Combination of various data bases and estimation methods to better estimate the market from the demand and the supply side and consequences

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Summary

- Available data bases
- Dealer population estimation
- Consumer population estimation
- Market estimation from demand and supply side
- Interception rate
- Age at first use of cannabis and problem drug use
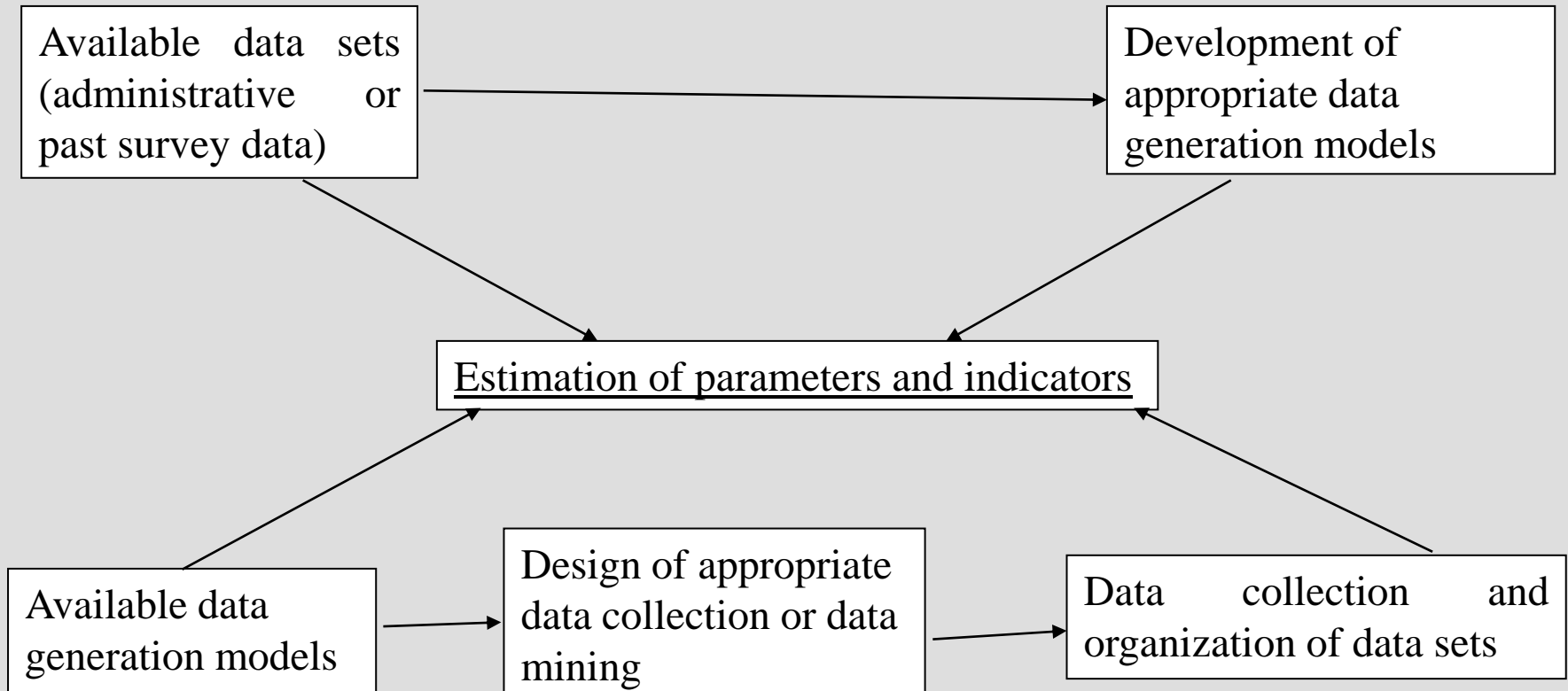- Drug market and corruption

Administrative data bases

- The data set provided by the Ministry of the Interior of registrations for personal use of illegal substances (art. 75 of the Law).

- The data set provided by a sample of public health care services (Milan area in particular).

- Data set of the subjects registered for dealing drugs (art. 73 of the Law).

- Data set on police operations and seizures (DCSA data set).

- Data set of persons in prison for drug law (DAP data set).

Data from surveys

- The School Population Surveys SPS 2010 and SPS 2011 (http://www.politicheantidroga.it/pubblicazioni/in-ordine-alfabetico/report-sps-dpa-2011-(1)/presentazione.aspx)

- The Surveys in the Therapeutic Communities and in the Low Threshold Services (2010 and 2012 CIBB, University of Rome "Tor Vergata").

- The online survey among occasional and regular users and the face to face interviews in the Therapeutic Communities and in the Low Threshold Services (2012 in the framework of the project ***Study on the further analysis of the EU illicit drugs market and responses to it – responding to future challenges:*** http://ec.europa.eu/justice/anti-drugs/files/eu_market_summary_en.pdf).

Relationships between models, data and estimates.

Dealer population estimation

- Methods:
- Truncated Poisson with heterogeneity:
- Chao;
- Zelterman;
- Negative Binomial.
- Data:
- Registrations for dealing and operations and seizures data.
- Multiple captures from the prison population data set.

Individuals registered for breaching the drug law (art. 73) by gender and number of captures for the years 2005-2009

year	gender	count								total (n)
		1	2	3	4	5	6	7	8	
2005	male	36302	2378	279	31	6	1	0	0	38997
	female	3810	227	27	4	0	0	1	0	4069
2006	male	37944	2657	301	46	7	4	2	0	40961
	female	4113	229	27	4	3	0	0	0	4376
2007	male	40516	2804	325	34	11	6	3	1	43700
	female	4147	271	38	8	3	0	1	0	4468
2008	male	42481	3024	325	40	6	4	1	0	45881
	female	4346	255	29	8	1	0	0	0	4639
2009	male	40153	2676	264	24	5	0	0	0	43122
	female	4009	209	17	4	0	0	0	0	4239

Estimates of the size of the dealers population

year	Zero-truncated Model	$\hat{N}$	95%CI
2005	**Chao**	351890	339168-365159
	Chao (covariates)	352129	339379-365428
	Zelterman	353566	340367-367351
	Zelterman (covariates)	353806	340579-367621
	Negative Binomial (covariates)	305418	295589-315246
2006	**Chao**	351780	339717-364338
	Chao (covariates)	353208	340973-365950
	Zelterman	353530	340988-366603
	Zelterman (covariates)	354962	342249-368220
	Negative Binomial (covariates)	304491	295211-313770
2007	**Chao**	372523	360141-385396
	Chao (covariates)	372613	360222-385496
	Zelterman	374446	361570-387851
	Zelterman (covariates)	374541	361655-387957
	Negative Binomial (covariates)	319456	310129-328781
2008	**Chao**	384885	372499-397748
	Chao (covariates)	385940	373437-398928
	Zelterman	386584	373706-399976
	Zelterman (covariates)	387648	374652-401166
	Negative Binomial (covariates)	339503	329725-349280
2009	**Chao**	385365	372499-397748
	Chao (covariates)	387056	373599-401068
	Zelterman	386684	372953-400994
	Zelterman (covariates)	388372	374436-402902
	Negative Binomial (covariates)	349281	338218-360344

Estimates from the prison population data set

	2007	2008
Zelterman	388958.8	386460.5
Chao	388796.0	386184.2

Zelterman estimate for 2007 from the other data set was: 374,541 and Chao was: 372,613

For 2008 Zelterman was: 387,648 and Chao was: 385,940

Estimates from prison data set are inside the confidence intervals of the estimates from the other data set and viceversa.

Adjustments

- Part time dealing (from literature 6 months a year);

- Different capture rates for different substances dealt (seizure data and literature);

- Dealer population not at risk for only cannabis dealing (from literature).

Active dealers and users estimates

Substance	Estimated active dealers	Ratio (Reuter)	Ratio (Bouchard & Tremblay)	Estimated active consumers (Reuter)	Estimated active consumers (Bouchard & Tremblay)	Average
Cannabis	143,700	40	32	5,748,000	4,598,400	5,173,200
Cocaine	56,600	25	28	1,415,000	1584,800	1,499,900
Opiates	47,000	15	16	705,000	752,000	728,500
Total	247,300	These estimates are affected by double counting for poly-use and poly-dealing				

Market estimation (supply side)
additional source: survey in the Communities and low threshold services 2012

Substance	Estimated active dealers	Median number of doses sold per week of activity	Sample size dose	Mean price per dose	Sample size price	Total amount (billion euro)
Cannabis	125,184	110	91	10	351	7.16
Cocaine	43,991	70	164	75	387	12.01
Opiates	34,206	55	156	35	504	3.42
Total	203,381					22.59

Estimated active consumers

Substance	Estimated active dealers	Ratio (Reuter)	Ratio (Bouchard & Tremblay)	Estimated active consumers (Reuter)	Estimated active consumers (Bouchard & Tremblay)	Average
Cannabis	125,184	40	32	5,007,360	4,005,888	4,506,624
Cocaine	43,991	25	28	1,099,776	1,231,749	1,165,763
Opiates	34,206	15	16	513,090	547,296	530,193
Total	203,381	These estimates are affected by double counting for poly-use and poly-dealing				

Market estimation (demand side)

Substance	Estimated active consumers	Average number of doses per month per person	Mean price per dose	Total amount (billion euro)
Cannabis	4,506,624	13	10	7.03
Cocaine	1,165,763	12	75	12.59
Opiates	530,193	15	35	3.34
Total	6,202,580			22.96

Estimation of the cannabis market from other sources
(Study on the further analysis of the EU illicit drugs market and responses to it – responding to future challenges)

- Estimates of consumers:

- 4,505,624

- Average grams consumed per year (possibly underestimated for lower response rate for very intensive users):

- 115.42

- Total value of the market:

- 6.03 billion euro

Estimates of the cannabis market in Italy, obtained using different data sets and methodologies

Substance	Methodology	Average quantities used for estimation	Total amount per year	Total amount (billion euro)
Cannabis	Supply side estimation	110 doses sold per dealer per week	716,052,480 (doses)	7.16
Cannabis	Demand side estimation	13 doses consumed per user per month	703,033,334 (doses)	7.03
Cannabis	Online survey estimation	115.42 grams consumed per user per year	520,150,035 (grams)	6.03

Interception rate (Italy 2011)

	Seizures 2011				
Substance seized	Amount (kgs)	Unit price on the market (last level before retail)	Total value of the substance seized (euros)	Retail value of the market (euros)	Ratio
Cocaine	6,346.3	39,000	247,505,700	12,590,000,000	0.020
Heroin	810	24,700	20,007,000	3,340,000,000	0.006
Marijuana	10,907.88	1,360	14,834,717		
Hashish	20,257.57	2,200	44,566,654		
Plants	100,822.8	1,360	13,711,901		
Total cannabis	131,988.25			7,030,000,000	0.010
Total			340,625,972	22,960,000,000	0.017

Age at onset of cannabis use and problem drug use

- It is often mentioned that starting earlier consuming drugs (for about 75% the first drug used is cannabis) is a risk factor for the use of more harmful substances.

- We had the possibility to analyse two different sets of data: the data from the survey among PDUs and the web-survey on cannabis users (mostly non problematic) and to compare the proportions of first use of cannabis before 15 years of age for Italy and Portugal.

CAST scores for the web-survey (7=moderate dep; 12=severe dep)

		Occasional	Regular	Intensive
Czech Republic	Mean	4.1	6.3	9.0
	Median	3.0	6.0	8.0
Italy	Mean	4.2	6.7	7.9
	Median	4.0	6.0	8.0
Portugal	Mean	3.8	6.5	9.6
	Median	4.0	6.0	9.0
	Median	4.0	7.0	9.0

ODD'S RATIO

Italy	Males		
	<15	15≤	Total
Web	180	633	813
Survey	202	221	423
Total	382	854	1236

OR=3.2143   p=0.00000

Italy	Females		
	<15	15≤	Total
Web	47	189	236
Survey	32	34	66
Total	79	223	302

OR=3.7847   p=0.00052

Portugal	Males		
	<15	15≤	Total
Web	20	77	97
Survey	107	139	246
Total	127	216	343

OR=2.9637   p=0.0011

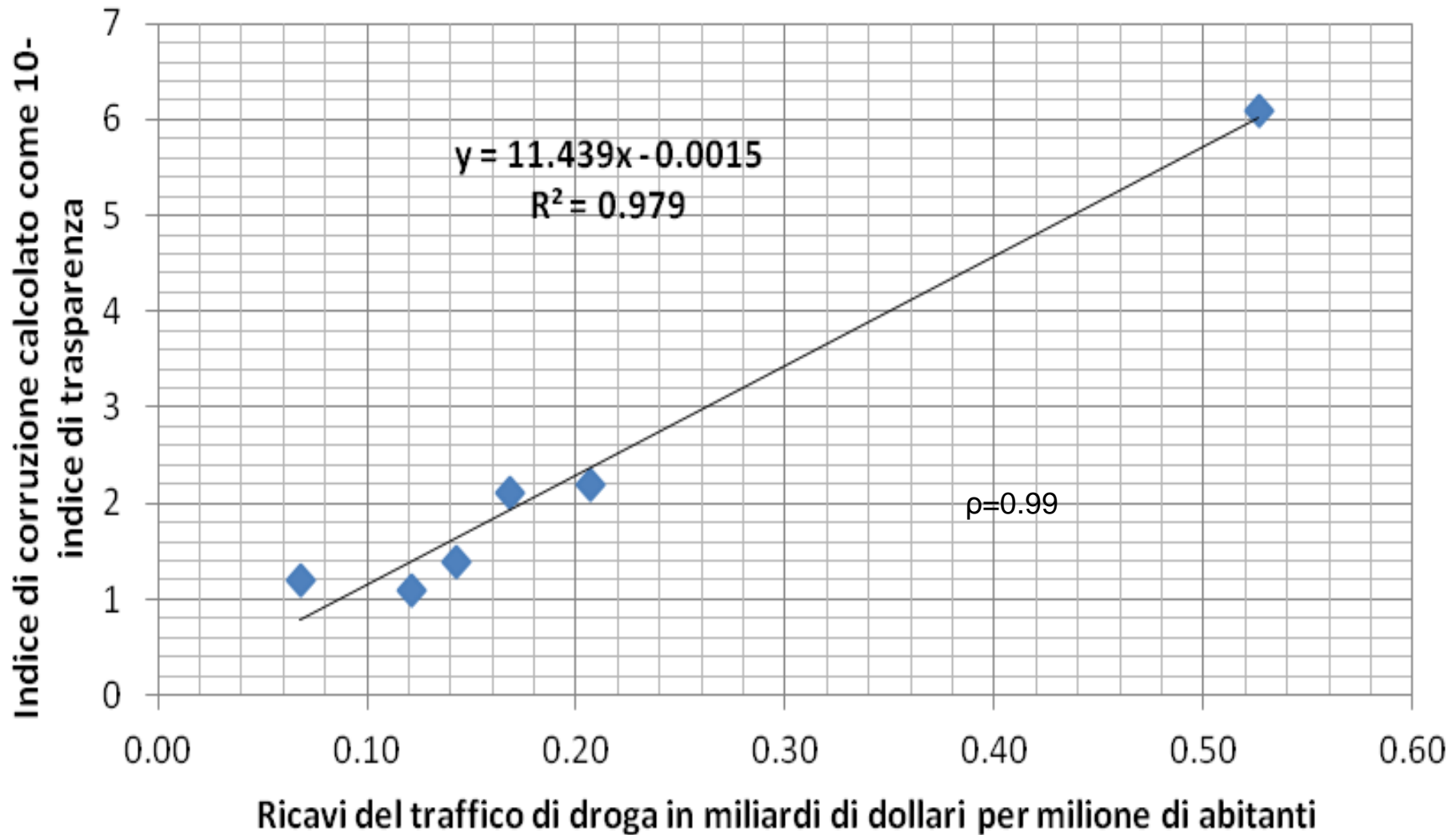| Portugal	Females		
	<15	15≤	Total
Web	7	47	54
Survey	20	25	45
Total	27	72	99

OR=5.3714   p=0.0055

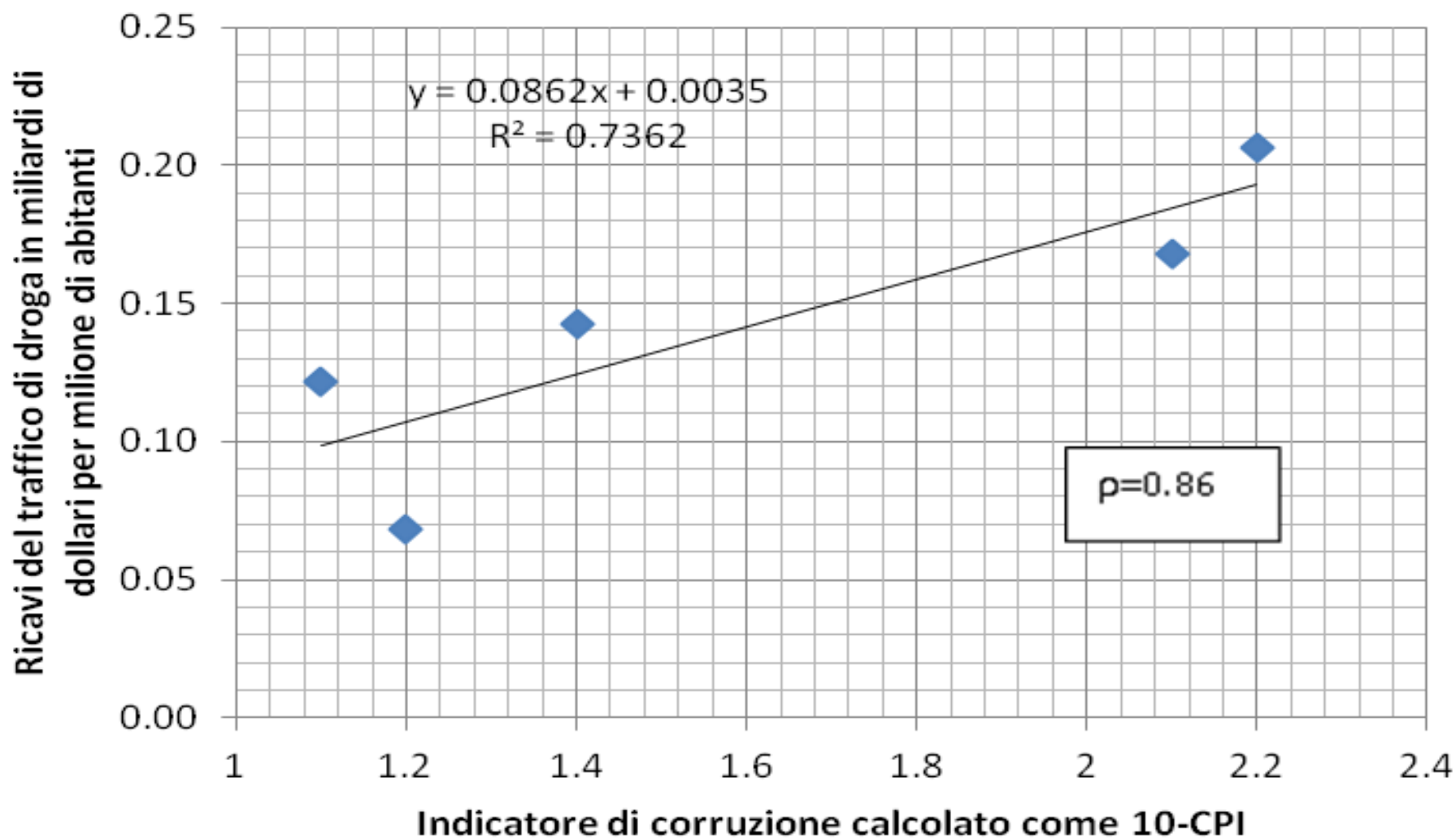# Drug market and corruption
(unintended consequences)

Country	Year	Value of the retail drug market (Billion dollars)	Value per million inhabitants	Corruption index=10-transparency index (CPI)
US	2000	64	0,21	2,2
UK	2004	8,4	0,14	1,4
Australia	2003	1,5	0,07	1,2
Netherlands	2003	2,07	0,12	1,1
Germany	2008	3,8	0,17	2,1
Italy	2010	31,58*	0,53	6,1

* Value confirmed by the 2012 study

Correlation between the size of drug market and the index of corruption
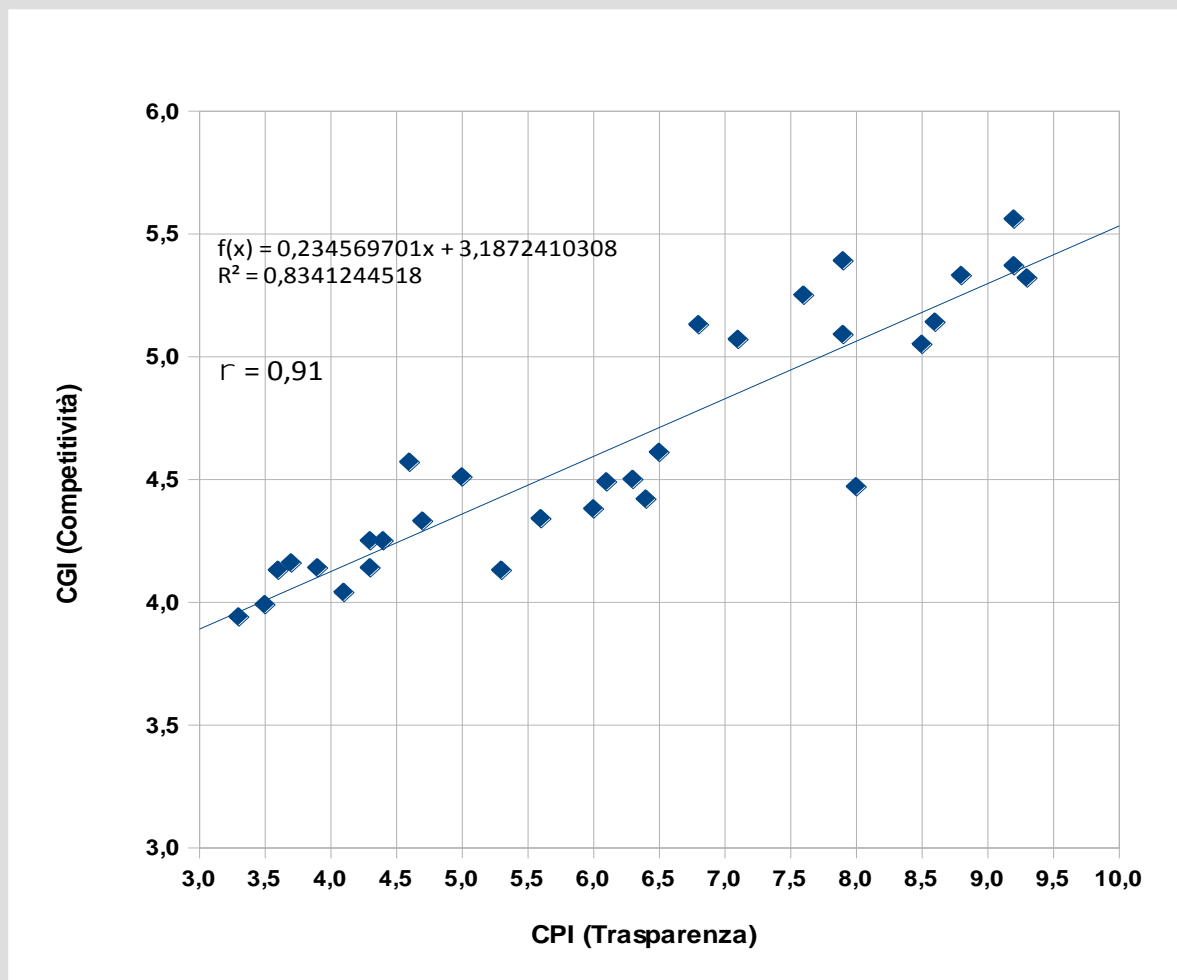
Correlation without Italy

Correlation between the index of corruption and the index of competitiveness

UE27+Albania, Croazia, Turchia, Norvegia

	Paese	CPI	GCI
1	Albania	3,3	3,94
2	Grecia	3,5	3,99
3	Bulgaria	3,6	4,13
4	Romania	3,7	4,16
5	Italia	3,9	4,14
6	Croazia	4,1	4,04
7	Slovacchia	4,3	4,25
8	Lettonia	4,3	4,14
9	Turchia	4,4	4,25
10	Repubblica Ceca	4,6	4,57
11	Ungheria	4,7	4,33
12	Lituania	5,0	4,51
13	Polonia	5,3	4,13
14	Malta	5,6	4,34
15	Portogallo	6,0	4,38
16	Spagna	6,1	4,49
17	Cipro	6,3	4,50
18	Slovenia	6,4	4,42
19	Estonia	6,5	4,61
20	Francia	6,8	5,13
21	Belgio	7,1	5,07
22	Regno Unito	7,6	5,25
23	Germania	7,9	5,39
24	Austria	7,9	5,09
25	Irlanda	8,0	4,47
26	Lussemburgo	8,5	5,05
27	Norvegia	8,6	5,14
28	Paesi Bassi	8,8	5,33
29	Finlandia	9,2	5,37
30	Svezia	9,2	5,56
31	Danimarca	9,3	5,32

$f(x) = 0{,}234569701x + 3{,}1872410308$
$R^2 = 0{,}8341244518$

$r = 0{,}91$

CGI (Competitività)

CPI (Trasparenza)

Publications

- Paolo Caserta and Carla Rossi authors. *Corruption, competitiveness and illicit drug market: a quantitative analysis*, Universitalia di Onorati s.r.l., ISBN 978-886507-408-4, Roma 2013.

- Mascioli, F., Scacciatelli, D. & Rossi, C. (2013). Assessing drug policy and law enforcement in Italy by using the estimated size of dealer population. Technical report on www.drugpolicyevaluation.eu.

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- Carla Rossi, Monitoring the size and protagonists of the drug market: combining supply and demand data sources and estimates, *Current Drug Abuse Reviews,* 2013, in press.

- Trautman F, Kilmer B, Turnbull P. Eds. *Further insights into aspects of the illicit EU drugs market.* European Commission, 2013.

- **Comments, questions?**

Thank you very much