1 754	0	0	0	0	**3 509**
55 – 59	0	0	0	0	0	0	**0**
60 – 64	0	0	0	0	0	0	**0**
Total	**61 832**	**39 778**	**16 993**	**13 917**	**0**	**0**	**132 520**

Source: (Vopravil 2010)

Table 0-13: Estimation of number of ecstasy users in the Czech Republic in 2008.

Age groups (in years)	Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week	Total
15 – 19	43 511	15 018	8 162	6 834	2 742	0	**76 268**
20 – 24	40 553	11 236	15 239	8 459	1 421	0	**76 908**
25 – 29	20 611	5 501	15 182	6 846	1 393	0	**49 533**
30 – 34	24 805	1 858	5 333	5 333	0	0	**37 328**
35 – 39	12 944	1 915	5 561	0	0	0	**20 419**
40 – 44	0	0	0	0	0	0	**0**
45 – 49	0	0	0	0	0	0	**0**
50 – 54	0	0	0	0	0	0	**0**
55 – 59	0	0	0	0	0	0	**0**
60 – 64	0	0	0	0	0	0	**0**
Total	**142 424**	**35 527**	**49 476**	**27 472**	**5 556**	**0**	**260 456**

Source: (Vopravil 2010)

Table 0-14: Estimation of number of LSD users in the Czech Republic in 2008.

Age groups (in years)	Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week	Total
15 – 19	24 551	8 164	8 205	0	0	0	**40 940**
20 – 24	23 828	8 524	13 948	0	0	0	**46 300**
25 – 29	17 920	9 633	9 609	0	0	0	**37 162**
30 – 34	10 425	0	0	0	0	0	**10 425**
35 – 39	14 859	3 830	0	0	0	0	**18 688**
40 – 44	1 979	0	0	0	0	0	**1 979**
45 – 49	1 723	0	0	0	0	0	**1 723**
50 – 54	0	0	0	0	0	0	**0**
55 – 59	0	0	0	0	0	0	**0**
60 – 64	0	0	0	0	0	0	**0**
Total	**95 285**	**30 170**	**31 762**	**0**	**0**	**0**	**157 217**

Source: (Vopravil 2010)

Table 0-15: Estimation of number of cocaine users in the Czech Republic in 2008.

Age groups (in years)	Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week	Total
15 – 19	5 484	1 371	0	2 742	0	0	**9 598**
20 – 24	8 395	1 421	2 777	1 421	0	0	**14 013**
25 – 29	9 609	0	4 108	4 108	0	0	**17 825**
30 – 34	5 333	1 737	3 595	0	0	0	**10 665**
35 – 39	0	0	0	0	0	0	**0**
40 – 44	0	0	0	0	0	0	**0**
45 – 49	1 723	0	0	0	0	0	**1 723**
50 – 54	0	0	0	0	0	0	**0**
55 – 59	0	0	0	0	0	0	**0**
60 – 64	0	0	0	0	0	0	**0**
Total	**30 543**	**4 529**	**10 480**	**8 271**	**0**	**0**	**53 823**

Source: (Vopravil 2010)

Table 0-16: Estimation of number of occasional heroin users in the Czech Republic in 2008.

Age groups (in years)	Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week	Total
15 – 19	5 442	1 371	0	0	0	0	**6 813**
20 – 24	6 974	1 421	0	0	0	0	**8 395**
25 – 29	2 739	2 739	0	0	0	0	**5 477**
30 – 34	7 190	1 737	0	0	0	0	**8 928**
35 – 39	0	0	0	0	0	0	**0**
40 – 44	0	0	0	0	0	0	**0**
45 – 49	1 723	0	0	0	0	0	**1 723**
50 – 54	1 754	0	0	0	0	0	**1 754**
55 – 59	0	0	0	0	0	0	**0**
60 – 64	0	0	0	0	0	0	**0**
Total	**25 821**	**7 268**	**0**	**0**	**0**	**0**	**33 089**

Source: (Vopravil 2010)

1.3.2. Consumption of illicit drugs from demand side

In the following calculation, the formula (4) from the Chapter 1.1 was used for estimation of the size of the market with the main illicit drugs consumed in the Czech Republic. Numbers of occasional (last 12 months) illicit drug users and their frequency of use were used from the Chapter 1.3.1; numbers of problem drug users were used from the Chapter 0.

Cannabis type drugs

Cannabis type drugs were the most consumed drugs in the Czech Republic in 2008. Number of cannabis users comes from the Table 0-11. Average frequency of use per year is calculated from GPS frequencies of illicit drug use in the last month (e.g.

average frequency 1-3 times in last month is averaged to 2 times per month, and for a yearly result, it is multiplied by 12; that results into 24 use days per year). Cannabis cigarette in Europe contains on average 260 mg of cannabis (EMCDDA, 2004). For occasional users, one such cigarette per a use day was assumed; since there is no estimate of the number of problem cannabis users, the number of daily or almost daily cannabis users was used instead (those who used cannabis 5-7 times in week). In terms of their consumption, twice the quantity per a use day (0.52 gram) was assumed, which corresponded to the results of a longitudinal study CANLONG that was focused on long-term cannabis users (Miovský et al., 2008). The total consumed quantity of cannabis type drugs in the Czech Republic in 2008 was about 18.8 tons. While the occasional cannabis users (excluding the daily users) consumed the total of 10.1 tons of cannabis in 2008, the daily cannabis users consumed 8.7 tons.

Table 0-17: Quantity of cannabis drugs consumed in the Czech Republic in 2008 (in grams)

	Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week
Number of users	363 791	137 774	261 132	191 118	90 102	53 933
Number of use days per year	1	6,5	24	78	182	312
Average quantity consumed per one opportunity (use day)	0,26	0,26	0,26	0,26	0,26	0,52
Total consumed quantity	**18 846 470**					

Source: (Vopravil 2010)

Methamphetamine

Methamphetamine (pervitin) was the second most consumed illicit drug in the Czech Republic in 2008. Number of occasional methamphetamine users comes from the Table 0-12. Their average quantity per one use opportunity (use day) is 0.3 grams. Number of problem methamphetamine users comes from the Chapter 0. Average quantity consumed by one problem users per one week is 3.53 grams (Petroš, Mravčík, & Korčišová, 2005). Total consumption of methamphetamine in the Czech Republic in 2008 was about 4.4 tons. Problem drug users consumed 87.7 % of the total methamphetamine consumption.

Table 0-18: Quantity of methamphetamine consumed in the Czech Republic in 2008 (in grams)

		Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week
Occasional users	Number of users	61 832	39 778	16 993	13 917	-	-
	Number of use days per year	1	6,5	24	78	-	-
	Average quantity consumed per one opportunity (use day)	0.3	0.3	0.3	0.3	-	-
Problem users	Number of users	-	-	-	-	21 200	
	Average quantity consumed by one user per week	-	-	-	-	3.53	
	Average quantity consumed by one user during year	-	-	-	-	183,56	
Total consumed quantity		**4 435 600**					

Source: (Vopravil 2010)

Ecstasy and LSD

In case of ecstasy and LSD, the average quantity of the drugs consumed at one opportunity was one piece of a pill or a crystal (in some cases, an impregnated paper of LSD). Number of ecstasy users comes from the Table 0-13; number of LSD users comes from the Table 0-14. Total consumption in the Czech Republic in 2008 was estimated as 4.7 million pieces of ecstasy and 1.0 million pieces of LSD.

Table 0-19: Quantity of ecstasy consumed in the Czech Republic in 2008 (in pieces)

	Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week
Number of users	142 424	35 527	49 476	27 472	5 556	0
Number of use days per year	1	6,5	24	78	182	312
Total consumed quantity	**4 714 833**					

Source: (Vopravil 2010)

Table 0-20: Quantity of LSD consumed in the Czech Republic in 2008 (in pieces)

	Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week
Number of users	95 285	30 170	31 762	0	0	0
Number of use days per year	1	6,5	24	78	182	312
Total consumed quantity	**1 053 683**					

Source: (Vopravil 2010)

Cocaine

Number of cocaine users comes from the Table 0-15. Average consumption of cocaine per an opportunity was estimated at 1 gram. Total consumption of cocaine in the Czech Republic in 2008 was estimated at 957 kilograms.

Table 0-21: Quantity of cocaine consumed in the Czech Republic in 2008 (in grams)

	Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week
Number of users	30 543	4 529	10 480	8 271	0	0
Number of use days per year	1	6,5	24	78	182	312
Average quantity consumed per one opportunity (use day)	1	1	1	1	-	-
Total consumed quantity	**956 610**					

Source: (Vopravil 2010)

Heroin

Table 0-22: Quantity of heroin consumed in the Czech Republic in 2008 (in grams)

		Once in last year	2-11 times in last year	1-3 times in last month	1-2 times in last week	3-4 times in last week	5-7 times in last week
Occasional users	Number of users	25 821	7 268	0	0	0	0
	Number of use days per year	1	6.5	-	-	-	-
	Average quantity consumed per one opportunity (use day)	0.4	0.4	-	-	-	-
Problem users	Number of users	-	-	6 400			
	Average quantity consumed by one user per week	-	-	3.86			
	Average quantity consumed by one user during year	-	-	200.72			
Total consumed quantity		**1 313 833**					

Source: (Vopravil 2010)

Same like in the case of methamphetamine, heroin users are split into occasional (Table 0-16) and problem users (Chapter 0). Average quantity consumed by an occasional heroin user at one opportunity was assumed as 0.4 gram; average consumption by problem heroin user per week was assumed as 3.86 grams (Petroš, et al., 2005). Total consumption of heroin in the Czech Republic in 2008 was estimated at 1.3 tons. Problem drug users consumed 97.7 % of the total heroin consumption.

1.3.3. Volume of illicit drug market

This chapter describes the origin of the different illicit drugs, and the process they undergo through the market chain, till they arrive to the final customer. In this chapter, the market is described in quantity figures (units of weight, pieces); monetary evaluations of the market are described in the Chapter 0).

Illicit drugs consumed within the EU are both domestically produced (part of domestic drug production is dedicated to export), and imported from countries outside of the EU. Purities of drugs such as heroin, cocaine or methamphetamine at the point of consumption are much lower than purities of the same drugs on the level of production or imported. This also means that the volume of drugs consumed is much higher than the volume at the point of import or production.

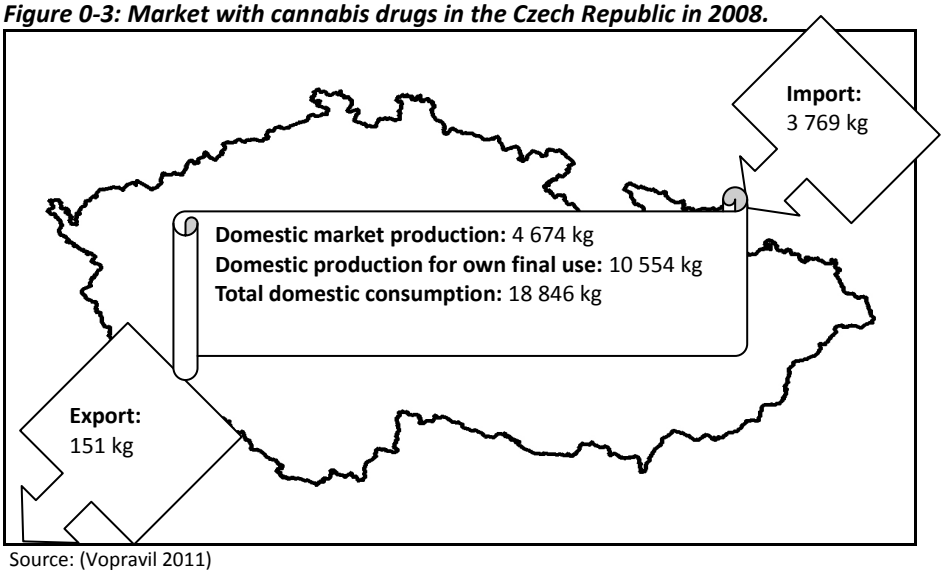
Cannabis type drugs

Marihuana (dried leaves and female flowers of the cannabis plant) is most commonly used drug in the EU. In the example of the Czech Republic, there exists both domestic production and import. The total consumption of cannabis is estimated at 18 846 kg.

The share between domestically produced and imported cannabis drugs can be estimated from information from cannabis users. In 2008, general population survey in the Czech Republic adopted a special module focused at cannabis type drugs. The module focused on marijuana market characteristics, and was answered by all last 12 months (occasional) cannabis users in the survey. According to GPS 2008, about 80 % of cannabis drugs consumed in the Czech Republic come from domestic production, which is about 15 228 kg. Out of this domestic production, about 70 % (10 554 kg) were dedicated for own final use, and 30 % (4 674 kg) were placed on market. The results of the study were published in the Annual Report (Mravčík et al 2009).

The remaining share of the market with cannabis (20 %) amounts to 3 769 kg that we suppose to be imported. As shown in police records, about 1 % of all seized cannabis was intended for export (Table 0-9); the same rate applied to overall domestic production would imply that 151 kg of domestic cannabis production was exported in 2008. The operation of the illicit cannabis market is drawn in the Figure 0-3.

Figure 0-3: Market with cannabis drugs in the Czech Republic in 2008.

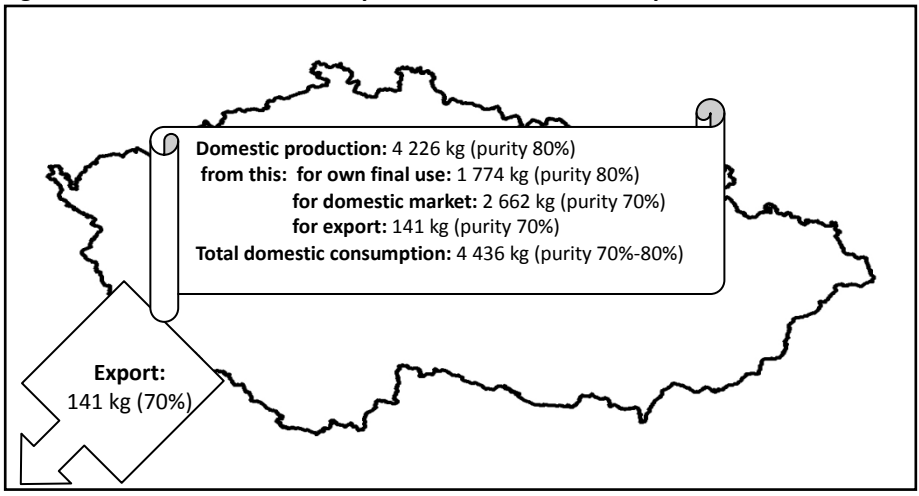


Source: (Vopravil 2011)

Methamphetamine (pervitin)

The Czech Republic has domestic production of methamphetamine (pervitin). Consumption in 2008 was about 4 436 kg of 70% methamphetamine. However, average purity of methamphetamine was 80 %; then total domestic production was 4 226 kg of 80% methamphetamine.

Figure 0-4: Market with methamphetamine in the Czech Republic in 2008.



Source: (Vopravil 2011)

According to expert opinions, 60 % of the production is placed on the market and 40 % of the production is used by the producers and their companions (1 774 kg). Before the production intended for the market is sold, it is diluted by drug dealers to 70% purity (see Table 0-8); this increases the quantity of methamphetamine placed on the market to 2 662 kg.

The total domestic production can be calculated with the use of the formula 5:

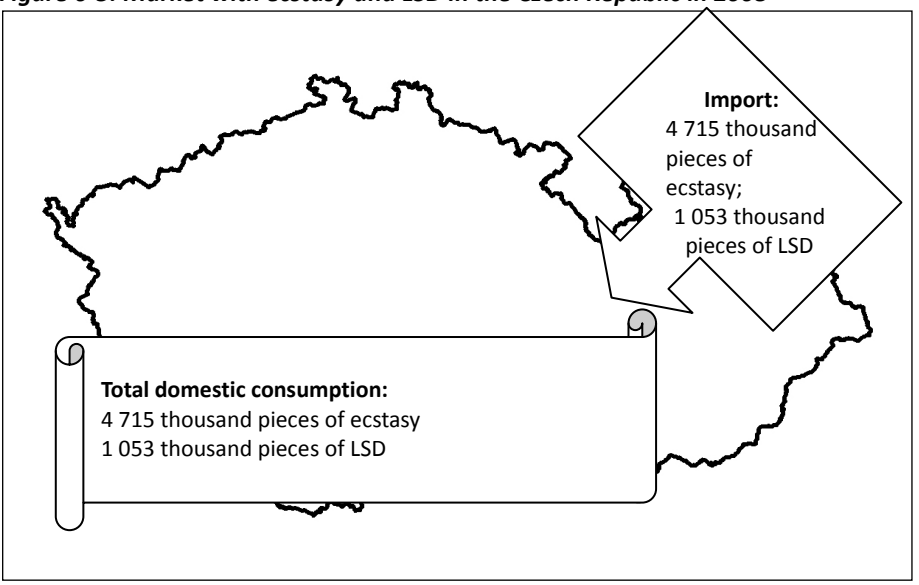
$$quantity\ produced = \left(quantity\ consumed \cdot \frac{purity\ at\ consumption}{purity\ at\ production} \right) + export \qquad (5)$$

As shown in police records, about 3 % of all seized methamphetamine was intended for export (Table 0-9); the same rate applied to overall domestic production would imply that 141 kg of 70 % pure methamphetamine was exported in 2008. The operation of methamphetamine market is drawn in the Figure 0-4.

Ecstasy and LSD

Ecstasy and LSD are non-diluted drugs, which are imported into the Czech Republic. The quantity of these drugs that is consumed equals to the quantity that is imported (about 4.7 millions of ecstasy tables and 1.0 LSD trips in 2008). The operation of ecstasy / LSD market is drawn in the Figure 0-5.

Figure 0-5: Market with ecstasy and LSD in the Czech Republic in 2008



Source: (Vopravil 2010)

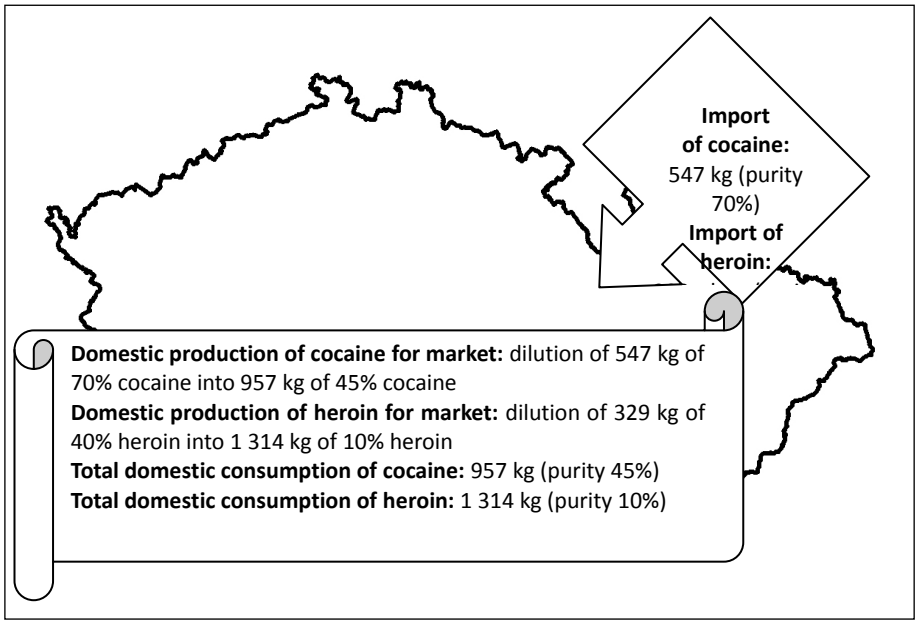
Cocaine and heroin

Cocaine and heroin are diluted drugs, which are imported into the Czech Republic. The import of the drugs was estimated with the use of the formula 6:

$$import\ of\ \ cocaine, heroin = \\ = consumption\ of\ \ cocaine, heroin \cdot \frac{purity\ at\ consumption}{purity\ at\ import} \qquad (6)$$

The import in 2008 reached 547 kg of 70% cocaine and 329 Kg of 40% heroin. The market value of the heroin and cocaine volume increased through the process of dilution shall be considered as domestic production of the Czech Republic. The operation of cocaine and heroin market is drawn in the Figure 0-6.

Figure 0-6: Market with cocaine and heroin in the Czech Republic in 2008



Source: (Vopravil 2010)

1.3.4. Inclusion of illicit drug market into the system of national accounts

Drug market should be included in the system of national accounts (SNA) as a part of illegal activities. Illegal activities are already described in the System of National Accounts 1993 (SNA93) in the paragraphs 6.30 to 6.33 (UN, 1993). They are also mentioned in the European System of Accounts 1995 (ESA95) in the paragraphs 1.13g, 1.42 and 3.08 (EC, 1996).

The drug trade is an illegal activity, which consists a part of non-observed economy, referred to as NOE (OECD, 2002). The statistical office of the European Union (Eurostat) defines seven categories (N1-N7) of producers in non-observed economy (Eurostat, 2005) in the framework of SNA. The drug market falls under the category N2: "Producers that deliberately fail to register as a legal entity or as entrepreneurship because they are involved in illegal activities".

The drug market was described in the previous chapters by epidemiological indicators (prevalence of drug use, frequency of use) and by volume indicators (quantity of drug used per occasion /use day/, quantity of illicit drugs produced or imported). This chapter describes the drug market valued in currency, in order to build up financial indicators that can be incorporated into the system of national accounts (see Table 0-23).

Output (P.1)

According to ESA95, the output consists of the total product created during the selected accounting period (EC, 1996). When it comes to illegal drugs, the indicator shall incorporate domestic production (such as the total domestic production of cannabis type drugs and methamphetamine). The output of illicit drug market shall be divided on market output (P.11) and on output produced for own final use (P.12), see bellow. The total production of illicit drugs in the Czech Republic reached EUR 307 million.

Market output (P.11)

ESA95 defines Market output as follows: "market output consists of output that is disposed of on the market or intended to be disposed of on the market" (EC 1996). The Czech Republic produced 4 674 kg of cannabis type drugs and 2 803 kg of methamphetamine in 2008 for both domestic market and for export. Domestic market production in the Czech Republic contains also drug dilution of imported cocaine and heroin. For instance, there were 547 kg of 70% cocaine imported into the Czech Republic, that were further diluted into 957 kg of 45% cocaine for the domestic market; and there were 329 kg of 40% heroin imported, that were further diluted into 1 314 kg of 10% heroin for the domestic market (see Figure 0-6). The market output is valued by wholesale prices (see Table 0-10). The value of the market production amounted EUR 157 million, from this cannabis drugs EUR 22 million, methamphetamine EUR 84 million, cocaine EUR 21 million and heroin EUR 30 million.

Output for own final use (P.12)

According to ESA95, producers also retain their production for own final use. The Czech producers consumed 10 554 kg of own marihuana and 1 774 kg of own methamphetamine. The output for own final use is valued by retail prices (see Table 0-10). The value of own marihuana reached EUR 78 million and own methamphetamine EUR 71 million.

Import (P.7)

According to the definition 3.129 from ESA95, import includes transfer of goods from non-residents to residents. In terms of illicit drugs, it' can be assumed that non-resident contrabands sell illicit drugs to domestic drug dealers – residents. The total drug import to the Czech Republic consists of 3 769 kg of cannabis drugs, 4 715 thousand pieces of ecstasy, 1 053 thousand pieces of LSD, 547 kg of cocaine and 329 kg of heroin. The import is valued by wholesale prices (see Table 0-10). The value of illicit drugs import to the Czech Republic in 2008 amounted EUR 83 million; from this cocaine EUR 37 million, cannabis drugs EUR 18 million, ecstasy EUR 12 million, heroin EUR 10 million and LSD about EUR 6 million.

Trade margin

According to ESA95, output of trade is measured by trade margin, which is incurred by goods purchased with purpose to sale. In case of drug trade, trade margin is incurred by the difference between wholesale per unit prices, for which drug dealers purchase illicit drugs in large quantities, and retail per unit prices, for which drug dealers sell illicit drugs in smaller quantities to final customers. This applies also to the price differential between wholesale and export. The total trade margin in the illicit drug market is estimated as a multiple of quantity of drugs that were marketed, and of price differential between the wholesale and the retail level. The trade margin is estimated by the formula 8:

$$TRADE\ MARGIN = (IMPORT + MARKET\ \ PRODUCTION + EXPORT) \times (RETAIL\ \ PRICE - WHOLESALE\ PRICE) \quad (8)$$

The quantity of illicit drugs marketed in the Czech Republic that composed the trade margin in 2008 were 8.4 tons of cannabis drugs (3.7 tons from import and 4.7 tons from domestic production), 2.8 tons of methamphetamine (70 % purity), 4.7 millions of ecstasy tablets, 1 million of LSD pieces, 957 kg of cocaine (45 % purity) and 1.3 tons of heroin (10 % purity). The trade margin of illicit drug market in the Czech Republic then was EUR 22 million for cannabis, EUR 28 million for methamphetamine, EUR 49 million for ecstasy, EUR 2 million for LSD, EUR 17 million for cocaine, and EUR 13 million for heroin; this was EUR 131 million in total. In fact, this amount represents an untaxed profit of drug dealers.

Intermediate consumption (P.2)

By definition ESA95, intermediate consumption consists of the value of products and services used as inputs in the production process. It is therefore the production cost. In case of the Czech Republic, production costs can be identified for cannabis type drugs and for methamphetamine.

Occasional cannabis users who participated in the general population survey in the Czech Republic (GPS, 2008) were asked supplementary questions about the nature of domestically produced cannabis they consumed most recently. 44 % of last 12 months cannabis users who knew the source of the cannabis they used last time claimed it was grown outdoor, 56 % claimed it was grown indoor (Běláčková, et al., 2012). From interviews with cannabis producers it is known, that the cost of producing one gram of cannabis produced by "indoor" technology is around 2.5 EUR per gram (70% of the cost is for the electricity consumption, 20% of the cost for the fertilizer, substrates, and water, 10% of the investments is for the initial investment to growing facilities: lamps, filters, etc.). Growing hemp "outdoor" technologies require almost no cost. The total cost of cannabis grown in the Czech

Republic in 2008 was EUR 20 million.
It is estimated that the cost of 70 grams of methamphetamine production is about EUR 800 (95% for expenditure on chemicals, the rest are spending on chemical glassware, lamp, weight, etc.). Given that in 2008, about 3 998 kg methamphetamine (80 % purity) were produced in the Czech Republic, the total cost of methamphetamine production in the Czech Republic was EUR 48 million.

Final consumption of households

The final consumption of households is divided into the expenditure on final consumption of households, and the consumption of production for own final use. According to the definition 3.75 from ESA95, the expenditure on final consumption consists of expenditure incurred by resident institutional units on goods or services that are used for the direct satisfaction of individual needs or wants. The final consumption of households including the consumption of production for own final use is valued in retail prices.
In the example of the Czech Republic, drug consumers paid for final consumption of cannabis EUR 61 million, methamphetamine EUR 107 million, ecstasy EUR 61 million, LSD EUR 8 million, cocaine EUR 75 million and heroin EUR 53 million. In addition, the Czech drug users consumed their own production of cannabis drugs in the value of EUR 78 million and methamphetamine in value of EUR 71 million. The total expenditure on illicit drugs that were purchased reached EUR 365 million; total consumption of illicit drugs that were produced for own consumption amounted EUR 149 million. The total value of drugs consumed in the Czech Republic in 2008 was EUR 515 million.

Export (P.6)

According to definition 3.128 from ESA95, export of goods consists of transactions in goods from residents to non-residents. Export is valued in retail prices. The Czech drug dealers exported 151 kg of domestically produced cannabis in the value of EUR 1 million, and 141 kg of domestically produced methamphetamine in the value of EUR 5 million. The total value of drugs exported from the Czech Republic in 2008 amounted EUR 59 million.
According to definition 3.133d from ESA95, the drug market model doesn't include drug transit through country, referred to as re-export. Re-export includes cases when wholesale dealers buy illicit drugs from non-residents, and then sell them again to non-residents within the same accounting period.

Value added (B1.g) and gross domestic product (B.1*g)

The Table 0-23 summarizes the estimate of the total illicit drug market in the Czech Republic in 2008 for use in the national accounts. The total Supply (domestic production + import + trade margin) is equal to the total Use (final consumption + export).

The added value of the drug market is calculated with the use of the formula 7:

$$VALUE\ ADDED = OUTPUT + TRADE\ MARGIN - \\ - INTERMEDIATE\ CONSUMPTION \quad (7)$$

The trade margin is included in the formula, because it is actually an output of merchants. According to our estimation, the added value of the drug market in the Czech Republic for the year 2008 amounted to EUR 369 million.

Table 0-23: Drug market in the system of national accounts in the Czech Republic in 2008 (EUR million)

	Total	cannabis drugs	methamphetamine	ecstasy	LSD	cocaine	heroin
Domestic production	307	101	155			21	30
production for market	157	22	84			21	30
production for own use	149	78	71				
Import	83	18		12	6	37	10
Trade margin	131	22	28	49	2	17	13
Total Supply	**521**	**141**	**183**	**61**	**8**	**75**	**53**
Final consumption	515	140	178	61	8	75	53
expenditure for final consumption	365	61	107	61	8	75	53
consumption of own account production	149	78	71				
Export	59	1	5				53
Total Use	**521**	**141**	**183**	**61**	**8**	**75**	**53**
Intermediate consumption	68	20	48				0
Value added	**369**	**102**	**135**	**49**	**2**	**38**	**43**

In the System of National Accounts, the drug market is recorded in the institutional sector of households. Production of cannabis, it´s import and export, consumption, intermediate consumption and value added is recorded in the Statistical Classification of Economic Activities (NACE) under the code 011 (Growing of non-perennial crops). The import/export of other, "synthetic" drugs and their dilution is recorded under the NACE 212 (Manufacture of pharmaceutical preparations). The trade margin of all illicit drugs is recorded under the NACE 479 (Retail trade not in stores, stalls or markets).

In the Supply/Use Tables, cannabis type drugs should be recorded in the Statistical Classification of Products by Activity (CPA) under the code 011 (Non-perennial crops). Other, "synthetic" drugs should be recorded under the CPA 212 (Pharmaceutical preparations).

1.4. Estimation of illicit drug market in Spain

Estimation of the illicit drug market in Spain was made with the use of the same methodology as the estimation for the Czech Republic. The detailed structure of prevalence rates and frequencies of use of the main illicit drugs were obtained from the survey EDADES 2009 (see Table 0-24 to Table 0-29).

Table 0-24: Prevalence rates of cannabis use in Spain in 2009

Age groups (in years)	1-3 days in the last year		4-9 days in the last year		10-19 days in the last year		20-29 days in the last year		30-150 days in the last year		>150 days in the last year	
	males	females	males	females	males	females	males	females	males	females	males	females
15 – 19	5.8	6.1	2.7	2.7	2.7	1.9	2.1	1.9	6.7	2.0	5.9	1.9
20 – 24	5.8	4.7	3.1	2.9	3.1	2.3	3.2	1.2	8.8	3.7	10.6	3.8
25 – 29	4.1	4.6	3.3	2.3	3.4	0.9	3.4	0.7	5.6	1.1	9.8	2.9
30 – 34	2.9	2.8	2.2	0.5	1.9	0.4	1.3	0.2	4.2	0.8	5.7	1.0
35 – 39	2.9	1.4	1.3	0.4	2.0	0.6	1.2	0.3	2.7	0.6	3.0	0.6
40 – 44	2.8	1.2	1.3	0.1	1.1	0.4	0.5	0.1	1.0	1.5	1.9	0.8
45 – 49	1.4	1.0	1.0	0.5	1.1	0.3	0.2	0.0	1.9	0.2	1.5	0.4
50 – 54	0.9	0.2	0.3	0.0	1.2	0.2	1.6	0.0	1.0	0.1	1.4	0.0
55 – 59	0.0	0.2	0.0	0.2	0.5	0.0	0.4	0.0	0.7	0.0	0.1	0.2
60 – 64	0.4	0.2	0.0	0.0	0.1	0.0	0.3	0.0	0.1	0.0	0.0	0.0

Source: EDADES 2009

Table 0-25: Prevalence rates of amphetamine use in Spain in 2009

Age groups (in years)	1-3 days in the last year		4-9 days in the last year		10-19 days in the last year		20-29 days in the last year		30-150 days in the last year		>150 days in the last year	
	males	females	males	females	males	females	males	females	males	females	males	females
15 – 19	1.2	0.4	0.5	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
20 – 24	2.0	1.1	0.9	0.2	0.5	0.4	0.5	0.1	0.2	0.1	0.2	0.1
25 – 29	1.0	0.4	0.3	0.1	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.0
30 – 34	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0
35 – 39	0.1	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40 – 44	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0
45 – 49	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
50 – 54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
55 – 59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60 – 64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: EDADES 2009

Table 0-26: Prevalence rates of heroin use in Spain in 2009

Age groups (in years)	1-3 days in the last year		4-9 days in the last year		10-19 days in the last year		20-29 days in the last year		30-150 days in the last year		>150 days in the last year	
	males	females	males	females	males	females	males	females	males	females	males	females
15 – 19	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20 – 24	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
25 – 29	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 – 34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
35 – 39	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
40 – 44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
45 – 49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50 – 54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55 – 59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
60 – 64	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0

Source: EDADES 2009

Table 0-27: Prevalence rates of cocaine use in Spain in 2009

Age groups (in years)	1-3 days in the last year		4-9 days in the last year		10-19 days in the last year		20-29 days in the last year		30-150 days in the last year		>150 days in the last year	
	males	females	males	females	males	females	males	females	males	females	males	females
15 – 19	2.0	0.4	0.5	0.4	0.4	0.0	0.1	0.1	0.1	0.1	0.2	0.0
20 – 24	3.3	1.5	1.6	1.0	0.9	0.8	1.1	0.2	1.1	0.4	0.3	0.0
25 – 29	3.3	1.9	1.5	0.5	1.5	0.2	1.1	0.1	0.9	0.1	0.3	0.1
30 – 34	2.7	0.6	1.0	0.2	0.7	0.0	0.7	0.0	0.5	0.2	0.3	0.1
35 – 39	1.7	0.3	1.2	0.0	0.4	0.0	0.4	0.0	0.6	0.1	0.0	0.0
40 – 44	1.4	0.4	1.3	0.0	0.3	0.0	0.3	0.0	0.3	0.4	0.3	0.0
45 – 49	1.3	0.0	0.6	0.3	0.1	0.0	0.2	0.0	0.5	0.0	0.1	0.0
50 – 54	0.9	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.5	0.0	0.1	0.0
55 – 59	0.4	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60 – 64	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0

Source: EDADES 2009

Table 0-28: Prevalence rates of ecstasy use in Spain in 2009

Age groups (in years)	1-3 days in the last year		4-9 days in the last year		10-19 days in the last year		20-29 days in the last year		30-150 days in the last year		>150 days in the last year	
	males	females	males	females	males	females	males	females	males	females	males	females
15 – 19	2.1	0.3	0.1	0.3	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0
20 – 24	2.3	1.0	0.7	0.5	0.5	0.1	0.5	0.2	0.4	0.3	0.0	0.0
25 – 29	1.3	0.3	0.6	0.0	0.7	0.2	0.0	0.0	0.3	0.0	0.0	0.0
30 – 34	1.0	0.1	0.3	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.1	0.0
35 – 39	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40 – 44	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
45 – 49	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50 – 54	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
55 – 59	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
60 – 64	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: EDADES 2009

Table 0-29: Prevalence rates of LSD use in Spain in 2009

Age groups (in years)	1-3 days in the last year		4-9 days in the last year		10-19 days in the last year		20-29 days in the last year		30-150 days in the last year		>150 days in the last year	
	males	females	males	females	males	females	males	females	males	females	males	females
15 – 19	1.9	0.8	0.3	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
20 – 24	1.9	1.0	0.4	0.3	0.3	0.1	0.1	0.2	0.1	0.0	0.1	0.0
25 – 29	0.9	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 – 34	0.4	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35 – 39	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40 – 44	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
45 – 49	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
50 – 54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55 – 59	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60 – 64	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: EDADES 2009

The population size in Spain for the year 2009 split into 5years age categories, and divided by gender were retrieved from the United Nations Economic Commission for Europe (UNECE) database.

Table 0-30: Population size by age groups and by gender in Spain in 2009

Age groups	Mid-year population	
	Males	females
15 – 19 years	1 159 305	1 096 220
20 – 24 years	1 362 733	1 307 719
25 – 29 years	1 776 673	1 689 576
30 – 34 years	2 099 076	1 956 335
35 – 39 years	2 024 398	1 901 884
40 – 44 years	1 877 211	1 818 194
45 – 49 years	1 699 886	1 694 862
50 – 54 years	1 468 697	1 501 119
55 – 59 years	1 260 143	1 317 493
60 – 64 years	1 151 227	1 242 149

Source: UNECE

Consumption of illicit drugs in Spain was estimated as a multiple of the number of users, the average frequency of use, and the average amount of drug used per a use day/opportunity. The average frequency was calculated as an average of frequencies in the heading of the Table 0-31 to Table 0-36. The average amount of drug used per day in Spain was assumed to be the same as in the Czech Republic.
The estimations of illicit drug consumption in Spain in 2009 reached about 113 tons of cannabis drugs, 1.2 tons of amphetamines, 19 tons of heroin, 51 tons of cocaine, 4.6 millions of ecstasy tablets and 1.6 millions of LSD trips. The daily users of illicit drugs (>150 days in the last year) consume the majority of illicit drug quantity.

Table 0-31: Quantity of cannabis consumed in Spain in 2009 (in grams)

	1-3 days in the last year	4-9 days in the last year	10-19 days in the last year	20-29 days in the last year	30-150 days in the last year	>150 days in the last year
Number of users	760 142	387 180	372 004	249 111	555 865	717 836
Average frequency of use per year	2	6.5	14.5	24.5	90	257.5
Average quantity consumed per one opportunity / use day (grams)	0.26	0.26	0.26	0.26	0.26	0.52
Quantity consumed (kilograms)	395	654	1 402	1 586	13 007	96 118
Total quantity consumed (kg)	**113 164**					

Table 0-32: Quantity of amphetamine consumed in Spain in 2009 (in grams)

	1-3 days in the last year	4-9 days in the last year	10-19 days in the last year	20-29 days in the last year	30-150 days in the last year	>150 days in the last year
Number of users	114 390	30 817	22 620	11 675	11 167	7 909
Average frequency of use per year	2	6.5	14.5	24.5	90	257.5
Average quantity consumed per one opportunity / use day (grams)	0.3	0.3	0.3	0.3	0.3	0.3
Quantity consumed (kilograms)	68 634	60 093	98 397	85 809	301 518	610 965
Total quantity consumed (kg)	**1 225 416**					

Heroin users were divided into occasional users (any use in the last 12 months) and problem users (PDUs). For the purpose of our estimation, heroin users who used heroin more than 10 times per year in 2009 were marked as problem users; this figure corresponds to the mean number of problem heroin users reported to EMCDDA by the Spanish Focal Point. The same data on frequency of use and the average amount of drug used per day by a problem heroin user were used as for the Czech Republic.

Table 0-33: Quantity of heroin consumed in Spain in 2009 (in grams)

		1-3 days in the last year	4-9 days in the last year	10-19 days in the last year	20-29 days in the last year	30-150 days in the last year	>150 days in the last year
Occasional users	Number of users	7 340	1 151	-	-	-	-
	Average frequency of use in year	1	6.5	-	-	-	-
	Average contain of drug by one opportunity of use (grams)	0.4	0.4	-	-	-	-
	Consumed quantity (grams)	2 936	2 993	-	-	-	-
Problematic users	Number of users	-	-	95 000			
	Average consumption of one user per week (grams)	-	-	3.86			
	Average consumption of one user per year (grams)	-	-	200.72			
	Consumed quantity (grams)	-	-	19 068 400			
Total consumed quantity (grams)		**19 074 329**					

As for cocaine, the mean number of its problem users in Spain, as reported to EMCDDA, was 145 000. We used this figure as an estimation of daily or almost daily cocaine users (see Table 0-34).

Table 0-34: Quantity of cocaine consumed in Spain in 2009 (in grams)

	1-3 days in the last year	4-9 days in the last year	10-19 days in the last year	20-29 days in the last year	30-150 days in the last year	>150 days in the last year
Number of users	370 105	173 450	95 702	74 068	98 511	145 000
Average frequency of use per year	2	6.5	14.5	24.5	90	257.5
Average quantity consumed per one opportunity / use day (grams)	1	1	1	1	1	1
Quantity consumed (kilograms)	740	1 127	1 387	1 815	8 866	37 337
Total quantity consumed (kg)	**51 273**					

Table 0-35: Quantity of ecstasy consumed in Spain in 2009 (in pieces)

	1-3 days in the last year	4-9 days in the last year	10-19 days in the last year	20-29 days in the last year	30-150 days in the last year	>150 days in the last year
Number of users	152 903	39 507	31 542	13 405	15 800	7 348
Average frequency of use in year	2	6.5	14.5	24.5	90	257.5
Average quantity consumed per one opportunity / use day (pieces)	1	1	1	1	1	1
Consumed amount totally (pieces)	**4 662 588**					

Table 0-36: Quantity of LSD consumed in Spain in 2009 (in pieces)

	1-3 days in the last year	4-9 days in the last year	10-19 days in the last year	20-29 days in the last year	30-150 days in the last year	>150 days in the last year
Number of users	111 145	17 502	9 272	5 796	2 522	3 063
Average frequency of use in year	2	6,5	14,5	24,5	90	257,5
Average quantity consumed per one opportunity / use day (pieces)	1	1	1	1	1	1
Consumed amount totally (pieces)	**1 628 108**					

The data for average drug purities on wholesale and retail level, and on prices, were collected from the Spanish NFP, from EMCDDA, and from UNODC reports. In comparison with the Czech Republic, cocaine purity on both retail and wholesale level were much higher in Spain.

Table 0-37: Average purities of illicit drugs in Spain in 2009

	heroin	cocaine
Wholesale level	48.0 %	73.0 %
Retail level	33.0 %	51.0 %

Source: Spain NFP, EMCDDA, UNODC

Table 0-38: Average prices of illicit drugs in Spain in 2009 (in EUR)

Prices	Cannabis	Amphetamine	Heroin	Cocaine	Ecstasy	LSD
Wholesale price	1.4	17.7	35.8	33.8	4.5	6.0
Retail price	4.8	25.8	62.7	60.8	10.7	11.4

Source: Spain NFP, EMCDDA, UNODC

In the case of Spain, no domestic (primary) production of illicit drugs could be identified from available data sources, for the purpose of this analysis, all drugs were considered to be imported into Spain. The domestic market production is represented by drug dilution of imported heroin and cocaine. Domestic production and import of all drugs is valued by wholesale prices. Trade margin was calculated with the use of the formula 7.

The expenditure on final consumption (valued at retail prices) represented the entire estimate on the total Use side in Spain. Total use was equal to total supply, and the total value of illicit drug market was EUR 4 957 million in 2009.
Added value was calculated by the formula 8. The total value added from the drug trade in Spain was estimated as EUR 3 066 million in 2009, which was 0.29 % of GDP.

Table 0-39: Drug market in the System of National Accounts in Spain in 2009 (EUR million)

NA indicators	Total	cannabis	amphetamine	heroin	cocaine	ecstasy	LSD
Supply	**4 957**	**543**	**32**	**1 196**	**3 117**	**50**	**19**
Domestic production	736	0	0	213	522	0	0
production for market	736	0	0	213	522	0	0
production for own use	0	0	0	0	0	0	0
Import	1 891	158	22	469	1 211	21	10
Trade margin	2 330	385	10	513	1 384	29	9
Use	**4 957**	**543**	**32**	**1 196**	**3 117**	**50**	**19**
Final consumption	4 957	543	32	1 196	3 117	50	19
expenditure for final consumption	4 957	543	32	1 196	3 117	50	19
consumption of own account production	0	0	0	0	0	0	0
Export	0	0	0	0	0	0	0
Intermediate consumption	0	0	0	0	0	0	0
Value added	**3 066**	**385**	**10**	**726**	**1 907**	**29**	**9**

1.5. Estimation of illicit drug market in Italy

Number of the occasional drug users in Italy was estimated on the basis of the last year prevalence rate applied to the population aged 15-64 years. For the number of daily users, an estimation of PDU was used. The total quantity of illicit drugs consumed was estimated with the use the formula 4 (see Table 0-40).

Table 0-40: Consumption of illicit drug consumption in Italy in 2008

	Regular users				Occasional users			
	Number of users	frequency (days of use per year)	consumed quantity per a use day (g)	Total quantity consumed (kg; 1,000 pieces)	number of users	frequency (days of use per year)	consumed quantity per a use day (g)	Total quantity consumed(kg; 1,000 pieces)
cannabis	618 086	240	0.52	77 137	2 472 343	12	0.26	7 714
amphetamine	26 805	52	1.00	1 394	107 219	12	1.00	1 287
heroin	251 997	240	0.50	30 240	-	-	-	-
cocaine	147 426	100	1.50	22 114	589 704	12	1.50	10 615
ecstasy	33 506	52	1	1 742	134 023	12	1	1 608
LSD	40 207	52	1	2 090	160 828	12	1	1 929

The data on average drug purities on the wholesale and the retail level, as well as the data on prices, were collected from the Spanish NFP, from EMCDDA, and from UNODC reports (see Table 0-41 and Table 0-42).

Table 0-41: Average purities of illicit drugs in Italy in 2008

	heroin	cocaine
Wholesale level	53.0 %	90.0 %
Retail level	41.0 %	66.0 %

Source: EMCDDA, UNODC

Table 0-42: Average prices of illicit drugs in Italy in 2008 (in EUR)

Prices	Cannabis	Amphetamine	Heroin	Cocaine	Ecstasy	LSD
Wholesale price	2.0	5.0	24.0	41.0	4.0	6.0
Retail price	8.1	17.5	53.6	76.2	18.1	28.6

Source: EMCDDA. UNODC

In the case of Italy, no domestic (primary) production of illicit drugs could be identified from available data sources, for the purpose of this analysis all drugs were considered to be imported into Italy. The domestic market production is represented by drug dilution of imported heroin and cocaine. Domestic production and import of all drugs is valued at wholesale prices. Trade margin was calculated with the use of the formula 7.

The expenditure on final consumption (valued at retail prices) represented the entire estimate on the total use side in Italy. Total use was equal to total supply, and the total value of illicit drug market was EUR 5 025 million in 2008.
Added value was calculated by the formula 8. The total value added from the drug trade in Italy was estimated as EUR 3 258 million in 2008, which was 0.21 % of GDP.

Table 0-43: Drug market in the System of National Accounts in Italy in 2008 (EUR million)

NA indicators	Total	cannabis	amphetamine	heroin	cocaine	ecstasy	LSD
Supply	**5 025**	**687**	**47**	**1 621**	**2 494**	**61**	**115**
Domestic production	522	0	0	164	358	0	0
production for market	522	0	0	164	358	0	0
production for own use	0	0	0	0	0	0	0
Import	1 766	170	13	561	984	13	24
Trade margin	2 736	518	34	895	1 152	47	91
Use	**5 025**	**687**	**47**	**1 621**	**2 494**	**61**	**115**
Final consumption	5 025	687	47	1 621	2 494	61	115
expenditure for final consumption	5 025	687	47	1 621	2 494	61	115
consumption of own account production	0	0	0	0	0	0	0
Export	0	0	0	0	0	0	0
Intermediate consumption	0						
Value added	**3 258**	**518**	**34**	**1 059**	**1 510**	**47**	**91**

2

Public expenditure on drug policy

This chapter describes the public expenditure on drug policy, same as availability of data sources and possibilities of the data collection and further estimations. The public expenditure is divided into labelled and non-labelled. The drug policy expenditure usually includes public expenditure on central, and on regional/municipal level. Drug policy public expenditure can be divided by types of drug services (e.g. prevention, treatment, syringe exchange) and/or split into demand and supply reduction.

2.1 Labelled expenditure

The labelled drug-related expenditure is earmarked expenditure for drug policy. These expenditures are destined as expenditure on drug policy in the state and/or regional and/or municipal budgets. These data are identified and collected from administrative data such us final budget accounts, annual reports, etc.(Vopravil & Běláčková, 2012). The labelled expenditure on drug policy is divided: (i) in terms of sources of funding – from the state budget and local budgets (regional budgets and the budgets of municipalities); (ii) in terms of the location of drug policy implementation – expenditure with central and with regional destination; (iii) in terms of purpose destination (type of service) - the basic areas of drug policy (prevention, harm reduction, treatment and enforcement), according to the Reuter's classification of drug policy (P. Reuter, 2006).

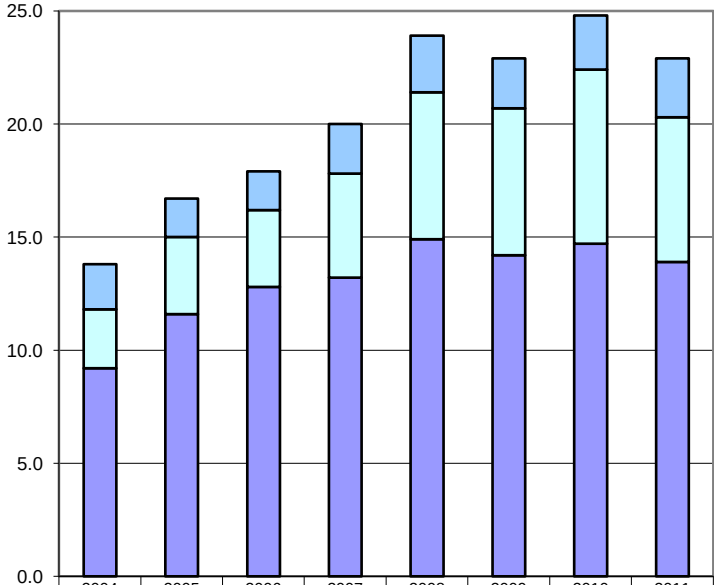
Labelled expenditures by sources of funding

The drug policy in the Czech Republic is funded from the state and local (regional and municipal) budgets. Financial resources earmarked in these budgets for drug policy programmes and activities are referred to as labelled expenditures with a special-purpose. The data were obtained from the national final accounts of the ministries whose budgets include drug policy programme. Additional information was obtained directly from the representatives or contact persons of individual ministries and governmental institutions, as well as from regional drug policy

coordinators (Mravčík, et al., 2012).

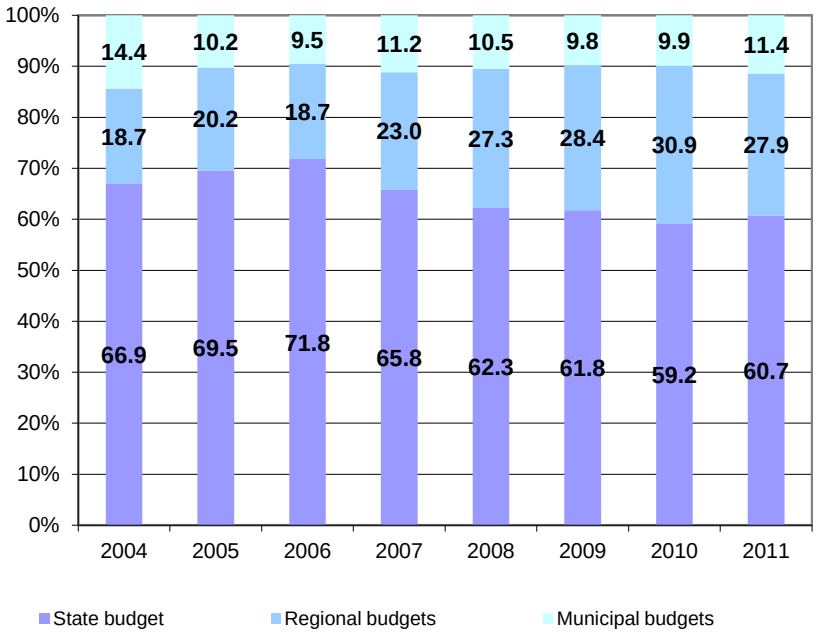
Public expenditure on drug policy amounted to a total of EUR 22,933 thousand in 2011 (see Figure 0-1). This sum included EUR 13,908 thousand (60.6%) provided from the state budget and EUR 9,025 from local budgets – regions contributed with EUR 6,387 thousand (27.9%) and municipalities EUR 2,638 thousand (11.5%). Items of the drug policy programmes were identified in the state budget of the Government Council for Drug Policy Coordination (GCDPC), in the budget of Ministry of Education, Youth, and Sports, in the budget of the Ministry of Defence, the Ministry of Health, and the Ministry of Justice. The Ministry of Labour and Social Affairs did not include expenses earmarked for the drug policy programmes; it provided subsidies for projects aimed at the target group consisting of individuals at risk of the use of addictive substances and dependency on them. The General Customs Headquarters did not account for any independent drug policy programme, but it provided investment expenditure associated with the investigation of drug trafficking. The Ministry of the Interior was responsible for the budget of the National Drug Squad of the Criminal Police and Investigation Service of the Police of the Czech Republic which reported current expenditure.

Figure 0-1: Labelled expenditure on drug policy in the Czech Republic (€ million)



	2004	2005	2006	2007	2008	2009	2010	2011
Municipal budgets	2.0	1.7	1.7	2.2	2.5	2.2	2.4	2.6
Regional budgets	2.6	3.4	3.4	4.6	6.5	6.5	7.7	6.4
State budget	9.2	11.6	12.8	13.2	14.9	14.2	14.7	13.9

Figure 0-2: Structure of labelled expenditure on drug policy by sources



Source: NFP (Mravčík, et al., 2012; Vopravil & Běláčková, 2012)

Labelled expenditures by destination of program realizations

The total labelled expenditure from state budget for drug policy are partly designated on programs on regional level (EUR 5,862 thousand) and the rest of EUR 8,046 are for national programs. The targeted expenditure on drug policy from region budgets (EUR 6,387 thousand) and municipality budgets (EUR 2,638 thousand) are designed for regional drug policy. The state budget is higher than regional budgets, but regional drug policy programs are financed mainly from the regional budgets (see Figure 0-3 and Figure 0-4).

Figure 0-3: Labelled expenditure on drug policy with regional destinations in the Czech Republic in 2010 (EUR million)

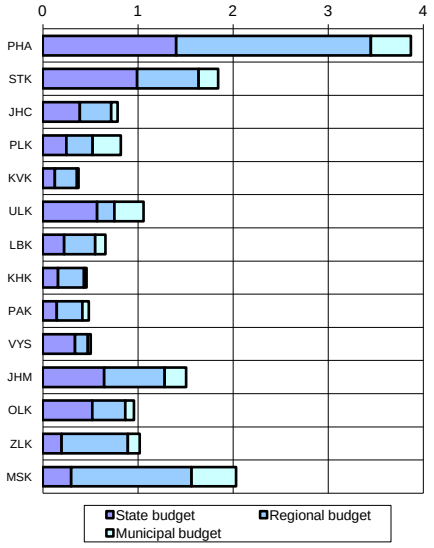
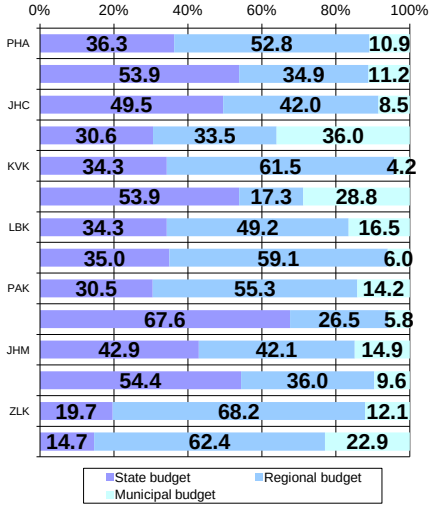


Figure 0-4: Structure of the labelled expenditure on drug policy with regional destinations in the Czech Republic 2010



Labelled expenditures by type of service

The main division of drug services follows the Reuter's classification: prevention, harm reduction, treatment and law enforcement. However, it needs to be divided more detailed for analyses of policy makers. Harm reduction is dividing on drop-in centres and outreach programmes. The treatment is divided on health care (outpatient and inpatient alcohol/drug treatment, including substitution therapy, detoxification, and social services provided as part of institutional health care), non-health outpatient care (outpatient and intensive outpatient non-health programmes, crisis intervention, social counselling, social rehabilitation, and prison-based programmes delivered by NGOs) and on therapeutic communities (see Table 0-1).

Table 0-1: Drug policy expenditures by service categories in the Czech Republic in 2011 (in EUR thousand)

Service category	State budget	Region budgets	Municipality budgets	Total	Total (%)
Primary prevention	723	870	641	2,234	9.7
Harm Reduction	3,725	1,284	1,200	6,209	27.1
Treatment	2,584	1,113	459	4,155	18.1
Sobering-up stations	0	2,731	76	2,807	12.2
Aftercare	688	294	218	1,200	5.2
Law enforcement	5,431	0	0	5,431	23.7
Coordination, research, evaluation	715	32	9	756	3.3
Others. unspecified	41	62	37	140	0.6
Total	13,908	6,387	2,638	22,933	100.0

Source: (Mravčík et al 2012)

The next items of drug services are sobering-up stations, aftercare and coordination, research and evaluation. The biggest part from the total sum was designated for harm reduction (27.1 %), for law enforcement 23.7 % and for treatment 18.1 %.

2.2 Non-labelled expenditure

The non-labelled drug related expenditure cannot be directly identified from budget or reports. The expenditure are divided on expenditures from health insurance and on law enforcement and the amounts are estimated.

2.2.1 Drug Treatment Costs Incurred by Health Insurers

This chapter provides an overview of drug policy expenditures that are not directly (or ex-ante) intended for the addressing of drug-related issues and neither are specifically labelled as drug policy expenditure, but that are, however, spent on addressing drug-related issues, and need to be estimated or specifically identified. These are mainly the costs of addiction treatment reimbursed by health insurance, and the costs of enforcing drug-related laws by police (except for labelled drug policy cost of specialized units, such as the National Drug Headquarters), prosecutors, courts and the prison service.

The National Monitoring Centre for Drugs and Drug Addiction in collaboration with the Institute of Health Information and Statistics (IHIS) newly processed data that estimate the costs of addiction treatment from health insurance funds for the years 2007 - 2010 (Mravčík, et al., 2012). Data on health insurance were processed

by the Czech Statistical Office (CZSO) for inclusion in the System of Health Accounts (SHA). This system is used for comprehensive expression of all health care spending, or spending on health in its broader sense, and are divided per each source of health care financing (such as insurance, private sources et al.).

The largest share of the financing of health care in the Czech Republic is covered by health insurance that represents approximately three quarters of all medical expenses. The costs from health insurance can be summed by diagnoses ICD-10 and their groups. Based on the data reported by insurers, treatment costs associated with the use of non-alcohol drugs were estimated (dg. F11-F19) as the sum of costs identified by the diagnosis, and as the sum of unidentifiable costs that were not allocated by diagnosis (Figure 0-3). For the year 2010, the estimate totalled EUR 16.6 million.

The unidentifiable costs had to be adjusted before processing. The costs of different healthcare segments (inpatient care, outpatient care, capitation payments to medical practitioners, etc.) were multiplied by the proportion of F11-F19 diagnoses cost on total costs in these segments (see Table 0-2).

Table 0-2: Total costs incurred by health insurers in relation to the F10–F19 diagnoses according to the segment of care (EUR thousand)

Type of care	Cost of diagnoses F11–F19			
	2007	2008	2009	2010
Treatment services	7,826	9,127	10,766	11,283
Inpatient care	6,620	7,857	9,244	9,699
One-day care	7	11	11	17
Outpatient care	1,184	1,223	1,496	1,553
Home care	15	35	14	14
Rehabilitation services	10	8	100	136
Long-term care	37	138	99	144
Supporting services	1,419	1,369	1,558	1,637
Medication and medical supplies	2,561	2,753	3,306	3,233
Prevention	76	738	154	114
Unknown	10	28	9	19
Total	11,931	14,150	15,981	16,551

Source: (Nechanská 2012, Mravčík et al 2012)

2.2.2 Costs on drug-related crime

The non-labelled drug-related expenditures are the expenditures which are not directly (or ex-ante) intended for the addressing of drug-related issues and neither are specifically labelled as drug policy expenditure (Mravčík et al 2007). This is especially the case of law enforcement costs which are, in general, not attributed to specific crimes in the budgets.

For drug-related crime, an attributable proportion was determined separately at particular phases of criminal proceedings (police, public prosecutors' offices, courts, prisons) – because of the different share of such criminal offences on the total number of offences that were processed in these phases. The attributable proportions for drug-related, so called primary drug offences (possession of drugs, production and sale of drugs, in the Czech Republic, this was Section 187a to Section 188a of the Penal Code in 2006), and other criminal offences committed by drug users, dealers and producers (secondary drug-related crime) were determined separately (see Table 0-3).

Table 0-3: Attributable proportions of drug-related crime in the law enforcement sector in the Czech Republic in 2006

Body / institution	**All criminal offences**	**Drug-related criminal offences (primary crime)**		**Secondary crime**		**Total**	
		Number	Attributable proportion (%)	Number	Attributable proportion (%)	**Number**	**Attributable proportion (%)**
Police – criminal offences cleared	133,695	2,758	2.06	12,388	9.27	**15,146**	**11.33**
Public Prosecutors' Offices – offenders prosecuted	102,476	2,630	2.57	8,965	8.75	**11,595**	**11.31**
Courts – offenders accused by Public Prosecutors' Offices	90,199	2,314	2.57	8,123	9.01	**10,437**	**11.57**
Prisons– offenders sentenced to prison	9,997	432	4.32	1,286	12.86	**1,718**	**17.19**

Source: (Mravčík et al. 2007)

First of all, the budget of law enforcement agencies was identified in the final account of the state budget, and expenditures for the activities which do not relate to investigation and prosecution criminal offences were deduced from the total law enforcement budget; data about the staff representation of individual professions given in the PAD study (Zabransky et al. 2001) were used for this purpose. The PAD study found that on the level of police, 86.06% participated in investigation and prosecution (for instance, the departments of traffic police, protection of state representatives, immigration police and border guard etc.), and on the level of courts, 26.2% of all judges worked on criminal cases. The total expenditures of the police and courts used for our estimate were adjusted with these proportions; in addition, budget of the National Drug Squad that is already included in the labelled expenditures, was deduced from the total expenditure used for our estimate (see Table 0-44).

Table 0-4: Expenses of law enforcement in the Czech Republic in 2006 (EUR million)

Category	Total expenditures	Adjusted expenditures
Police services	1,205.4	1,033.6
Public Prosecutors' Offices	68.3	68.3
Courts	305.6	80.1
Prisons	224.6	224.6

Source: (Mravčík et al. 2007)

The amounts which can be attributed to addressing drugs issues on the side of law enforcement were obtained as a multiple of adjusted budget (Table 0-44) and of attributable proportions of both primary and secondary drug-related crimes from the Table 0-3. See Table 0-55 for the results.

Table 0-5: Non-labelled drug-related expenditures of law enforcement in the Czech Republic in 2006

Category	Adjusted expenditures total (€ million)	Directly attributed to drug use (drug-related criminal offences)		Indirectly attributed to drug use (secondary drug-related crime)		Total attributed	
		Proportion (%)	Amount (€million)	Proportion (%)	Amount (€million)	**Proportion (%)**	**Amount (€million)**
Police services	1,033.6	2.06	21.3	9.27	95.8	**11.33**	**117.1**
Public Prosecutors' Offices	68.3	2.57	1.8	8.75	6.0	**11.31**	**7.7**
Law courts	80.1	2.57	2.0	9.01	7.2	**11.57**	**9.3**
Prisons	224.6	4.32	9.7	12.86	28.9	**17.19**	**38.6**

Source: (Mravčík et al. 2007)

In our subsequent analyses, we created a time trend of attributable proportions of primary drug crimes (see Table 0-6).

Table 0-6: Attributable proportions of drug related crime in the Czech Republic (%)

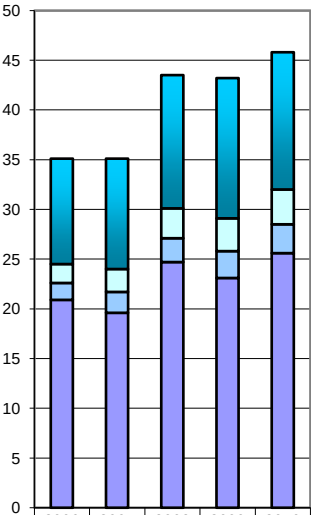
	2006	2007	2008	2009	2010
Police – criminal offences cleared	2.06	1.84	2.01	2.05	2.21
Public Prosecutors' Offices – offenders prosecuted	2.57	2.78	2.93	3.30	3.50
Courts – offenders accused by Public Prosecutors' Offices	2.57	2.90	3.13	3.42	3.61
Prisons– offenders sentenced to prison	4.32	4.20	4.39	4.60	4.46

Source: (Mravčík, et al., 2012; Vopravil & Běláčková, 2012)

The non-labelled cost of drug-related law enforcement (excluding the National Drug Squad) was estimated at EUR 45.7 million in 2010. Despite the number of drug-related crimes was quite stable in the observed time period, the adjusted cost of law enforcement institutions was on increase in the period – because of a general cost increase. An exception to this was the year 2007, when a decrease of drug-related cost was caused by a drop in attributable proportion (due to a rise in total crimes).

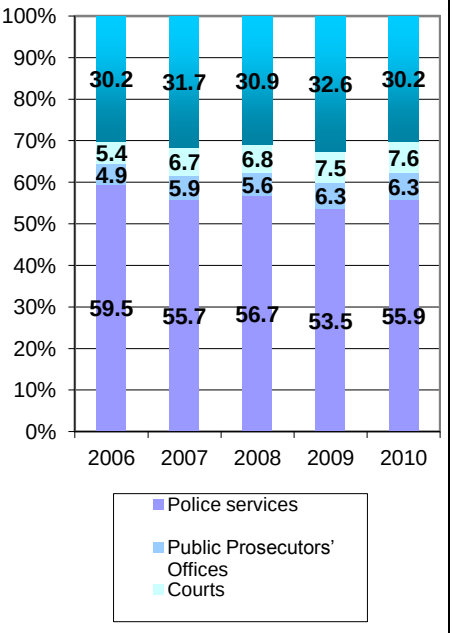
The majority of non-labelled drug-related law enforcement costs were incurred on the level of Police (see Figure 0-6). However, its share on the total non-labelled law enforcement cost decreased in the observed period, while the share of public prosecutor's office increased. The share of prisons on the non-labelled law enforcement cost of primary drug crimes was about 30 % in the whole period.

Figure 0-5: Non-labelled expenditure on law enforcement (€ million)



	2006	2007	2008	2009	2010
Prisons	10.6	11.1	13.4	14.1	13.8
Courts	1.9	2.3	3	3.3	3.5
Public Prosecutors' Offices	1.7	2.1	2.4	2.7	2.9
Police services	20.9	19.6	24.7	23.1	25.6

Figure 0-6: Structure of the non-labelled expenditure on law enforcement



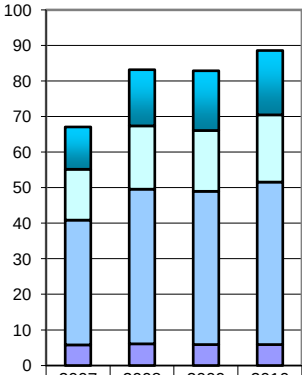
Source: (Mravčík, et al., 2012; Vopravil & Běláčková, 2012)

As it was already noted, the estimate presented in Figure 0-5 is related to primary drug crimes only; other crimes that are attributable to drug use (secondary drug crimes) were not included.

2.3 Total public expenditure on drug policy

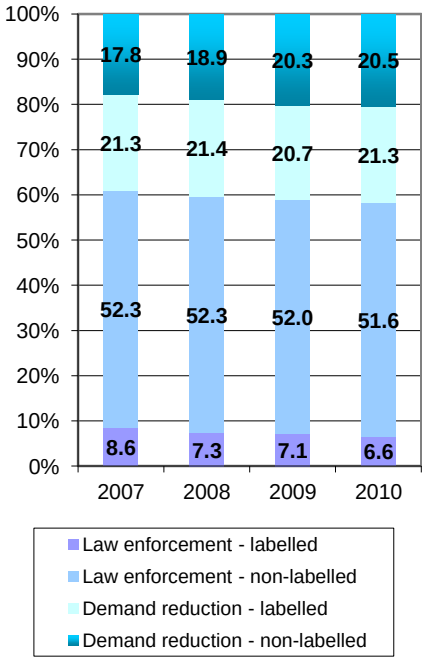
In 2010, the total drug policy expenditure in the Czech Republic, combining labelled and non-labelled expenditures, was EUR 88.6 million (this represented a 6.9 % yearly increase). The split of the total expenditure between demand reduction and supply reduction (law enforcement) in a time line of methodologically consistent estimates is presented in Figure 0-7.

Figure 0-7: Labelled and non-labelled public expenditure on drug policy in the Czech Republic (€ million)



	2007	2008	2009	2010
Demand reduction - non-labelled	11.9	15.8	16.8	18.1
Demand reduction - labelled	14.3	17.8	17.1	18.9
Law enforcement - non-labelled	35.1	43.5	43.1	45.7
Law enforcement - labelled	5.8	6.1	5.9	5.9

Figure 0-8: Structure of the labelled and non-labelled public expenditure on drug policy in the Czech Republic (%)



Source: (Mravčík, et al., 2012; Vopravil & Běláčková, 2012)

The greatest share of the total drug policy expenditure (51.6 %) was represented by non-labelled law enforcement costs (Figure 0-8). The total cost of law enforcement (supply reduction) further included the cost of National Drug Squad, the Customs Administration of the Czech Republic with their drug policy program, and the cost of drug detection in prisons, that together composed 6.6 % of the total budget. The share of demand reduction on the total drug policy expenditure in the Czech Republic increased from 39.1 % in 2007 to 41.8 % in 2010. Approximately half of it was labelled expenditure (21.3 % of the total), and the other half consisted of non-labelled expenditure (20.5 %).

The total volume of the expenditures from the public budgets which were expended in 2010 for addressing drugs issues was estimated to be EUR 88.6 million (0.04 % of total public expenditure in 2010), of which EUR 37.0 million (41.8 %) were spent on drug demand reduction and drug-related treatment. and EUR 51.6 million (58.2 %) were used for drug supply reduction and law enforcement.

2.3.1 Social costs

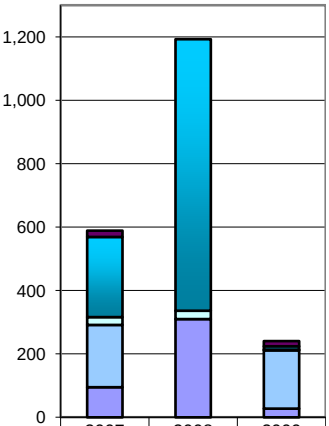
Another way to estimate public expenditure related to substance abuse is the methodology of social costs, developed by Canadian Center on Substance Abuse (Single et al., 1996) and adopted by WHO (Single et al., 2003). The methodology is built upon. Cost of illness studies that estimate the amount of resources that would be available to society in case the condition in focus (here substance use) didn´t exist (D. P. Rice, 1966; D. P. Rice, 1999). COI studies focus on external costs of drug use exclusively; therefore different kinds of public expenditures are estimated, rather than the private expenditure on alcohol, tobacco or illicit drugs. At the same time, transfers within the social welfare systems are not considered an economic cost to society, and only costs of administering these transfers are commonly involved. Costs of substance use are divided into direct and indirect costs in this methodology.

Direct costs are categorised as health-related costs (those incurred in addiction treatment and harm reduction services, and in the treatment of attributable diseases, such as HIV or hepatitis C), law enforcement costs (those related to the operation of the criminal justice system – police, public prosecutors, courts, and prisons – in responding to so-called primary and secondary drug crimes), and other areas (such as the costs of research or excise tax administration).

Indirect costs are associated with lost productivity due to morbidity and due to mortality. In health care, they include productivity lower incurred during treatment and as a result of incapacity to work and absence from work) and mortality (years of life lost), while in terms of law enforcement, they are divided into costs related to criminal careers and those incurred by the victims of crime in relation to their morbidity and mortality.

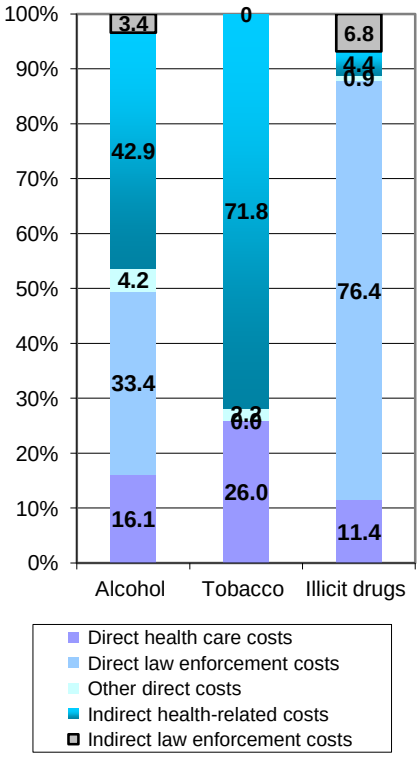
The Department of Addictology, First Faculty of Medicine of Charles University in Prague and General Faculty Hospital in Prague carried out a study of the social costs of alcohol, tobacco and illicit drugs in the Czech Republic in 2007. The social costs (Cost of Illness, COI) in 2007 related to the use of three major groups of addictive substances, i.e. tobacco, alcohol, and illegal drugs, amounted to EUR 2,023 million in the Czech Republic (Zabransky et al. 2011), with EUR 1,193 million (59.0%) attributed to tobacco, EUR 589 million (29.1%) attributed to alcohol, and EUR 241 million (11.9%) attributed to illegal drugs, see Figure 0-9. The total costs associated these substances reached approximately 1.6 % GDP. Approximately 0.2 % of GDP was incurred in relation to illicit drugs. The share on GDP was comparable to an estimate of social costs of illicit drugs in the Czech Republic in 1998 (Zábranský, Mravčík, Gajdošíková, Kalina, & Vopravil, 2001).

Figure 0-9: Social costs of the alcohol, tobacco and illicit drugs in the Czech Republic, 2007 (€ million)



	2007	2008	2009
Indirect law enforcement costs	19.9	0	16.4
Indirect health-related costs	252.9	856.7	10.6
Other direct costs	24.7	26.4	2.2
Direct law enforcement costs	196.5	0	183.9
Direct health care costs	95.1	310	27.5

Figure 0-10: Structure of social costs of the alcohol, tobacco and illicit drugs in the Czech Republic, 2007 (%)



Source: (Zábranský, Běláčková, Štefunková, Vopravil, & Langrová, 2011)

The total direct costs of substance use amounted to EUR 900 million (42.8%), while the indirect costs totalled EUR 1,100 million (57.2%). Indirect costs reached two-and-a-half times higher that the direct ones for tobacco, particularly because of the high mortality-related costs. For alcohol, direct costs were slightly higher than the indirect ones; the most significant items were both primary and secondary crime and mortality. As regards When it comes to illicit drugs, the direct costs surpassed the indirect ones enormously, which was caused by the significant level of secondary crime involving offences against property.

2.3.2 Expenditure on drug policy in other countries

Labelled expenditure on drug policy are published in the EMCDDA annual reports. Estimations of the non-labelled expenditure for the year 2008 were summarized in the EMCDDA report (EMCDDA 2008), but out of the project partner countries, non-labelled costs were available for the Czech Republic only.

In Spain, total labelled expenditure was EUR 432.7 million in 2009, from which EUR 136.9 million were from the state budget, and EUR 295.8 million were from regional budgets. Out of the total amount, EUR 324.1 million were distributed in regions into the following programs: prevention (EUR 53.6 million, 16.5 %); welfare, health care and rehabilitation (EUR 254.7 million, 78.6 %); research, documentation and publication (EUR 6.4 million, 2.0 %); and institutional coordination (EUR 9.4 million, 2.9 %).

In Portugal, the total labelled expenditure was EUR 75.5 million in 2010, out of which 45.8 were from state budget, 26.5 were transferred directly from the social games' returns, and the rest came from the IDT's (Instituto da Droga e da Toxicodependencia) own revenues and from its previous year balance.

Italy provided an estimate of social costs of illegal drug use in the total amount of EUR 12.4 billion in 2009 (0.81 % GDP).

3

Analyses

This chapter describes several examples of analytical procedures that bring insight into the dynamics of illicit drug market economy and drug policy expenditures.

3.1 Potential impact of illicit drug market on GDP

The National Statistical Offices in the European Union shall report the estimations of illegal activities, including the illicit drug market, in their national accounts system (see chapter 1.3.4). As shown in Chapter 1, the share of value added from drug market on GDP in the Czech Republic amounted to 0.22 %, the share on GDP in Italy was about 0.21 %, and it reached 0.29 % in Spain. All estimations used the same methodology, only epidemiological indicators and some market characteristics differed across the countries. Our results show that the contribution of the illicit drug market to the national economy is about 0.2-0.3 % GDP.

Several drug market estimates, however, focus on the total value of illicit drug market at the point of consumption (RAND, et al., 2009) that correspond rather to the estimation of total use or total supply (see Table 0-23). Reporting these estimates as a share of GDP, however, seems rather inappropriate and yields into over-estimation of illicit drug market share on national economies. We suggest that total use / total supply figures are presented in absolute figures only.

3.2 Time series of drug market size in the Czech Republic

The main data source for the detailed structure of use prevalence rates and frequencies of use are the general population surveys (GPS). General population surveys on substance use and attitudes towards it were conducted in the Czech Republic in the years 2004, 2008 and 2012 (results of the GPS2012 were not available till finalization of this study). In the Czech Republic, further surveys into general population with the focus on substance use were conducted; one of them

was the Gender, Alcohol, and Culture: an international study (GENACIS) for the population 18-64 years old in 2002. The GPSs can be completed with data on the population of 16-18 years old from the European School Survey Project on Alcohol and Other Drugs (ESPAD); in the Czech Republic, ESPAD was conducted in the years 1995, 1999, 2003, 2007, and 2011. In between the years when large surveys are conducted, prevalence rates can be updated with results of small surveys on drug use conducted by the NFP or other research institutions(e.g. (Kubů, Škařupová, & Csémy, 2006).

Data on drug purities and prices are updated each year, and are published by the NFP in its Annual Reports. A time trend of the drug market size based on the above mentioned data was developed for the Czech Republic (see Table 0-1: Drug market in the System of National Accounts in the Czech Republic in 1999-2011 (EUR million).

Table 0-1: Drug market in the System of National Accounts in the Czech Republic in 1999-2011 (EUR million)

NA indicators	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total supply	224	230	237	258	247	258	303	350	387	475	460	488	517
Domestic production	169	172	178	193	184	189	208	218	220	247	237	247	262
production for market	78	78	80	86	80	87	100	111	126	152	150	164	167
production for own use	37	38	39	43	42	46	65	87	107	141	138	144	163
Import	18	20	20	22	22	23	30	44	61	88	85	97	92
Trade margin	91	94	98	107	104	102	108	107	94	94	87	82	96
Total use	224	230	237	258	247	258	303	350	387	475	460	488	517
Final consumption	224	229	237	257	247	258	302	347	384	469	453	481	505
expenditure for final consumption	187	191	198	214	205	211	237	260	277	329	315	337	342
consumption of own account production	37	38	39	43	42	46	65	87	107	141	138	144	163
Export	1	1	1	1	1	1	2	3	4	6	6	7	12
Intermediate consumption	37	38	39	42	40	42	47	52	56	66	68	65	102
Value added	**169**	**172**	**179**	**194**	**186**	**194**	**226**	**254**	**271**	**321**	**307**	**326**	**323**

The time series was used in the Czech NA revision in 2011. In the future, the time series will be updated with the use of the GPS2012 data, and drug consumption will be adjusted with the use of the moving average method.

3.3 Drug market and public expenditure on drug policy

The total value of illicit drugs that were marketed in the Czech Republic in 2010 was estimated at EUR 488 million. The trade margin from the illicit drug trade, which are untaxed profits of drug dealers, was estimated at EUR 82 million. The total expenditure (labelled and non-labelled) on drug policy was estimated at EUR 88.6 million, which is very close to the trade margin estimate. In the Czech Republic thus, approximately the same amount was used to tackle the drug problem, as was the untaxed profit of drug dealers within the country. However, total social costs attributed to illegal drugs were estimated at EUR 241 million (for year 2007).

3.4 Labelled expenditure on drug policy and PUD in regions

In this chapter, we take a look at regional decomposition of drug policy budgets. In the Czech Republic, the biggest share of drug policy expenditure was allocated in the capital city Prague (23.6 %) which accommodates the largest proportion of country´s problem drug users (29.0 %). The biggest difference between the proportion of regional drug policy cost on the national cost, and the proportion of PDUs in the region on the national count, was in the Usti region. In this region, 12.5 % PDUs of the total country were estimated, while only 6.5 % of the total drug policy cost allocated to the regions went to Usti region.

Table 0-2: The number of PUD and drug policy expenditure on regional level in 2010

Regions	Abbreviation	Problem drug users		Drug policy costs allocated to the regions	
		Count	%	mil CZK	%
Prague	PHA	11 350	29.0	97 938	23.6
Central Bohemia	STK	2 150	5.5	46 685	11.3
South Bohemia	JHC	1 400	3.6	19 941	4.8
Pilsen	PLK	2 000	5.1	20 751	5.0
Karlovy Vary	KVK	900	2.3	9 519	2.3
Ústí nad Labem	ULK	4 900	12.5	26 849	6.5
Liberec	LBK	2 650	6.8	16 722	4.0
Hradec Králové	KHK	950	2.4	11 694	2.8
Pardubice	PAK	400	1.0	12 298	3.0
Vysočina	VYS	600	1.5	12 800	3.1
South Moravia	JHM	3 900	9.9	38 186	9.2
Olomouc	OLK	3 300	8.4	24 301	5.9
Zlín	ZLK	2 350	6.0	25 807	6.2
Moravia-Silesia	MSK	2 350	6.0	51 394	12.4
Total		39 200	100.0	414 885	100.0

Source: (Mravčík, et al., 2012; Vopravil & Běláčková, 2012)

The fact that drug policy is under-financed in the Usti region, relatively to the extent of the drug problem (as expressed by the PDU estimate), is caused by the low support of the regional government. In the Czech Republic, the average ratio of financing local drug policy "state : region : municipality" was about 38 : 47 : 15. However, in the Usti regions, it was 54 : 17 : 29 (see Figure 0-2). While the total drug policy expenditure decreased in 2.8 % between 2009 and 2010, drug policy expenditure in the Usti region decreased in 6.8 %.

Figure 0-1: Labelled drug policy expenditure on regional level in 2010 (mil EUR)

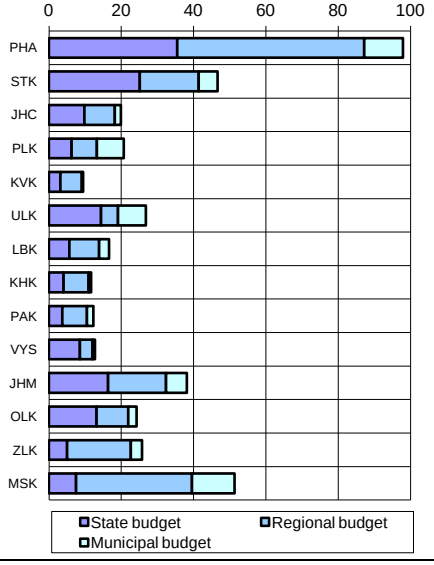
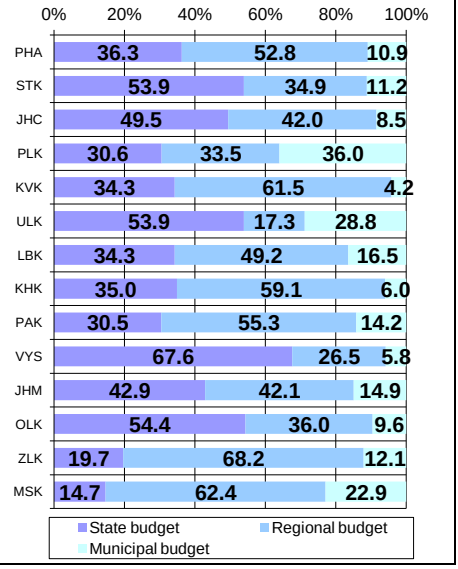


Figure 0-2: The structure of labelled drug policy expenditure on regional level in 2010

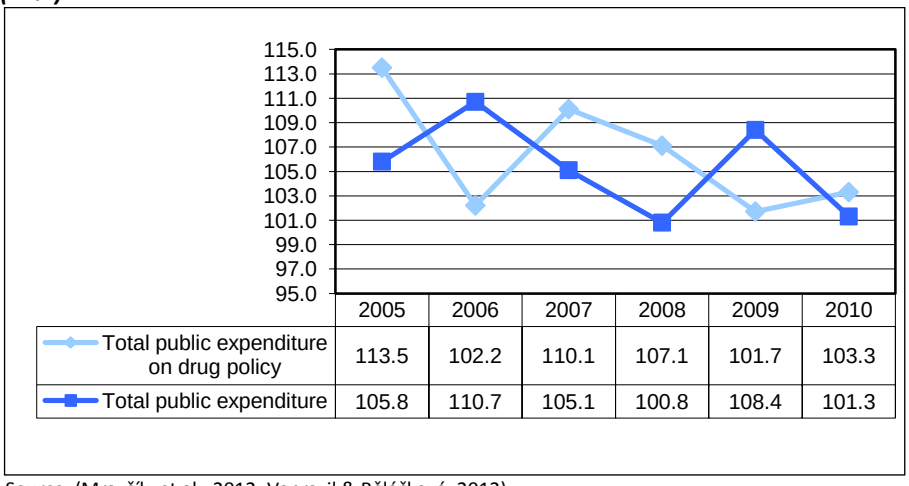


Source: (Mravčík, et al., 2012; Vopravil & Běláčková, 2012)

3.5 Labelled expenditure for drug policy and total expenditure from public budgets

Between the years 2005 and 2010, the average yearly growth of total drug policy expenditure was 6.3 %; the average yearly growth of total public expenditure was 5.4 %. It seems that expenditure on drug policy increased more rapidly than the total public expenditure, see Figure 0-3.

Figure 0-3: Year-on-year index of public expenditure and drug policy expenditure (in %)



	2005	2006	2007	2008	2009	2010
Total public expenditure on drug policy	113.5	102.2	110.1	107.1	101.7	103.3
Total public expenditure	105.8	110.7	105.1	100.8	108.4	101.3

Source: (Mravčík, et al., 2012; Vopravil & Běláčková, 2012)

Conclusions and discussions

The methodology for estimation of illicit drug market from demand side was presented in this publication. The methodology is built upon illicit drug consumption of drug users, and therefore stems from epidemiological indicators of substance use. The data for number of occasional (last 12 months) drug users comes from General Population Surveys, which are performed in most European countries. The number of problem drug users is estimated separately. The average quantity used per one opportunity (use day) is used in the estimation process; however, quantities consumed per a use day/occasion may differ between countries because of different drug users behaviour in different drug supply markets. The data on drug quantities consumed remain scarce in Europe.

Illicit drugs are imported into the European Union, while some countries have domestic production of particular kinds of illicit drugs at the same time. Prices and purities on wholesale and retail levels are different across countries. Data on prices and purities are published by EMCDDA and UNODC; however, they are not acquired through systematic collection.

Market size estimates can be further incorporated into the System of National Accounts (ESA95) as a part of export (P.6), import (P.7), output for final use (P.12), output (P.1), market output (P.11), value added (B.1g), intermediate consumption (P.2), final consumption of households, and trade margin.

The example of estimation of illicit drug market size in the Czech Republic for 2008 was shown. The size of illicit drug market as an expression of both total supply and total use of was 141 mil EUR in the case of cannabis, 183 mil EUR in the case of methamphetamine, 75 mil EUR in the case of cocaine, 53 mil EUR in the care of heroin, and 61 mil EUR in case of ecstasy and 8 mil EUR in case of LSD – a total of 521 mil EUR.

However, a correct estimation of the impact illicit drug markets have on national economies, shall account for added value only (B.1g in SNA). In the Czech Republic, the value added within the national economy was EUR 102 million for cannabis type drugs, EUR 135 million for methamphetamine, EUR 49 million for ecstasy, EUR 2 million for LSD, EUR 38 million for cocaine and EUR 43 million for heroin – a total of EUR 369 million. The share of value added from drug market on GDP in the

Czech Republic amounted to 0.22 %. With the use of the same methodology, we estimated the share of illicit drug market on GDP in Italy to be about 0.21 %, and in Spain to be 0.29 %. Our results indicate that the contribution of the illicit drug market to the national economies in the European Union (or at least the project participant countries) ranges from 0.2 to 0.3 % GDP.

Our results seem to be lower than what was previously published in the body of literature on drug market size in the Czech Republic. While estimates of drug use prevalence are generally retrieved from EMCDDA and represent a comparable part of different methodological approaches, a greater level of uncertainty lies in quantity estimates. For example, other studies used 150 grams for last month cannabis users in annual cannabis consumption, which is more than what we assumed for the Czech cannabis users (Kilmer and Pacula 2009). Another difference lies in the fact that previous studies tended to relate the total consumption to GDP, and thus yielded higher results.

Finally, we presented a detailed overview of data collection of public expenditures on drug policy in the Czech Republic. While the labelled public expenditures are more readily accessible, and therefore can be retrieved with one year delay the latest, the non-labelled public expenditures, which are not directly (ex-ante) intended for addressing drug related issues in public budgets (such as health care insurance spending and enforcement of drug-related crimes) and that require a detailed estimation technique, can be retrieved with a two years delay. In terms of further analysis, we suggest that drug policy expenditure shall be interpreted in the context of overall public budget expenditures. Another point of concern might be regional distribution of public budgets that shall reflect the size of drug problem in a particular region. In our analysis, we found no obvious relationship between the size of the drug market and drug policy expenditure from public budgets. We suggest that drug policy spending is rather a subject to drug policy discretion across different times and spaces, than a reflection of drug market size.

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Abbreviations

CPA	Statistical classification of products by activity
CZK	Czech national currency (Czech Crown)
CZSO	Czech Statistical Office
EC	European Commission
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
ES	Spain
ESA95	European System of Accounts 1995
ESPAD	European School Survey Project on Alcohol and Other Drugs
EU	European Union
EUR	Euro (European currency)
Eurostat	Statistical office of the European Union
GDP	Gross Domestic Product
GENACIS	Gender, Alcohol, and Culture: an international study
GPS	General Population Survey
ICD	International Classification of Diseases
IDT	Instituto da Droga e da Toxicodependencia (in Portugal)
IHIS	Health Information and Statistics
LSD	Lysergic acid diethylamide, hallucinogenic drug
NA	national accounts
NACE	Statistical classification of economic activities in the EU
NFP	National Focal Point
NOE	Non-Observed Economy
OECD	Organisation for Economic Co-operation and Development
PDU	problem drug users
SHA	System of Health Accounts
SNA93	System of National Accounts 1993
UN	United Nations

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Estimating the Cocaine Market in Italy: A National Accounts Framework

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Abstract

In this work, we propose a scheme to estimate the economic aggregates of the cocaine market using the standard framework of National Accounts. We will build a scheme to provide estimates for production and profit in the cocaine market. To carry out this task, we gathered data from several sources (central administration, international organizations, the Italian police force), and we created an interpretative design of the cocaine supply chain. This framework allows us to study the different phases of the supply chain and to carry out separate estimates. The results we discovered stress the relevant weight of cocaine-related activities in the Italian economy and the asymmetric distribution of the value added along the supply chain.

Introduction

According to scholars and control authorities, illegal activities represent a relevant part of the economy in several Countries, where the magnitude and characteristics of this phenomenon varies according to their political, social and environmental features.

By definition, illegal economy comprises activities concerning (1) goods and services that are outside the boundary of the law, or (2) activities related to legal goods and services that are carried out by illegal operators.[2]

Illegality comprises productive and redistributive activities. Productive activities (such as illicit drug production and trafficking, prostitution, smuggling, weapon trafficking) are connected with the creation of some economic value. Redistributive activities (such as theft, corruption, extortion) are instead linked to the transfer of economic value. From an economic point of view, redistributive actions do not affect the magnitude of national GDP, while productive actions do.

In this context, a lack of information about the magnitude of illegal productive actions implies some under-estimation of GDP. Though this obviously calls for an effort to provide reliable estimates of illegal economy, this task is however hard to be afforded. Indeed, illegal transactions are by definition hidden, and no complete and reliable data exist about the connected flow of goods and services.

In this work, we aim to contribute with our brick to the building up of a complete framework to measure illegal economy. Particularly, we provide an estimate of the magnitude of cocaine market utilising the usual National Account scheme. Data, methodologies and hypotheses are referred to Italy in 2010.

Illicit drug market represents a relevant part of illegal economy. UNODC (2012) estimates that an amount between 153 and 300 million people (5% of prevalence) have consumed some kind of illicit drugs al least once during 2010 in the world. These numbers witness the relevance of the phenomenon, which concerns in different shapes many Countries around the world. Evidently, moreover, the

[2] For instance, the illegality of drug trafficking is clearly connected with the nature of the product, while illegality of weapon trafficking is linked to the characteristics of the agents carrying out transactions.

magnitude of illicit drug consumption has an economic counterpart. Indeed, activities connected with illicit drug production, trafficking and retailing can be estimated to generate an amount of economic value similar to relevant legal products.

Table 1: Prevalence rates and number of users. Source: UNODC (2012)

Illicit drugs	Prevalence (percentage)		Number of consumers	
	Low	*High*	*Low*	*High*
Cannabis	2.6	5.0	119.4	224.5
Opioids	0.6	0.8	26.4	36.1
Opiates	0.3	0.5	12.9	20.9
Cocaine	0.3	0.4	13.2	19.5
Amphetamine-type stimulants	0.3	1.2	14.3	52.5
Ecstasy	0.2	0.6	10.5	28.1
Any kind of illicit drug	3.4	6.6	153.0	300.0

Table 1 shows prevalence rates and number of users for each illicit drug. From the table, among others, we can stress two interesting elements. The first is the difficulty in providing accurate estimates concerning the real magnitude of consumption. Indeed, the range between the low and the high hypothesis related to the measurement of prevalence rates is generally very large. The second is that one of the most reliable estimates can be achieved for cocaine, for which the difference between the low and the high hypothesis in terms of users is fairly small.

The difficulty in providing reliable estimates for consumption involves a similar, if not greater, difficulty to estimate production, which is exactly what we need in order to calculate the proportion of GDP linked to the illicit drug market. That notwithstanding, starting from data about consumption it is possible to build a scheme to achieve a reliable estimate of the supply, thus being able to develop a standard National Accounts framework.

This is exactly what we will try to do in this study, which is structured as follows. In section 2, we provide an overview of the general National Accounts framework. Section 3 is devoted to estimating illegal activities within the National Accounts scheme. Section 4 is aimed at stressing the main features of the cocaine market in order to set the interpretative framework that grounds following estimation procedures. In section 5 we provide a National Accounts scheme to estimate the full extent of the cocaine market. In section 6 we present our findings and, finally, in section 7, we comment on them.

2

System of National Accounts: an overview

The system of National Accounts is a framework to represent economic and financial activities carried out by the agents resident in a given country. Generally, economic actions turn into creation, transformation or destruction of economic value, thus determining the level and composition of the national stock of assets and liabilities. Therefore, the stock of wealth of a country is modified by the flows connected with the transactions carried out by resident agents. The system of National Accounts have the role of measuring these flows and, thereby, assessing the final result in current and patrimonial terms. Indeed, the present amount of wealth of a Country is determined based on the way in which current operations carried out by residents have modified the wealth of yesterday.

Economic actions can be broadly divided into four main categories: production, distributive operations, consumption and financial activities

Production is connected with the creation of economic value. Indeed, goods and services provided are the result of a process that creates and transforms resources. The difference between the value of the goods and services supplied and the value of the resources utilised represents the economic value created by the productive process. This amount is defined as value added, which can be thought of as the amount of economic resources that the productive system has been able to produce without impacting, in terms of value, on the previous stock of resources.

The value added can be also seen as the disposable amount of resources to remunerate factors of production. Indeed, labour, capital and entrepreneurship have to be rewarded for their contribution to the productive process. Distributive transactions determine their market remuneration, while taxation and contribution are utilised by the State to provide a further redistribution of income.

Distributive and redistributive actions, therefore, define the amount of resources that every agent owns in order to satisfy his needs. Resources can be used to consume or can be saved to be spent in the future. The choice between present and future consumption is relevant in defining the temporal allocation of economic value and, consequently, the amount of resources that are available for further investments.

The difference between savings and the resources needed to carry out investments defines a balancing item called (positive or negative) net borrowing, which represents the amount of resources that must be exchanged in order to equilibrate the system. Indeed, if net borrowing is positive, financial operations have to exchange liabilities with assets so as to balance accounts. Symmetrically, if net borrowing is negative, financial transactions have to balance the deficit by exchanging assets with liabilities.[3]

The European System of Accounts version 95 (ESA95) provides guidelines and the general framework to define and estimate National Accounts aggregates. ESA95 introduced the supply and use scheme as the main reference to develop the system of accounts. Indeed, for each element of the system, economic aggregates have to be defined based on their relative position as resources or uses in that context, while balancing items are defined so as to equalise supply and demand for each account.

The supply and use scheme is based on the equality between supply and demand, which should be independently estimated. Within this scheme, flows and aggregates generated by productive actions are summarised into two product-by-branch matrices (supply and use tables).

Figure 1: Supply matrix at market price

			internal production					import	distributive margins	taxes	total resources
			branches								
			NACE Rev.2				total				
			1	.	.	n					
products	CPA08	1	P(1,1)				P(1,)	Imp(1,)	DM(1,)	T(1,)	R(1,)
		.									
		.									
		.									
		.									
		.									
		.									
		.									
		m									
total			P(,1)				P	Imp	DM	T	R

Figure 2: Use matrix at market price

			intermediate consumption					final consumption	fixed capital	change in inventories	export	total uses
			branches									
			NACE Rev.2				total intermediate uses					
			1	.	.	n						
products	CPA08	1	IC(1,1)				IC(1,)	FC(1,)	C(1,)	dI(1,)	Exp(1,)	U(1,)
		.										
		.										
		.										
		.										
		.										
		.										
		.										
		m										
total			IC(,1)				IC	FC	C	dI	Exp	U
value added			VA(,1)				VA					
production			P(,1)				P					

[3] Obviously, the picture of the system of National Accounts provided can sound a little simplistic for specialists, but here the aim is to present just an insight of the this complex system. In order to go deeper into this subject readers can refer to the ESA95 manual edited by Eurostat.

Figures 1 and 2 show the structure of the two matrices[4]. Supply table represents the supply-side of the economic system. By-row, it shows the amount of value connected with the production and import of a good or service as defined by the CPA08 classification. Distributive margins and taxes are needed to obtain an evaluation of aggregates at market price starting from base price (or CIF price for imports). By-column, the supply table shows the value of the production carried out by enterprises classified into some homogeneous kind-of-activity-unit (branch) as defined by the Nace Rev.2 classification.

The use table represents the demand-side of the economic system. By-row, it shows the amount of value connected with the utilisation (consumption, investment, inventories) of the given product or service. By-branch, the use table shows the structure of costs, that is the set of products and services needed to carry out productive actions.

By-product the total amount of resources (R(1,)) has to be equal to the total amount of uses (U(1,)) in order to respect the constraint of the equality between supply and demand. By-branch, the difference between the value of production (P(,1)) and the amount of intermediate consumption (IC(,1)) is represented by the value added (VA(,1)).

Supply and use tables, therefore, allow us to define the total amount of resources that have been created by carrying out productive actions during a given period (generally one year) and the use agents done of these goods and services.

Furthermore, this scheme also provides us with other relevant information.

The supply table shows the structure of the system of production. Indeed, it answers the question *who produces what?*, thus stressing the degree of specialisation of the productive system. Furthermore, the supply table helps us to know whether products and services used by the community are either internally produced or imported.

The use table shows instead the structure of costs of the productive system. Indeed, it tells us *who uses what*, and which is the composition of consumption between intermediate and final**.**

Finally, supply and use tables can be jointly utilised to obtain the input-output table (by-branch or by-product), which stresses inter-sectorial relationships within the productive system. Indeed, by aggregating the information about the structure of production with the information about the structure of costs, one is able to derive the structure of transactions (purchases and sales) implied in productive actions. The input-output table gives us some relevant information about the transactional infrastructure between the branches and about the technological composition of products.

[4] Supply and use matrices shown in figure 1 and 2 are simplified versions of the usual matrices that have normally been used in the National Account framework. In this context, some columns have been aggregated.

3

National Accounts and the illegal economy

National accountants are recommended by ESA95 to estimate the value created by every economic activity inside the «boundary of production», defined as the conceptual space of the «productive activities that contribute to the creation of goods and services utilised to satisfy human needs, irrespective of their being directly or indirectly observed».
Therefore, national accounts have to take into account productive actions independently from their being observed or unobserved, legal or illegal. Obviously, this involves several matters. What is unobserved and voluntarily hidden cannot be measured based on some clear and complete set of information. Furthermore, in contrast to legal unobserved activities, which are in their emerged parts already included in National Accounts, illegal activities, in terms of products and branches of production, are not included. Thus, estimating the size of the illegal economy also implies modifying the the structure of supply and use tables.
Non-Observed Economy (NOE, hereafter) includes four main categories:
1. *Illegal economy*, which includes economic activities that are outside the boundary of the law. Illegal activities can be referred to products and services that are prohibited by the law or to legal products and services that are produced or consumed by unauthorised agents. Redistributive activities such as theft, corruption and extortion are not included in National Accounts.
2. *Informal economy*, which includes unities of production that are characterised by low organizational level, blurred division between labour and capital, and/or economic relationships based on occasional collaborations and parental links rather than on formal contracts.
3. *Underground activities for statistical motivations*, which represent the situation in which activities are not directly observed because of intrinsic lacks in the statistical system. Mainly, we refer to non-response in surveys, incomplete archives or un-updated archives.
4. *Underground activities for economic motivations*, which represent the situation in which legal activities are hidden to the central administration and, thereby, to the statistical system, in order to achieve some reduction in costs. The main

sources of underground economy are tax evasion and concealed labour (contribution evasion).

In order to produce estimates of NOE two main approaches can be followed. (1) The macroeconomic approach involves estimates obtained by exploiting relationships between variables, and by modelling agent behaviours. (2) The statistical approach produces estimates of NOE by integrating and reconciling informative sources about enterprises and families.

National statistical offices are advised by Eurostat to use the statistical approach. That notwithstanding, if the statistical approach can be considered as reliable in the estimation of the legal part of NOE, the same conclusion does not always hold for the illegal part.

Legal activities, though not directly observed, can be indirectly estimated using the statistical approach. Indeed, estimates can be obtained by exploiting the fact that some comparison is possible with observed activities. This way, non-response can be statistically treated starting from existing declarations, informal activities can be evaluated taking into account similar formal activities, and tax evasion can be estimated by comparing the results of suspect enterprises with those of non-suspect ones. Conversely, illegal activities cannot be estimated starting from some kind of reference point and, generally, an efficient term of comparison does not exist.

In this context, macroeconomic models can provide some estimates. Several attempts have been undertaken to give NOE a measure by exploiting macroeconomic models. The incoherence between the total amount of money demanded by the market and the amount of money that should be needed for observed activities is generally utilised to give an estimates of the magnitude of NOE. However, this method of estimation involves a difficulty in separating the effects of the different components of NOE.

Both approaches, therefore, are not completely reliable. The choice between them is mainly related to the aims of the work to be done. Here, we are trying to build up a framework to estimate cocaine-related aggregates. This firstly involves the need to separate this magnitudes from the rest of illegal activities, thus making the macroeconomic approach evidently inappropriate. On the other hand, it is largely simplistic to ground our estimate on the hypothesis that illegal activities and transactions can be assumed to be similar to legal ones. Therefore, a purely statistical approach is inadequate.

In this study, we decided to follow the path of utilising existing (incomplete) data, integrating them based on an interpretative scheme of the cocaine supply chain. This way, we implicitly chose to take-up a pseudo-deterministic approach, which consists of integrating lacking information based on hypotheses grounded in a knowledge of the organization and behaviour of illegal operators.

Obviously, this choice involves some shortcomings, mainly related to the reliability of the interpretative scheme (by definition unknown) and of the data provided by the different sources of information we use (normally based on some kind of estimates). That notwithstanding, we think this way to be the most efficient for

two main reasons. First, it allows us to estimate the value added as the result of the difference between production and costs, rather than deriving it based on its relationship with some macro-variables. Second, the interpretative scheme of the supply chain permits to decompose it based on the different kinds of operation carried out by actors (production, different levels of trafficking, dealing), and to define the distribution of value added along the supply chain.

4

The supply chain of cocaine

This section does not aim at providing readers with a reliable picture of the cocaine market, but, rather, aims at building up the 'fiction' we utilise to ground our estimates. The task of describing the supply-chain of cocaine would merit dedicated work, and would not in any case be particularly useful for the goal of this study. Indeed, the National Accounts framework hardly permits to handle a complex context of analysis, especially when each variable should be estimated rather than just collected.

Production of cocaine is located in the Andean region. The principle markets for traffickers are the United States, Western Europe and Oceania, where the cocaine produced in South-America arrives following different trafficking routes. Indeed, after the phase of production, the second step in the supply-chain is represented by the import of cocaine. Importers can buy cocaine from domestic producers in South-America and send it to their Countries, or rather they can buy cocaine from intermediaries which carry out the transaction with producers and, then, sell back the product to other traffickers.

After arrival, cocaine is inserted into the domestic market and is sold and purchased several times before arriving at the retail market. During this intermediate phase, cocaine is generally adulterated in order to increase the quantity to be sold. The number of passages in this intermediate phase is highly variable and depends on the form and extent of the traders' network, and on the localization and size of the market. Indeed, the more markets are localised close to arrival points, the bigger they are, and the closer traders are to the centre of the trafficking network, the lower in number the individual passages tend to be.

Finally, once this intermediate trafficking phase is terminated, retail traffickers sell to users. Also in this part of the supply-chain different kinds of dealers and users exist. Indeed, on one hand, users can be occasional, regular or intensive, this involving different types of transactions in terms of quantities and prices, while, on the other hand, retailers can have different kinds of selling networks, this also involving different quantities to be managed and different selling prices.

In order to build-up our model we need to arrange this set of possibilities into a simpler and more systematic set of assumptions. This mainly consists in defining

the different functions that may be carried out within the supply-chain of cocaine based on some «technology» and «localization» and then, secondly, to design some set of features in order to characterise them.

In this work, we take into consideration three different functions:

1. international wholesale trade, which includes the import of cocaine, independently from the type of intermediation, if any. This function implies some productive activity. Indeed, the complexity of logistics and transport service involved at this stage of the supply-chain allows us to suppose the generation of some value added rather than just the existence of trade margins.
2. Domestic wholesale trade, which involves the control on a relevant part of the domestic market, but not the possibility to intervene in foreign markets. In this phase, cocaine is transported from arrival points to localised markets and sold. The process of adulteration of cocaine is supposed to take place at this stage of the supply chain.
3. Retail trade, which is supposed to involve just direct selling to consumers and no further process of adulteration. At this stage of the supply chain, no further productive process is carried out.

The cutting point between functions is established taking into account the different set of competences and «technologies» needed to carry out processes, and the type of «localization» of the actions involved. International wholesale trade involves an international spatial and relational localization, and needs specific logistic and financial technologies and competences. Domestic wholesale trade also implies widespread spatial and relational localization, but at a domestic level, while technologies and competences in term of logistics are less relevant than was the case with international wholesale trade. Finally, as we defined it, retail trade does not presuppose a widespread localization nor high capabilities in terms of logistics. Indeed, retailer and dealers only need a network of users and are characterised by the narrow localization of their activities.

5

A National accounts framework for cocaine

As we stressed in section 2, the supply and use framework provides a product-by-branch scheme. The definition of products and branches is therefore a necessary step before starting estimation procedures.

In this context, a definition of the product to be taken into consideration is strictly necessary, while a definition of the branch is not. Indeed, activities connected with illegal products may also be supposed to be the result of a secondary production of some other existing branch (e.g. production of marijuana in the branch of agriculture or the selling of cocaine in the branch of retailing or wholesale trade).

In this work, however, we define both the product and the branch for two main reasons. The first is separating legal and illegal productive activities irrespective of their technological characteristics. This strategy is coherent with the aim of providing a clear representation of illegal activities in the economic system. The second is related to the peculiarity of the product we are concerned with. Indeed, as we stressed in section 4, cocaine is generally produced abroad and its supply chain is characterised by several passages among traders in which not only prices but also quantities change. The increase in quantity, which is related to the adulteration process, prevents us from allocating the whole value added as a trade margin, and poses the problem of allocating the value added created by adulteration (for instance, the idea of allocating it as a secondary production of the branch of chemicals is clearly misleading).

The definition of a peculiar branch of production representing cocaine-related activities permits us to overcome the problem of allocating the value added connected with the different phases of the value chain and allows us to provide a separate representation of cocaine-related aggregates.

We define the product as «pure and adulterated cocaine», while the branch is defined as «activities connected with the production, trafficking, adulteration and dealing of cocaine». This definition of the branch of production requires that we include in the same branch each phase of the value chain of cocaine (from import to street selling passing through adulteration and wholesale trade).

Particularly, as we said, we take into consideration three macro-phases, separately estimating their production, costs and value added. This method, which is

currently applied to estimate aggregates for electricity and gas distribution, has the consequence of including distributive margins within the value created by internal production.

In this context, two types of estimation are possible. Indeed, cells in supply and use matrices can be filled up following a by-product or rather a by-branch method. The first involves filling up cells horizontally taking into account information about quantity and prices for each product. The second takes up an evaluation in value based on the information provided directly by firms, and fills up the cells vertically. Generally, this latter method is utilised to estimate internal production and intermediate costs.

However, this procedure is coherent with a process involving an informative set based on enterprises declarations. Obviously, this is not the case with cocaine-related activities. Here, as the available information about cocaine trade is product-related, a quantity-by-price estimation is more efficient, at least for the supply table.

Estimating supply aggregates following an horizontal filling up may involve some shortcomings related to the existence of secondary productions. Indeed, a by-product estimation provides a measure of the total amount of value generated by the activities connected with such a product, irrespective of the branch producing it. The existence of secondary productions involves that each product can be produced by different branches and that the same branch can produce several products. This means that we need some hypotheses to allocate along the row the total amount estimated (black square by-row in figure 3) and some methods to estimate the production of other products related to the given branch of production (black squares by-column in figure 3).

Figure 3: Supply matrix including cocaine at market price

			internal production								
			branches				total	import	distributive margins	taxes	total resources
			NACE Rev.2								
			1	.	cocaine	n					
products	CPA08	1									
		.									
		.									
		.									
		.									
		.									
		cocaine			P(c,c)		P(c,)	Imp(c,)			R(c,)
		.									
		m									
total					P(,c)		P	Imp	DM	T	R

In this context, however, the problem is less relevant than it would seem. Indeed, by defining the branch of cocaine-related activities we implicitly exclude that they can produce value as a secondary production of other branches (black horizontal cells are blank). Symmetrically, the same definition of the branch, which directly connects the product and the kind-of-activity, excludes that activities linked to other products can produce value as a secondary production of the branch of cocaine-related activities (black vertical cells are blank).

The possibility to exclude the issue of secondary productions by-row and by-column involves some simplification in the estimation procedure. Indeed, it implies that the total value of cocaine-related activities is concentrated in the so called characteristic cell (P(c,c)) and, consequently, the value of production by-product (P(c,)) – which represents our quantity-by-price estimate – is equal to the value of production by-branch (P(,c)) – which is our unknown.

Looking at figure 3 we can see that other cells have to be filled up outside the boundary of internal production. Import is obviously needed, while taxes and distributive margins are not. Indeed, being that cocaine is illegal, taxes on related productive activities are not paid, and distributive (transport and trade) margins are by hypothesis included in the value of production.

In order to define the value added, we need to step to costs evaluation. This involves filling up the use matrix (figure 4). By-product, we can estimate: the characteristic cell of intermediate consumption (IC(c,c)), which obviously consists of the cocaine included in the production of cocaine, the final consumption (FC(c,)) represented by the value connected with use of cocaine by households[5], and the export (Exp(c,)), which mainly represents the cases in which Italy is just a transit point.

Obviously the use of cocaine in the productive processes of other products or services can be excluded (black horizontal cells in intermediate consumption are blank), as well as its utilisation as fixed capital. In principle, change in inventories cannot be considered as irrelevant. However as no information is available to provide a reliable estimation, we decided not to take it into account.

Other intermediate costs by branch (grey cells by row) have to be estimated based on some hypotheses about the productive technology of cocaine-related activities. Indeed, transport costs, chemicals and other services[6] (such as logistics, financial intermediation and so on) can be supposed to be involved in the productive process even though a punctual information is lacking. In this context a by-share estimation can be carried out.

The filling up of the value connected with the costs of products and services included in the productive processes of cocaine allows us to define an estimate of total costs of the branch (IC(,c)).

[5] Normally, final consumption consists of consumption of households, Public Administration and Non-profit institutions. In this case, obviously, consumption of cocaine has to be accounted just to households. Therefore, column related to Public Administration and Non-profit institutions have been omitted in the use matrix.

[6] What we called other services (that is, logistics, financial intermediation, security and so on) consists of existing products in the supply and use scheme. In this context we decided to aggregate them in one “product” just for the sake of simplicity.

Figure 4: Use matrix including cocaine at market price

			intermediate consumption branches NACE Rev.2				total intermediate uses	final consumption	fixed capital	change in inventories	export	total uses
			1	.	cocaine	n						
products	CPA08	1										
		.										
		.										
		.			IC(,c)							
		.										
		.										
		cocaine			IC(c,c)		IC(c,)	FC(c,)			Exp(c,)	U(c,)
		.										
		m										
total					IC(,c)		IC	FC	C	dI	Exp	U
value added					VA(,c)		VA					
production					P(,c)		P					

Once the value of total costs by-branch has been evaluated, the value added (VA(,c)) can be calculated as the difference between production (P(,c)) and costs (C(,c)) by-column.

6

Estimating cocaine aggregates

As we stressed in section 4, the branch of production of cocaine-related activities consists of three different sub-branches: international wholesale trade, domestic wholesale trade, retail trade. For each sub-branch, we estimate the value of production separately, following the quantity-by-price approach.

The main problem in estimating the supply-side of the cocaine market is represented by the lack of information about the real magnitude of drug trafficking in terms of quantity. Indeed, while price and purity estimates provided by police are considered to be reliable, information about quantity deduced based on seizures are not. To overcome the issue, we estimated quantities starting from data on consumption, which can be considered more accurate. Starting from the information about the general prevalence rate of cocaine (last-year-user), which is estimated to be 3.7%, it is possible to go back to prevalence rates per age-groups and, then, to the number of users (Table 2).

Table 2: Prevalence rates and cocaine users per age groups, Italy 2010

Age groups	Mid-year population (Thousands)			Prevalence rate (Percentage)			Cocaine consumers (Thousands)		
	Males	*Females*	*Total*	*Males*	*Females*	*Total*	*Males*	*Females*	*Total*
15 - 24	3116.4	2961.1	6077.5	5.8	2.3	3.7	180	68	248
25 - 34	3839.3	3781.5	7620.8	9.2	4.6	6.5	354	175	529
35 - 44	4888.6	4860.5	9749.1	4.2	1.2	2.5	203	56	259
45 - 54	4350.4	4462.5	8812.9	2.3	0.9	1.6	100	41	142
55 - 64	3622.4	3851.2	7473.5	0.5	0.9	0.7	17	36	52
Total (15 - 64)	19817.0	19916.8	39733.8	4.4	2.1	3.0	854	376	1230

In Italy, cocaine users are estimated to number about 1.2 million.[7] In order to step from the number of users to the amount of consumption, we need to characterise users and their consumption habits.

[7] The structure (proportion) of prevalence rate per age-group and gender is derived from IPSAD (Italian Population Survey on Alcohol and Drugs) 2010/2011. The total prevalence of

Table 3 shows our assumptions about those features, and stresses our method to achieve an estimation of the total amount of the cocaine that is consumed in Italy. We derived two different hypotheses (low and high) admitting that in total consumers could number 15% higher than our estimation, and that cocaine quantity per-dose could be 0.65 grams rather than our assumption of 0.75 grams.

Table 3: Determination of total consumption of cocaine, Italy, 2010

Type of cocaine user	Share on total (percentage)	Cocaine user by type of consumption (Thousands)		Doses per month	Doses per year	cocaine quantity per dose (Grams)		cocaine quantity per year (Grams)		Total consumption of cocaine per year (Kilos)	
		High	*Low*			*High*	*Low*	*High*	*Low*	*High*	*Low*
Intensive	0.30	424.4	369.0	25	300	0.75	0.65	225.0	195.0	95482.9	71958.0918
Regular	0.23	325.3	282.9	12	144	0.75	0.65	108.0	93.6	35137.7	26480.5778
Occasional	0.47	664.8	578.1	2	24	0.75	0.65	18.0	15.6	11967.2	9018.74751
Total	1.00	1414.6	1230.1							142587.7	107457.4

Thus, from our calculation, we obtain two different estimates about the quantity of cocaine consumed. The high hypothesis provides an amount of about 142t, while the low one an amount of about 107t. In order to determine the final consumption, we need to multiply those quantity by some consumption price. Street price of cocaine is estimated to be between 55,000 and 80,000 euros per kilo, depending on purity and quantities. To calculate two hypotheses for final consumption we assumed a high (72,000 euro per kilo) and a low (68,000 euro per kilo) street price, thus obtaining two different estimates: 10,266 and 6,307 million euro.

Cocaine consumed is considered to have a street purity of about 10%, while cocaine imported has an average purity of 80%. Starting from this data, we can back calculate the quantity of imported cocaine taking also into account that a small part of the imported cocaine is exported. Supposing that export represent the 10% of the cocaine marketed in Italy, we obtain an amount of imported cocaine between 21.0t and 16.4t (where export accounts for 1.9t and 1.4t, respectively). Import and export have different prices. Indeed, while import price varies between 2,500 and 4,000 euro per kilo, the export price is supposed to be in line with the first level trafficking price, which is about 34,000 euro per kilo. Thus, we can obtain estimates for imports (between 58.8 and 44.3 million euros) and exports (between 65.0 and 50.7 million euros).

Right now, therefore, starting from the number of users, we obtained estimates for final consumption, import and export. To step forward through completing our scheme, we have to make some other assumptions about intermediate prices and

use is derived from an elaboration of a set of administrative data and surveys carried out by Carla Rossi (2013) and by Santoro et al. (2012).

productive technologies for each of the sub-branches in order define production, intermediate costs and, finally, value added.
Production of international wholesale trade (Table 4) is equal to the product of the total quantity imported and the selling price. Imported quantity is equal to the correspondent of final consumption at a purity level of 80% plus the quantity exported. Selling price is supposed to be equal to 34,000 euro per kilo, which is the average value of cocaine at its arrival point in Italy. In this case, NA production, which indicates that the value of the output of the activity is equal. Intermediate costs are in this case equal to the sum of input, transport and other services costs, where input costs are represented by the value of import, transport (7%) and other service (2%) are evaluated based on a share of the value of the cocaine managed. Value added is calculated by subtracting costs to from NA production and it is equal to 666.6 million euros in the high estimate and 502.4 million euros in the lowest one. At this stage of the value chain, the value added-production ratio is equal to 0.90 while the value added per gram ratio is equal to 30,73 euro under both hypotheses. This is because technologies and process subtended are equal in both scenarios.

Table 4: International wholesale trade

International wholesale trade						
Aggregate	Low hypotesis			High hypothesis		
	Quantity (Kg)	*Price* (Euro per Kg)	*Value* (Million Euro)	*Quantity* (Kg)	*Price* (Euro per Kg)	*Value* (Million Euro)
NA Production			**502.4**			**666.6**
	14775.4	*34000*	*502.4*	*19606.4*	*34000*	*666.6*
Costs			**48.3**			**64.1**
- Input	*14775.4*	*3000*	*44.3*	*19606.4*	*3000*	*58.8*
- Transport	7% of value of cocaine managed		*3.1*	7% of value of cocaine managed		*4.1*
- Other services	2% of value of cocaine managed		*0.9*	2% of value of cocaine managed		*1.2*
Value added			**454.0**			**602.5**
Va/Prod ratio			**0.90**			**0.90**
Va/Gram ratio			**30.73**			**30.73**

The output of domestic wholesale trade (Table 5) is represented by the quantity sold, which is by hypothesis equal to the total cocaine demanded, multiplied by the selling price (55,000 euro per kilo at this stage of the supply chain).
At this second level of the supply-chain, intermediate costs also include those connected with chemical products used to adulterate cocaine, which are accounted for a 2% of the value of the cocaine managed. Similarly to the international trafficking transport (5% to take into account that we are dealing with

domestic transport) and other services (2%) are evaluated based on a share of the value of the cocaine managed.
Value added is obtained as the difference between NA production and intermediate costs and is equal to 7,842.5 (high hypothesis) and 5,910.2 (low hypothesis) million euros. For the same motivation highlighted above, value added-production ratio (0.87), and value added per gram ratio (47,69 euro) are also in this case equal in both scenarios.

Table 5: Domestic wholesale trade

Domestic wholesale trade						
Aggregate	Low hypotesis			High hypothesis		
	Quantity (Kg)	*Price* (Euro per Kg)	*Value* (Million Euro)	*Quantity* (Kg)	*Price* (Euro per Kg)	*Value* (Million Euro)
NA Production			**5910.2**			**7842.5**
	107457.4	*55000*	*5910.2*	*142591.7*	*55000*	*7842.5*
Costs			**785.5**			**1042.3**
- Input	*13432.2*	*34000*	*456.7*	*17824.0*	*34000*	*606.0*
- Transport	5% of value of cocaine managed		*182.7*	5% of value of cocaine managed		*242.4*
- Chemicals	2% of value of cocaine managed		*73.1*	2% of value of cocaine managed		*97.0*
- Other services	2% of value of cocaine managed		*73.1*	2% of value of cocaine managed		*97.0*
Value added			**5124.6**			**6800.2**
Va/Prod ratio			**0.87**			**0.87**
Va/Gram ratio			**47.69**			**47.69**

The output of retail trade (Table 6) is by definition represented by trade margins. Indeed, at this stage of the value-chain no production process takes place and activities are limited to buying and selling cocaine with price modifications. The output of this stage of the value chain is represented by the difference between the value of sold cocaine at street price per kilo (72,000 or 68,000 according to high and low hypotheses) and the costs connected with the cocaine to be sold without transformation. In this case value added, which is equal to trade margins because no other intermediate consumption is assumed, is equal to 2,599.6 million euro for the high hypothesis and to 1550.6 million euro for the low hypothesis.

Table 6: Retail trade

Retail trade						
Aggregate	High hypothesis			Low hypothesis		
	Quantity (Kg)	*Price* (Euro per Kg)	*Value* (Million Euro)	*Quantity* (Kg)	*Price* (Euro per Kg)	*Value* (Million Euro)
Revenue (Value of sold cocaine)			**11010.3**			**8110.9**
	152920.2	*72000*	*11010.3*	*119277.8*	*68000*	*8110.9*
Costs (Cocaine to be sold without transformation)			**8410.6**			**6560.3**
	152920.2	*55000*	*8410.6*	*119277.8*	*55000*	*6560.3*
Trade margins (equal to Value added)			**2599.6**			**1550.6**
Va/Prod ratio			**0.24**			**0.19**
Va/Gram ratio			**17.00**			**13.00**

Considering retail trade, value added-production and value added per gram ratios are different according to whether we take into account the different scenarios because of the change in street price of cocaine. Indeed, in the high hypothesis value added-revenue (0.24 with respect to 0.19) and value added per grams (17,00 with respect to 13,00 euro) ratios are obviously higher.

Once we calculated production, costs and value added for each sub-branch and once determined the value of final consumption, import and export, we can fill up the supply and use table for cocaine.

Figure 6: Supply matrix for cocaine (high hypothesis, data in Millions of euros)

			Internal production						Total	Import	Distributive margins	Taxes	Total resources
			Branches										
			NACE Rev.2										
			1	.	Cocaine-related activities				.	n					
					Int prod	Whole 1	Whole 2	Retail							
Products	CPA08	1													
		.													
		.													
		.													
		.													
		.													
		Cocaine			0.0	666.6	7842.5	1853.7			10362.9	58.8			10421.7
		.													
		m													
Total production					0.0	666.6	7842.5	1853.7			P	Imp	DM	T	R

Figure 7: Use matrix for cocaine (high hypothesis, data in Millions of euros)

			Intermediate consumption						Total intermediate consumption	Final consumption	Fixed capital	Change in inventories	Export	Total uses
			Branches											
			NACE Rev.2											
			1	.	Cocaine-related activities				.	n						
					Int prod	Whole 1	Whole 2	Retail								
Products	CPA08	1			0.0											
		.			0.0											
		Chemicals			0.0	0.0	97.0	0.0								
		Transport			0.0	4.1	242.4	0.0								
		Other services			0.0	1.2	97.0	0.0								
		.			0.0											
		cocaine			0.0	58.8	606.0	0.0			664.8	9696.2			60.6	10421.7
		.			0.0											
		m			0.0											
Total costs					0.0	64.1	1042.3	0.0			IC	FC	C	dI	Exp	U
Value added					0.0	602.5	6800.2	1853.7			VA					
Total production					0.0	666.6	7842.5	1853.7			P					

Figure 6 and 7 respectively show the supply and the demand side of the cocaine market as represented within the National Accounts framework. By summing up production and import, we can obtain the total value of resources (10,421.7 million euro), which is obviously equal to the value connected with total uses represented by the sum of intermediate costs, final consumption and export. This amount represents in some way to the turn-over of the cocaine market. Total value added, which is equal to the sum of the value added of the different sub-branches (9,256.4 million euro) is exactly the same as the missing part of Italian GDP connected with cocaine.

7

Comments

The aim of the study has been to provide a scheme to include cocaine within the framework of National Accounts and to estimate relative aggregates. Our results confirm the economic relevance of the cocaine market. Indeed, according to whether we take into account the high or the low hypothesis, the turnover connected with the cocaine market can be evaluated at between 8,283.6 and 10,421.7 million euros, where the relative value added is between 7,405.5 and 9,256.4 million euros.

In 2010, the Italian GDP at current prices has been estimated at 1,553,083.2 million euros. This means that cocaine roughly represents something between 0.5% and the 0.7% of Italian GDP. Comparing the value added of cocaine-related activities with other productive branches, we can highlight that the former generates more value added with respect to chemicals (9,093 million euros), ICT devices (8,721), metallurgy (7,970) or R&D (7,505).

Taking into account the characteristics of the supply-chain of cocaine, the following points can be made. Generally, cocaine-related activities are featured by an high value added-production ratio. Indeed, taking the average of all sub-branches under the high hypothesis, the indicator is equal to 0.52%. However, this average value hides a disproportion between the different stages of the value chain. Indeed, while international and domestic trafficking shows values proximate to 0.90%, the retail trade indicator is significantly lower (0.24)%. Our analysis, furthermore, requires us to consider to what extent each phase of the value-chain contributes to the generation of value added. Indeed, about the 80% of the value added is generated in (international and domestic) wholesale trade, while retailing contributes only to about 25%.

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