



Addiction and Lifestyles in Contemporary Europe: Reframing Addictions Project (ALICE RAP)

Addiction Revenues

Deliverable D10.1, Work Package 10

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December 2014

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Acknowledgments

The research leading to these results or outcomes has received funding from the European Union's Seventh Framework Programme (FP7/2007-2013), under Grant Agreement nº 266813 - Addictions and Lifestyle in Contemporary Europe – Reframing Addictions Project (ALICE RAP – www.alicerap.eu).

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Abstract

The three reports that are part of this deliverable examined the retail expenditures of different addictive goods and activities: alcohol and tobacco (report 1), heroin and cocaine (report 2), and gambling (report 3). Overall, the three strands of work aimed to advance the knowledge of retail expenditures on these addictive goods, and the share of those markets that is attributable to those who are addicted. In addition, the study on heroin and cocaine (report 2) aimed to further analyse the costs and profits associated with the illicit drug trade. The three studies drew on different methodological approaches, ranging from an analysis of secondary survey data to primary data collection through interviews with imprisoned drug dealers. Each of the studies make relevant contributions to expanding the evidence base on economic aspects directly or indirectly related to addictive goods and activities.



Introduction

The work presented here as part of deliverable 10.1 (work package 10) examined the retail expenditures on addictive goods and activities: alcohol and tobacco (report 1), heroin and cocaine (report 2) and gambling (report 3). Each report focused on a particular set of addictive goods or activities, with a view to achieve two overall objectives, as presented in Textbox 1.

Textbox 1. Objectives of deliverable D10.1 (work package 10).

- 1) Calculate retail expenditures on addictive goods for selected Member States and estimate what share of these markets are attributable to those who are addicted;
- 2) Improve understanding of the costs and profits associated with the illicit drug (heroin and cocaine) trade – using estimates generated from Objective 1.¹

In order to achieve these objectives the three research strands applied different methodologies, which we discuss in the following section, and focused on different EU Member States. Table 1 provides an outline of the structure of this deliverable (10.1, work package 10).

Table 1. Structure of Deliverable D10.1 (work package 10).

	Title	Addictive goods/activities	Research Teams
Report 1	<i>Addicts' share of alcohol and tobacco expenditures</i>	Alcohol and tobacco	UNIKENT ²
Report 2	<i>Prices, profits, and business practices of drug dealers in Italy, Slovenia and Germany</i>	Heroin and cocaine	RAND Europe UNICRI ³ UTRIP ⁴ TUD ⁵
Report 3	<i>Lottery gambling, problem gambling, and addiction</i>	Gambling	Prof. Ian Walker ⁶

¹ Please note that given the challenges, outlined in the following sections, in generating estimates of retail expenditures on drugs (heroin and cocaine) it was necessary for the study described in report 2 to adapt slightly from the intended objectives. Therefore report 2 will (a) present tables with average prices reported by interviewees (and caveats about these data); (b) present qualitative information about the nature of costs of dealing from interviews; (c) review existing estimates (from the wider literature) of retail expenditure in Italy, Slovenia and Germany in order to supplement (a) and (b); (d) present analysis of cycles of purchase and re-sale; (e) present findings from qualitative data about the treatment of addicts by dealers, discounting and price-setting.

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Methods

The first report, which examined the share of alcohol and tobacco consumption and expenditure that is accounted for by addicts, draws on a review of European survey data (Eurobarometer survey 2009 and English Adult Psychiatric Morbidity Survey 2007). The study uses data on alcohol and tobacco consumption across Europe and links these data to separate data on the relationship between alcohol and tobacco consumption and dependence.

The second report, which analysed the prices, profits and business practices of drug dealers in Italy, Slovenia and Germany, is based on interview data with imprisoned drug dealers in those three EU Member States, as well as on a review of the relevant literature. The research team conducted a total of 135 interviews with dealers in the selected countries (72 interviews in Italy, 44 interviews in Slovenia and 19 interviews in Germany).

Finally, the report on lottery gambling, problem gambling and addiction relies on UK datasets on gambling prevalence and gambling expenditure (the UK Gambling Prevalence Survey - GPS). The research team responsible for report 3 used also data on individual wellbeing, which allowed for an estimate of gambling demand elasticity and impacts on wellbeing and problem gambling.

Challenges

Throughout the course of the research a number of challenges were identified by the research teams.⁷ For both report 1 on alcohol and tobacco as well as for report 3 on gambling, the research teams reported delays caused by the **lack of available data** or as a result of difficulties experienced during the process of requesting **access to existing data** (not publicly available).⁸ With regards to report 2 on cocaine and heroin, the research team had initially hoped to build upon information generated by a separate study into the market for heroin and cocaine in the EU, however this work did not provide the data needed.⁹

There were also delays with regards to the interviews in Italy, Slovenia and Germany. **Ethics approval** to conduct the interviews in Germany took longer than anticipated by RAND Europe or TUD.¹⁰ This process involved re-drafting the interview schedule and returning to the ethics committee several times. Applications to access prisons were only granted upon the ethics

⁷ Please see the second technical report 2014 for more information about deviations from the initial description of work and their impact on other tasks, resources and planning.

⁸ For example, please see chapter 1 of Baumberg, B. (2014). Addicts' share of alcohol and tobacco expenditures. ALICE RAP D10.1, work package 10 (report 1).

⁹ The separate studies referred to were published in 2013. At the time of writing the ALICE Description of Work (in 2010/1), the scope of this 2013 publication was not finalised. The content of the published reports, unfortunately, do not provide relevant data needed for the objectives of workpackage 10. For more information about these reports please see: <http://www.rand.org/randeurope/research/projects/illicit-drug-market-in-europe.html> (last accessed 19 November 2014).

¹⁰ The application for ethics approval was submitted in January 2012 and approved in December 2012. For more information about this Committee please see: http://tu-dresden.de/die_tu_dresden/gremien_und_beauftragte/kommissionen/ethikkommission/index_html/document_view?set_language=de (last accessed 14 October 2014).



committee's approval.¹¹ Issues concerning the transcription and translation of the interviews also resulted in delays. The original plan was to only partially transcribe the interviews. However, almost all the Italian and Slovenian interviews proved relevant and this required more time to transcribe and translate. The full set of interviews was only ready in mid-September 2013 (Italian data), in mid-October 2013 (Slovenian data), and between late November 2013 and January of 2014 (German data).

The primary data collection undertaken for the research on heroin and cocaine (report 2) encountered additional constraints. Firstly, **fewer interviews** were conducted in Germany and Slovenia than anticipated. Following from the extensive delays in gaining ethical approval, the interviewers from TUD were not allowed to approach the imprisoned dealers directly. Therefore, the study was introduced to potential interviewees by the prison staff. While staff were supportive, the TUD team did not have control of the motivation of prison staff to participate in the study. Prison staff members were busy and perhaps they were not able to devote sufficient time to recruiting interviewees. As a result the sample size from Germany was much smaller than expected: TUD conducted 19 interviews rather than 70. Also in Slovenia, fewer interviews were conducted: a total of 44 were completed compared to a target of 70. This limited our ability to work on objective 1 outlined above. In order to mitigate this shortcoming, we ensured that our findings were placed in the context of the wider literature, and conducted a review of existing estimates of retail expenditures in the selected countries. Throughout the report we also discussed limitations regarding reliability and generalizability of the findings.

A second challenge concerning the interview data (report 2) results from **gaps and inconsistencies in interviewees' descriptions** of the prices at which they bought and sold heroin and cocaine, and their revenues and costs. In particular:

- Some interviewees quote profits per month that cannot be achieved given the amount the interviewees say they bought and sold per month at the given price;
- The prices quoted relate to different time periods (and interviewees were not always able to name the time period precisely), which means prices are not comparable;
- The interviewed dealers brought and sold in different quantities, and without consistent information about the amount brought on a particular occasion it is not possible to control for any 'bulk-buy' discount;
- Also dealers were not very precise in detailing their expenses and costs, which impeded our ability to estimate profits;
- It was not always easy to understand at what level interviewees were dealing and whether they were part of an organised group or dealing independently (which would affect the price and their profits).

While these issues are not unexpected (and our interview protocol aimed to gather these pieces of information), some of the questions were not responded to in as much detail as hoped, and it was not always possible to cover all the topics on the protocol in the time available. However, there are insights in the interview data that were not originally expected, so while the data is limited in some respects regarding quantifiable information on prices and profits, there are qualitative insights into interviewees' views of dealing in drugs and on addicts as customers which we were able to explore in more detail. As a result, rather than trying to estimate retail expenditures for the *whole market* in Italy, Slovenia and Germany we

¹¹ Furthermore, one of the German prisons then requested changes to the interview guide which had to be approved again by the ethics committee.



focused on producing information about ‘cycles’ of purchase and resale reported by individual interviewee dealers.

A dealer executes a drug dealing cycle each time he or she purchases illicit drugs, breaks them down into smaller quantities (if applicable) and subsequently resells them. Analysing these cycles allows us to look at price mark-ups – which is an aspect of dealers’ strategies for making profits, the accumulation of mark-ups throughout the distribution chain, the distribution of revenue across levels of the market, and the variation in market level earnings. This is a different approach to analysis from that originally planned, but the ‘cycles’ approach is tried and tested by other researchers¹² and allowed us to make the most of the rich data collected through the interviews. In order to conduct a thorough and robust cycle analysis, information about a complete cycle is needed. A thorough transaction cycle analysis requires complete and reliable data on four pieces of information: a typical purchase quantity and price and a typical sales quantity and price. Taken together, these data points form a complete transaction cycle and can be used to analyse basic costs and revenues.

As we were able to identify a larger and more robust number of cycles within the Italian sample of cocaine dealers, we focused our analysis on that subset of the sample. We feel this is a valuable contribution to the field, replicating analysis of similar data collected from dealers and traffickers imprisoned in the UK.¹³

¹² Caulkins, J, Gurga, B., Little, C., (2009) Economic analysis of drug transaction ‘cycles’ described by incarcerated UK drug dealers *Global Crime* 10:1-294-112.

¹³ Matrix Knowledge Group, ‘The Illicit Drug Trade in the United Kingdom’, Home Office Online Report 20/07 (2007).



Addiction and Lifestyles in Contemporary Europe: Reframing Addictions Project (ALICE RAP)

Report 1: Addicts' share of alcohol and tobacco expenditures

**Deliverable 10.1 Addiction Revenues, Work
Package 10**

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Many thanks to James Downes for his research assistance work that accompanied this part of D10.1.



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1. Introduction

The ALICE RAP Description of Work states that Objective 1 of WP10 is to *“Calculate retail expenditures on addictive goods in Member States and estimate what share of these markets are attributable to those who are addicted.... For alcohol and tobacco, UniKent and RAND will systematically review studies which analyze expenditure information and quantity consumed in Member States. We will compare these demand-side estimates with information about EU production, exports, and imports (e.g., data collected by the Food and Agriculture Organization of the United Nations) and incorporate information about unrecorded alcohol consumption (e.g., Rehm & Gmel, 2001).”* This part of D10.1 presents the method for obtaining these estimates, and presents the results of the analysis.

2. Previous studies

No previous estimates exist for the share of alcohol or tobacco consumption or expenditure that is accounted for by addicts. This chapter is therefore partly guided by relevant previous work that looks at:

- The share of alcohol consumption accounted for by those drinking above recommended drinking guidelines (Baumberg, 2009; Foster, Vaughan, Foster, & Califano, 2003; Foster, Vaughan, Foster, & Califano, 2006; T. K. Greenfield & Rogers, 1999; T Stockwell, Sturge, & Macdonald, 2005; T Stockwell, Zhao, Chikritzhs, & Greenfield, 2008);
- The share of alcohol consumption accounted for by underage drinkers (Baumberg, 2009; Doran, Shakeshaft, Hall, & Petrie, 2009; Foster et al., 2003; Foster et al., 2006);
- It also considers research within the addictions but outside of alcohol/tobacco, namely the share of gambling consumption accounted for by gambling addicts (section P.4 of Australian Productivity Commission, 1999; Volberg, Moore, Christiansen, Cummings, & Banks, 1998; Williams & Wood, 2004, 2007).

In order to extend these to estimates for alcohol and tobacco addiction across Europe, it was necessary to considerably develop the existing methodologies, partly to enable an estimate to be made *per se* in the face of data limitations, and partly to overcome the limitations of existing studies that usually offer no measure of the statistical uncertainty around their estimates (commonly expressed as confidence intervals). The following sections explain the methods used.

3. Methods

At heart, the method involved is simple – in a general population survey that contains data on both consumption and addiction (however defined; see below), you can simply estimate the proportion of consumption that is accounted for by addicts. Three further steps were necessary for the following analysis however.

Statistical uncertainty

Firstly, very few of the reviewed studies produce estimates of the statistical uncertainty around their estimates in the form of confidence intervals¹ - despite studies commenting on the small numbers of problem gamblers in the samples used (Williams & Wood, 2004, 2007).

¹ Two surveys do present confidence intervals (Foster et al., 2006; T. K. Greenfield & Rogers, 1999), but as far as it is possible to tell, these use confidence intervals for the *mean* consumption in those drinking over government guidelines – which is not the same as the confidence interval around the share of these drinkers in total consumption, as it does not take into account sampling error around the proportion of people consuming over government guidelines *per se*.



While there is no simple arithmetic estimate for confidence intervals available, it is possible instead to use the statistical technique of ‘bootstrapping’ to obtain these estimates (Carpenter & Bithell, 2000; Efron & Tibshirani, 1993). Put simply, bootstrapping is a resampling method that takes the sample as an approximation of the whole population. If we then take 100 new samples (with replacement) from the initial sample, then the simplest bootstrap estimate of the 95% confidence interval is to use the estimates derived from the middle 95 of these 100 new samples. In practice, the estimates below use bias-corrected non-parametric bootstrap with 1000 replications (as in Baumberg, 2009).

Estimating tobacco/alcohol dependence

Secondly, there are unfortunately no surveys available to us that include data across Europe on both consumption and dependence for either alcohol or tobacco; indeed, there are considerably fewer studies on tobacco dependence *per se* (as reviewed elsewhere in ALICE RAP by Marmet et al., 2014, which had the same difficulties but provide information on the best sources for dependence of both substances). The only studies that were found were two WHO surveys, MCSS (the Multi-Country Survey Study 2000-2001) and the more recent WHMS (the World Mental Health Surveys), but for different reasons we were denied access to both studies.² We strongly recommend that in order to avoid unnecessary and substantial future expenditure on international surveys, that pressure should be applied to make these surveys publicly available to researchers.

This has forced us to use a second-best alternative, of using (i) data on alcohol and tobacco consumption across Europe; linked to separate data on (ii) the relationship between alcohol and tobacco consumption and dependence. For the former (consumption), we have used the Eurobarometer survey 2009, following elsewhere in the ALICE RAP project (Marmet et al., 2014). As we discuss below, the questions on alcohol and tobacco consumption here are imperfect. Subsequently, there is no data area available for Cyprus, and the quality of the survey is lower than best-practice surveys such as in the European Social Survey, but it is the best survey available at the present time. For the latter (the consumption-dependence link), we use the following:

- *Relationship of alcohol consumption and dependence*: while there are several studies looking at the relationship of alcohol consumption and dependence (e.g. Caetano, Tam, Greenfield, Cherpitel, & Midanik, 1997; Thomas K. Greenfield et al., 2014), relatively few of these are within Europe (Flensburg-Madsen, Knop, Mortensen, Becker, & Grønbaek, 2007), and no comparative surveys exist. Only one modelling exercise has attempted to link consumption to dependence in the same way that we do here (Purshouse et al., 2013 for the UK).

² For WHMS (see <http://www.hcp.med.harvard.edu/wmh/index.php>), the team that maintains the data informed us that “It was difficult to get the various funding agencies to contribute data to a centralized repository and we had to sign data protection agreements that prohibit us from taking any of the data off the enclave for use by other researchers. We collaborate with other people in analyses, but we have to triage this when there is no funding because so many people ask us for things like this.”

For MCSS, we were in fact able to access the data through the WHO (<http://apps.who.int/healthinfo/systems/surveydata/index.php/catalog/mcss/about>). However, the alcohol dependence questions are part of the Composite International Diagnostic Interview (CIDI) banks of questions, and this itself is not available to researchers without paying to undergo training in one of only four countries (http://www.hcp.med.harvard.edu/wmh/cidi/trc_main.php). Hence while having access to the MCSS data, we were unable to use it to study alcohol dependence in this project.



For our analysis, in the absence of the MCSS data (see footnote 2), we used the English Adult Psychiatric Morbidity Survey 2007, 'APMS' (UK Data Archive study number 6379), the updated version of the dataset used in Purshouse et al's modelling and an influential previous analysis of consumption and dependence in (Farrell et al., 2001). APMS has the advantage of a measure of alcohol consumption that is almost identical to the one in Eurobarometer, and uses the validated Severity of Alcohol Dependence Questionnaire (SADQ) as a measure of dependence (Tim Stockwell, Murphy, & Hodgson, 1983), using a score of 4+ as a marker of (at least mild) dependence as used in the official APMS report (McManus, Meltzer, Brugha, Bebbington, & Jenkins, 2009).

As we draw attention to below, this makes the assumption that the association between consumption and dependence is the same across all European countries – an assumption that is likely to be wrong. To account for this, we adjust these estimates by using the best estimates for alcohol dependence in each European country (as reported in J. Rehm et al., 2014, Table 2.2.3).³ We therefore make the lesser assumption that the *relative* risk of dependence compared to other levels of consumption is the same across European countries, but the *absolute* risk of dependence is taken from the best estimates available in each country.

- *Relationship of tobacco consumption and dependence*: we use the reported risk of tobacco dependence for a given number of cigarettes smoked per day given from a review of the prevalence of tobacco dependence elsewhere in the ALICE RAP project (Marmet et al., 2014, Table 3.7.4.1). These are new empirical estimates from the five datasets that Marmet et al have available to them across Switzerland ('AMIS', Addiction Monitoring in Switzerland), Germany ('ESA', the German Epidemiological Survey of Substance Abuse), and England (APMS once more).⁴

In interpreting the results below, it is important to note that Marmet et al use two different definitions of tobacco dependence: DSM-IV (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)) and FTND (the Fagerström Test for Nicotine Dependence). While these are discussed at length in Marmet et al 2014, the main difference for our purposes is that FTND partly defines dependence according to the smoker's level of cigarette consumption. This means that the association between consumption and dependence is partly circular, and as a result, there is a much stronger link between level of consumption and dependence. While we therefore have a preference for the DSM-IV results, we present both sets of results to enable the reader to choose the estimates that best captures their definition of dependence.

³ To unpack these steps in more detail: (i) for each combination of self-reported drinking frequency and usual consumption in APMS, we estimated the probability of alcohol dependence; (ii) this probability was then applied to each person's self-reported consumption-frequency in Eurobarometer; (iii) the resulting probabilities were then scaled so the total predicted probability of dependence matched the best estimates of dependence in that country according to Marmet et al {, 2014 #2284}.

We account for statistical uncertainty around these estimates using bootstrapping, as above. For step (i), each bootstrap replication used a different bootstrapped estimate of the relationship between consumption-frequency and dependence in APMS. For step (ii), people were considered alcohol dependent in each bootstrap replication if their predicted probability of dependence was greater than a random number between 0 and 1. In this way, a person with an estimated 50% chance of being alcohol dependent would be likely to be classified as 'dependent' in half of the bootstrap samples.

⁴ The analysis precedes much as in the preceding footnote, except that we do not have estimates of the statistical uncertainty around the relationship between consumption and dependence for tobacco; see limitations below.



Under-reporting

A final complicating factor in these analyses is that tobacco (Warner, 1978) and particularly alcohol consumption are often under-reported in social surveys, compared to our best estimates of actual consumption based on e.g. sales data. Typically for alcohol, only 40-60% of consumption is captured (T Stockwell et al., 2005), and in the EU-funded 'European Comparative Alcohol Survey' over a decade ago, coverage rates varied from 31% in Germany to 96% in the UK (Leifman, Österberg, & Ramstedt, 2002:30). A recent project in the UK has attempted to examine each possible cause of under-reporting and to adjust for it, but this still struggled to provide a definitive account of which possible explanation for under-reporting is quantitatively the most important (Meier et al., 2013).

While previous studies of addicts' share of gambling consumption have likewise noted mismatches between reported spending in surveys and actual spending (Volberg et al., 1998; Williams & Wood, 2004, 2007), in the case of alcohol we have the possibility of using a recently-developed technique to adjust for it. This is the method outlined by Rehm et al (Kehoe, Gmel, Shield, Gmel, & Rehm, 2012; Jürgen Rehm, 2010; Jürgen Rehm et al., 2010), who observed that the distribution of alcohol consumption in populations tends to follow certain statistical distributions in sample surveys, despite varying levels of under-reporting. They therefore propose standardising alcohol consumption across populations by assuming that drinking among the population follows a gamma distribution,⁵ with a mean of the best available estimate of consumption taken from information on production, exports, and import, as well as estimates of unrecorded alcohol consumption.

One further development of the gamma upshifting method is necessary for our purposes however: to apply up-shifting consumption estimates to *individuals* rather than population distributions, so that we can look at the proportion of our up-shifted estimates that are accounted for by addicts. To do this, we place each individual in order of their alcohol consumption, and apply the up-shifted gamma distribution to that person based on their position in the distribution. (Data on alcohol consumption within each country, included unrecorded alcohol consumption, was taken from a separate paper by Rehm et al (2012). Unrecorded consumption primarily refers to home production, illegal production, and illegal imports and is estimated by Rehm et al from a variety of sources; further information is given in Rehm et al {, 2007 #2285:68}). No adjustments were made for under-reporting of tobacco consumption in the absence of a recognised methodology to do this (e.g. studies of the extent to which tobacco consumption can be approximated by a given statistical distribution), and we therefore restrict the tobacco analyses to examining under-reporting compared to official sales sources.⁶

The levels of under-reporting from the Eurobarometer data for both alcohol and tobacco are given in the table overleaf. This shows firstly that reported consumption in a given country from survey data can often vary considerably from recorded consumption, and that reporting levels are roughly accurate for cigarettes (there is in fact slight *over-reporting* in general), but

⁵ More precisely, they suggest that alcohol consumption follows a gamma distribution in which the standard deviation is a constant (but gender-specific) function of the mean. Rehm et al also find that some other distributions fit slightly better than the gamma distribution, but these are difficult to use for the up-shifting method here, so it is the gamma distribution that they propose to use.

⁶ Official data on tobacco consumption is taken from The Tobacco Atlas (<http://www.tobaccoatlas.org/more/data/>), which reports its sources (http://www.tobaccoatlas.org/uploads/Images/PDFs/TA4_pdf_sourcesandmethods.pdf) as (i) ERC. (2010). World Cigarette Reports 2010. Suffolk, UK: ERC Group Ltd and (ii) Euromonitor International. (2011). Cigarette consumption sticks per capita: 2010. Hong Kong.



there is considerable under-reporting for alcohol. This further emphasises the importance of adjusting for under-reporting for the alcohol data.

Table 1: Share of Recorded Consumption That is Reported in Eurobarometer 2009

	<i>Alcohol</i>	<i>Tobacco</i>
Austria	50%	130%
Belgium	69%	116%
Bulgaria	47%	71%
Cyprus (Republic)	51%	141%
Czech Republic	34%	58%
Denmark	80%	97%
Estonia	23%	88%
Finland	42%	109%
France	58%	141%
Germany (West+East)	42%	124%
Greece	54%	115%
Hungary	30%	130%
Ireland	54%	169%
Italy	50%	84%
Latvia	21%	206%
Lithuania	26%	158%
Luxembourg	52%	145%
Malta	77%	89%
Poland	19%	96%
Portugal	55%	100%
Romania	43%	105%
Slovakia	22%	64%
Slovenia	35%	57%
Spain	51%	87%
Sweden	60%	79%
The Netherlands	113%	134%
UK (GB+NI)	72%	186%

4. Results

The results of these analyses are shown in the two tables overleaf. Looking firstly at alcohol consumption in *TABLE 2*, we can see that in the preferred specifications, the 3.9% of Europeans who are alcohol addicts account for about 19% of all alcohol consumed in Europe. The 95% confidence interval around these estimates is relatively small (17.0-19.9%), reflecting the large sample size in Eurobarometer, and also relatively little sensitivity to the sampling uncertainty around the relationship between consumption and dependence in APMS. There are however much greater non-statistical sources of uncertainty that we describe below.

[Text continues following the tables]



Table 2: Alcohol Addicts' Share of Tobacco Consumption in Europe

	Upshifted	Dependence adjustments	Weighted	Addicts share of consumption	95% confidence interval	% dependent
Main, as reported		Y		18.7%	(17.0 - 19.9%)	3.9%
Main, upshifted	Y	Y		18.9%	(17.9 - 19.1%)	3.9%
Sensitivity analyses						
Sensitivity 1			Y	17.8%	n/a	3.4%
Sensitivity 2	Y		Y	15.5%	n/a	3.4%
Sensitivity 3				16.8%	(16.1 - 18.4%)	3.1%
Sensitivity 4	Y			14.6%	(13.9 - 15.8%)	3.1%

Table 3: Tobacco Addicts' Share of Cigarette Consumption in Europe

	Dependence definition	Survey source	Weighted	Addicts share of consumption	95% confidence interval	% dependent
Main	DSM	Germany 2009		37.7%	(37.0 - 39.0%)	8.0%
Main	DSM	Germany 2006		38.6%	(37.9 - 40.0%)	8.4%
Main	FTND	Germany 2006		53.1%	(51.6 - 54.3%)	9.7%
Main	FTND	Switzerland 2011		60.6%	(59.9 - 62.7%)	11.6%
Main	FTND	England 2007		64.2%	(62.9 - 65.4%)	12.8%
Weighted analyses						
Weighted 1	DSM	Germany 2009	Y	37.6%	n/a	8.3%
Weighted 2	DSM	Germany 2006	Y	38.3%	n/a	8.7%
Weighted 3	FTND	Germany 2006	Y	52.9%	n/a	10.2%
Weighted 3	FTND	Switzerland 2011	Y	60.2%	n/a	12.1%
Weighted 4	FTND	England 2007	Y	63.9%	n/a	13.3%



Looking at the sensitivity analyses for the alcohol estimates, we can firstly see there is relatively little impact of up-shifting (to account for different levels of under-reporting across Europe) in the main specifications, but an impact of about two percentage points in the sensitivity analyses. The greater impact in the latter cases is likely to be because countries that report relatively high proportions of actual consumption will seem to have artificially inflated numbers of people who are alcohol dependent (according to the APMS risk function, before adjustment for actual levels of dependence in their country). The impact of weights (to make the data representative of the EU population) increases the proportion of consumption accounted for by people who are alcohol dependent, and while these headline results are preferable, it is not possible to obtain bootstrapped confidence intervals for these.

If we move on to the parallel estimates for cigarette consumption in *TABLE 3*, we can see the estimates depend substantially on the definition of tobacco dependence. If we use the DSM-IV definition of dependence then 38-39% of all cigarette consumption is accounted for by addicted smokers, but if we use the FTND definition then this rises substantially to 53-64%. This difference is both because FTND dependence is estimated to be more common than DSM-IV dependence (12-13% of the population vs. 8-10%), and because FTND dependence is much more strongly related to people's level of cigarette consumption (see above). There are relatively few differences between the survey waves (although noticeably fewer people are dependent at a given level of consumption in the German rather than Swiss or English data), and relatively little impact of using survey weights.

Interpreting these results

In interpreting the figures above, there are several limitations that we must be aware of:

- **The measures of alcohol consumption in Eurobarometer are the best available in a comparative survey, but are nonetheless imperfect.** The questions are a standard quantity-frequency measure; that is, they ask how often people drink in the past 30 days, and then how much they usually drink on a day that they are drinking.⁷ This is a common quick method of assessing consumption, but other, more accurate measures exist in surveys that have greater space for questions on alcohol (e.g. T Stockwell et al., 2008). While the gamma upshifting method for dealing with differential under-reporting in different countries will mitigate some of the problems of this, higher-quality comparative studies of alcohol across Europe would strengthen the results.
- **The estimated link between alcohol consumption and dependence is uncertain.** The risk function of dependence at different levels of alcohol consumption is taken from a single survey (APMS) in England, and we would expect this relationship to be different in different countries. While we do account for this by adjusting the absolute risk by the best estimates of the level of alcohol dependence in each country, this is clearly an approximation. Using direct estimates of dependence in each country in a comparable survey would strengthen the results; or failing that, we could obtain more confidence

⁷ More precisely, they ask "In the last 30 days, how many times did you drink any alcoholic beverages? (1) Daily (2) 4 - 5 times a week (3) 2 - 3 times a week (4) Once a week (5) 2 - 3 times a month (6) Once", and "On a day when you drink alcoholic beverages, how much do you usually drink? (1) Less than 1 drink (2) 1 - 2 drinks (3) 3 - 4 drinks (4) 5 - 6 drinks (5) 7 - 9 drinks (6) 10 drinks or more". We convert this to grams of alcohol per day on the grounds of assuming the same quantities given in the question explanatory notes (150ml wine per glass, 330ml beer per bottle, 40g spirits per serving) and standard strengths (12% for wine, 4.5% for beer, 40% for spirits), and in the absence of data on beverage-specific consumption, taking the average of these.



in the results by using sensitivity analysis for the relationship using studies from different countries across Europe.

- **The estimated link between cigarette consumption and tobacco dependence is uncertain.** While this link is more robust than that for alcohol (we test two different definitions of tobacco dependence, and use studies from three countries; moreover, we would expect less variation in the risk function than for alcohol), it would still be preferable to examine this association in a greater number of countries across Europe, or (ideally) base these estimates on a single, high-quality survey across Europe that contains data on both tobacco consumption and dependence.
- **We do not consider tobacco consumption aside from cigarette consumption.** However, the data from Eurobarometer 2009 suggest that non-cigarette consumption is a very small part of the total, so this is unlikely to bias the results substantially.
- **Some statistical uncertainty is not captured in the confidence intervals above,** namely uncertainty around the association between tobacco dependence and cigarette consumption (taken from the new analyses elsewhere in ALICE RAP (Marmet et al., 2014)).

For these reasons, country-specific estimates are not given here – though it was worth stressing that the techniques used are capable of producing country-specific estimates, when the data is of sufficient robustness to make this defensible.

Nevertheless, the Europe-wide estimates given above are likely to be reasonably accurate, which allows us to come to two general conclusions:

1. **Firstly, addicts account for a substantial share of both tobacco and alcohol consumption across Europe.**
2. **Secondly, addicts seem to account for a greater share of total consumption for tobacco vs. alcohol.** While this is perhaps to be expected given that tobacco use has sometimes been equated to tobacco dependence (see the discussion in Marmet et al, 2014) in ways that are not true for alcohol, it is perhaps surprising that the share of tobacco addicts is lower than we might expect (38-64% of cigarette consumption depending on the definition of dependence), and the share of alcohol addicts is perhaps higher than we might expect (15-20% of total consumption).

Expenditure

Finally, we can use these figures to estimate the amount of alcohol and tobacco expenditure in Europe, by combining them with figures on the total alcohol and tobacco markets. There are several sources for these figures.

One way of estimating total expenditure is by looking at household's reported expenditure, using Eurostat data for 2010.⁸ Across the EU27, households reported spending an average of €278/year on alcoholic drinks and €329/year on tobacco, which implies total spending across the EU of €58bn⁹ on alcoholic drinks and €69bn on tobacco. Survey-based expenditure sources are subject to several biases however, ranging from the nature of people's reporting of

⁸ Data is from the Household Budget Surveys run by each national government; see: http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/hbs_esms.htm

⁹ There are two definitions of 'billion' in existence; we here refer (as is becoming standard) to one thousand million.



expenditure (and the under-reporting of alcohol and tobacco spending discussed above), to response biases to the survey as a whole.

A better alternative therefore is to look at industry estimates of the size of particular markets in Europe. A recent Commission-sponsored analysis stated that the size of the cigarette market in Europe was €121.3bn, along with €9.3bn in roll-your-own tobacco, and €5.9bn of other tobacco products (excluding electronic cigarettes and nicotine replacement therapy; Matrix Insight, 2013:21). Using industry data from the Euromonitor International Passport for 2010,¹⁰ the alcoholic drinks market in Europe is €315bn, while the tobacco market is €142bn (of which €135bn is for cigarettes, including hand-rolled cigarette tobacco). Comparing these figures to the implied spending from survey reports, this again shows the considerable under-reporting of alcoholic drinks consumption.

Combining these with the figures on addicts' share of consumption above, looking across the range in the confidence intervals and from sensitivity analyses, **this suggests that tobacco addicts spend some €49-54bn (if dependence is assessed using DSM-IV) or €69-88bn (if using FTND) on cigarettes across the EU, while alcohol addicts spend €44-63bn on alcoholic drinks.**

As before, in using these figures we must be aware of various uncertainties that are not accounted for within these ranges, so the precise differences between e.g. addicts' spending on alcohol and tobacco across the EU should not be over-analysed. Moreover, this assumes that the share of addicts in *consumption* will be the same as the share of addicts in *expenditure*, when this is unlikely to be the case – there is evidence that e.g. alcohol addicts spend less per drink than non-addicts (noted by Foster et al., 2003:992; and confirmed by Kerr & Greenfield, 2007). Still, these offer a first estimate of addicts' spending on alcohol and on tobacco in the EU, and it is hoped that both the rough estimates provide a useful input into policymaking.

We also recommend that there are investments to provide better data to underpin more robust estimates in future, in particular, to fund **high-quality European comparative surveys of the entire population¹¹ that contain data on alcohol/tobacco consumption, expenditure, and dependence.**

¹⁰ Data is provided in countries' own currencies; this is converted to € using the exchange rate from the final day of 2010.

¹¹ In particular, this should cover people who are homeless and who are in institutions, given that both of these will over-represent people with alcohol/tobacco dependence and will vary considerably across countries.



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Addiction and Lifestyles in Contemporary Europe: Reframing Addictions Project (ALICE RAP)

Report 2: Prices, profits, and business practices of drug dealers in Italy, Slovenia and Germany

Deliverable 10.1 Addiction Revenues, Work Package 10

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Acknowledgments

The research leading to these results or outcomes has received funding from the European Union's Seventh Framework Programme (FP7/2007-2013), under Grant Agreement n° 266813 - Addictions and Lifestyle in Contemporary Europe – Reframing Addictions Project (ALICE RAP – www.alicerap.eu).

Participant organisations in ALICE RAP can be seen at <http://www.alicerap.eu/about-alice-rap/partner-institutions.html>.

The views expressed here reflect those of the authors only and the European Union is not liable for any use that may be made of the information contained therein.

Special thanks to partners at UNICRI, TU Dresden and UTRIP.

Prison interviews in Italy were conducted by Alice Paola Brizi, Alice Rena, Cristina Imperatori and Francesca Becciu from UNICRI, who also made other substantial contributions to the achievement of ALICE-RAP objectives.

Prison interviews in Germany were conducted by Anja Pixa and Sandra Koch from TU Dresden, and Prof. Gerhard Bühringer, Prof. Jürgen Rehm from TU Dresden were responsible for the supervision of the study, supporting ethical approval processes and coordinating contact with the relevant prison authorities.

Interviews in Slovenia were conducted by Sanela Talic and Matej Kosir from UTRIP.

Analysis of corruption of officials was conducted with the generous pro-bono support from students from Heinz College, Carnegie Mellon University: Alexander Perschall, Muhammad Ali Asad Khan, Andrea Marie Zimmer, Xiaoke Zhang, Maureen Washburn and Hemali Shah.

We are extremely grateful to Professor Jon Caulkins (Carnegie Mellon University, Heinz College) for directing contributions from Carnegie Mellon students and helpful advice on analysis and comments on earlier drafts.



Funded by
the European Union



Abstract

Objectives: The aim of this study was to improve understanding of how drug dealers in Italy, Slovenia and Germany organise their dealing operations. In particular, we focused on the business side of drug dealing, examining dealers' profits and revenues, dealers' discounting practices and other business strategies. We analysed also the drug transaction cycles of cocaine dealers in Italy.

Methods: The present study draws on interviews with 135 drug dealers in three EU countries (72 interviews in Italy, 44 interviews in Slovenia and 19 interviews in Germany). Interviewees were in prison at the time of the interview, having been convicted of at least one drug offence related to distribution/sales of heroin or/and cocaine. Only adult males participated in the study. In addition to conducting interviews, we reviewed relevant prior studies.

Results: We found that economic motivations were one of the factors explaining involvement in drug dealing. We found limited information about dealers' profits and operating costs. Discounting practices were common among dealers in the Italian and Slovenian sample. Dealers had mixed views about customers and of the addicts among them. Investments made by dealers with dealing profits were often not strategic. We found that dealers' perception of other profitable businesses focused on other illicit activities, such as trafficking and sale of firearms. Analysis of drug transaction cycles of cocaine dealers in Italy provided further details as to that market structure and the price-mark ups realized by those dealers.

Conclusions: The interviews offer rich insights into dealers' operations, making an important contribution to research and knowledge in this field. The findings from this study should not be generalised to the wider population of those involved in dealing and trafficking, given the sample was drawn from specific countries and only included those who had been incarcerated.

Keywords: drug dealing; dealing profits; drug policy; prison interviews; 'cycles' analysis



1. Introduction

There is limited evidence on the business operations and decisions taken by drug dealers and traffickers, and on the amount of profit dealers earn across Member States of the EU. One study in this area, which drew on in-depth interviews with drug dealers, investigated their operations and strategies in the UK (Matrix Knowledge Group, 2007). This study was supplemented by analysis which indicated that an important share of net revenues for those in the drug business in fact derive from the domestic distribution inside the UK, rather than the importation per se (Caulkins, Burnett, & Leslie, 2009; Caulkins, Gurga, & Little, 2009).

However, the particular geographic, political, socioeconomic and cultural characteristics of countries and their crime networks influence dealing and trafficking operations in important ways (Paoli, Greenfield, & Reuter, 2009). Because of this, illicit drugs operations vary by country, and the experiences documented in the UK cannot be assumed to be generalizable to those in other countries. It is likely that those involved in illicit drug business in the UK do not have the same revenue streams and costs as those operating in other countries. In this report we examine three countries each unlike the UK in its own way: Italy which is a Mediterranean country with many ports of entry and large, mature criminal networks; Germany, which is a large transit country (where drugs entry the country and are distributed to other parts of Europe) and also has a large retail market; and Slovenia, which is a small South-eastern country with a large freight industry. In this report we focus on dealers' reported drug prices and drug dealing revenues, as well as the reported costs of doing business, drawing on interviews with 135 imprisoned drug dealers in Italy, Slovenia and Germany. Other issues relevant to understanding how dealers perceive and operate within the drugs market are also explored.

The following chapter sets out the research questions motivating the study. Chapter 3 then looks at previous research on this subject area, and provides some contextual information in relation to the three selected countries. The next chapters (4 and 5) offer an overview of the methodological approach taken in this study as well as its limitations. Chapters 6 to 9 present and discuss the study findings. We discuss dealers' involvement in the business, other areas of work perceived as profitable by the dealers and what quantities of drugs they report managing and handling. Dealers' costs of doing business are also discussed, as well as the reported prices of drugs, and dealers' discounting practices. Additionally, we investigated dealers' attitudes and relationship towards addicted users and how dealers reported investing their drugs profits. Subsequently, drawing exclusively on the Italian interview data, we discuss the market levels and the so-called drug transaction 'cycles' in chapters 8 and 9. Finally, we offer some concluding notes in chapter 10.

2. Research questions

This report sets out findings from a study which aimed to develop understanding of how cocaine and heroin markets operate in selected Member States (Italy, Slovenia and Germany), and the ways in which drug dealers operate to earn money. Dealers who have been convicted of drug dealing or trafficking offenses in Italy, Slovenia and Germany were asked to talk about their experiences in the drug business, particularly the costs of doing business and the amount of money earned, as well as how flexible dealing in a particular market is. The report also describes and discusses the way dealers manage their business, in particular with regards to how they engage with and perceive their customers. In addition, we conducted further analysis drawing on the Italian interview data specifically, investigating the market level demarcation in this sample, and the drug transaction 'cycles'.¹

¹ A cycle is the process of purchasing and then reselling a load of drugs. The approach adopted in the analysis of the drug cycles is further explained in chapter 4.2 of this report.



3. Context for the study

The following sections offer an overview of relevant literature, with a focus on the three selected countries.

3.1 Size of the market estimates

The difficulties associated with estimating the revenues and size of the illegal drug markets have been extensively discussed in the existing literature. As Kilmer et al. (2014) note, one such difficulty relates to the availability of data itself, which is “an inevitable consequence of trying to measure sales of something sold in hidden markets or consumption behavior that is both illegal and dominated by a relatively small number of heavy users” (p. 7). Despite these difficulties the United Nations Office on Drugs and Crime (UNODC) has attempted to scale the major global drug markets, estimating that the retail value of the global cocaine market in 2009 ranged from \$75-100 billion, and that of heroin was at approximately \$55 billion (UNODC, 2012). A number of other studies have sought to develop different approaches to measure illicit drug markets.² These are discussed in more detail in the following paragraphs.³

Supply-side estimates

From a supply-side perspective there are two main approaches to estimation, i.e. production-based and seizure-based estimates. While production-based estimates focus on the beginning stages of the drug supply chain, seizure-based estimates “divide the quantity of drugs that are seized or eradicated by the proportion of drugs that are believed to be seized or eradicated” (p. 9) (Kilmer et al., 2014).⁴ Sources used for production-based estimates may include aerial or satellite images of cultivated land and interviews with farmers about amounts harvested (Kilmer et al., 2011; Kilmer et al., 2014). For example, the World Drug Report of the UNODC reports on coca and opium poppy production (UNODC, 2013). Both types of estimates have -limitations (Kilmer et al., 2011). For example, on the one hand, production-based estimates are based on assumptions about yield and eradication efforts, and the satellite imagery used may lead to discrepancies in the estimates generated (Kilmer et al., 2010; Kilmer et al., 2014). On the other hand, seizure-based data from law enforcement agencies may reflect law enforcement efforts rather than the actual drug production in a particular area/period (Kilmer et al., 2011; Kilmer et al., 2014).

Demand-side estimates

Demand-side estimates are more commonly used (Giommoni, 2014), including both consumption-based and expenditure-based estimates. Consumption-based estimates take into account the number of users, the use days and grams consumed per use day (Kilmer et al., 2014; Organization of American States, 2013). One limitation of this type of estimates is that they usually rely on self-reported drug use by individuals and might therefore lack accuracy (Pudney et al., 2006). One way to address this limitation, and the likelihood of under-reporting in particular, is to use data that includes both self-reporting and biological tests (Pudney et al., 2006).⁵

² A way to address the limitations of the different estimation strategies is through creating and comparing independent demand and supply-side estimates, one of the approaches Kilmer et al. (2014) followed in their recent analysis of the illicit drug market in the US from 2000 to 2010.

³ Beyond the estimates discussed here we are also aware of a novel type of estimate of drug consumption based on wastewater analysis. Please see: <http://www.emcdda.europa.eu/wastewater-analysis> (last accessed 26 September 2014)

⁴ Often this assumed proportion of seizures corresponds to 10%, which does not take into account possible variations of the share seized over time, in different places or the different substances being seized (Giommoni, 2014; Kilmer et al., 2010).

⁵ The biological tests may involve the analysis of urine samples to find drug traces of previous days' usage.



Another challenge with consumption-based estimates is that users often have a hard time describing weights or quantities consumed. Expenditure-based estimates look instead at how much users spent on drugs since people may find questions about amounts spent easier to answer than questions about weight consumed. For example, Kilmer et al. (2013) relying on self-reported expenditures, estimated the size of the heroin market to be 51 million euros circa 2004 in the Czech Republic and 2.5 billion euros circa 2006 in England and Wales. One of the limitations of this approach relates to the dependence on when a user survey is conducted as “patterns of drug consumption may vary at various times of the year” and thus may limit the representativeness of the data (Kilmer et al., 2013).

Size of the market estimates in the three selected countries

A recent study by Giommoni (2014) has adopted a consumption-based approach to estimate the retail value of the illicit drug market in Italy. The author concluded that heroin and cocaine represented the biggest share of the overall drugs market in terms of value. The study sought also to review previous estimates of the Italian drugs market, which are presented in Table 1 below. There is considerable variation among these estimates, which, in the case of the cocaine market, range from 1258 million euros to 12590 million euros.

Table 1. Estimates of the value of the heroin and cocaine market in Italy.

Source	Year	Method	Heroin (mn of €)	Cocaine (mn of €)
Canzonetti (2009)	2005	Demand	868	4096
	2005-2009	Supply	855	3963
Baldassarini and Corea (2009)	2005	Demand	2046	2774
		Supply	887	3688
Kilmer and Pacula (2009)	2005	Demand	1623	2490
Di Censi, Esposito, Scacciatelli, and Rossi (2010)	2008	Demand	1980	5413
Fabi, Ricci, and Rossi (2011)	2010	Demand	2453	9771
Transcrime (2013)	2008	Demand	1842	1711*
Rossi (2013)	2009	Demand-Supply	3340	12590
Sallusti (2013)	2010	Demand		10266
Giommoni (2014)	2012-2011	Demand	1203	1258

*Average between lower and upper bound

Source: Adapted (with the author's permission) from Giommoni, L. (2014). "The retail value of the illicit drug market in Italy: a consumption-based approach." [Global Crime](#).

There is a dearth of studies investigating the value of the illicit cocaine and/or heroin market in Slovenia and Germany.⁶

3.2 Data on drug prices collected by the European Monitoring Centre for Drugs and Drug Addiction

At the European level, the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) receives data from the Reitox network⁷ of national focal points on a regular basis and is therefore a useful source for data on drugs in Europe. Nevertheless, data on drug prices comes from different

⁶ It is worth noting that Paoli conducted a pilot project to describe and analyse the illegal drug market in Frankfurt in 2000. However, and while reporting on retail prices at the local level, this study did not produce an estimate of the size of the heroin or cocaine market.

⁷ Reitox is the “the European information network on drugs and drug addiction” and consists of national institutions or agencies that collect data on drugs and drug addiction and report back on those findings to the EMCDDA. For more information, please see: <http://www.emcdda.europa.eu/about/partners/reitox-network> (last accessed 23 September)



sources, including police data and surveys, using various sampling strategies and methods, and thus caution is required when it comes to comparability and representativeness of the data (EMCDDA, n.d.).

Data on drug prices in the three selected countries

The tables below present data on prices of cocaine and heroin, as collected by the National Focal Points of Italy, Slovenia and Germany and collated by the EMCDDA. In Italy, the average prices of cocaine dropped between 2007 and 2012. In Slovenia, the minimum price for cocaine at the retail level decreased significantly in the 10-year period shown in Table 2. The maximum price followed the opposite trend, reaching 120€ per gram in 2012. In Germany, the average price for cocaine in 2012 (64.9€ per gram) as reported by the EMCDDA appears close to that in Italy (69.9€ per gram).

Table 2. Price of cocaine at retail level (in euros, for 1 gram) in Italy, Slovenia and Germany (2002-2012).⁸

	Price	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Italy	Minimum	87	80	80	77	72	71	66	59	58	55	57
	Maximum	105	99	98	97	93	93	90	84	80	80	83
	Average	*	*	*	*	*	82	78	71	69	68	70
Slovenia	Minimum	65	65	33	38	38	40	40	40	30	30	35
	Maximum	70	70	75	83	75	100	100	100	100	120	120
	Average	68a	68a	54a	60a	*	*	69	70	65	*	*
Germany	Minimum	35	*	41	*	*	*	*	*	*	*	*
	Maximum	93	*	78	*	*	*	*	*	*	*	*
	Average	64	60	59	61	59	63	62	62	66	66	65

Source: EMCDDA, accessed via <http://www.emcdda.europa.eu/data/2014> (last accessed 5 September 2014)

* No data available.

a Figures reported as averages are actually middle points between minimum and maximum prices.

With regards to heroin, in Italy both white and brown heroin prices at retail level dropped between 2007 and 2012 (Table 3). There is limited information in relation to the prices of heroin in its brown or white form in Slovenia and Germany.

⁸ These prices are not adjusted for purity. Therefore, it is difficult to compare prices across time and place. For an overview of the added value of collecting and analysing purity-adjusted prices, please see Kilmer, Pacula et al. (2010) or Caulkins (2007).



Table 3. Price of white and brown heroin⁹ at retail level (in euros, for 1 gram) in Italy and Germany (2002-2012).

		Price	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
White Heroin ¹⁰	Italy	Minimum	77	76	75	74	69	59	53	53	53	53	55
		Maximum	88	90	90	89	87	87	66	68	68	72	69
		Average	*	*	*	*	*	73	60	61	61	63	62
	Germany	Minimum	18	*	*	b	b	b	b	b	b	b	b
		Maximum	63	*	*	b	b	b	b	b	b	b	b
		Average	41	*	40	b	b	b	b	b	b	b	b
Brown Heroin	Italy	Minimum	57	49	50	48	45	42	41	35	36	36	36
		Maximum	68	62	60	61	60	60	53	48	48	48	47
		Average	*	*	*	*	*	51	47	41	42	42	41
	Slovenia	Minimum	35	35	B	*	b	30	b	30	17	20	20
		Maximum	44	44	B	*	b	70	b	50	30	70	60
		Average	40	40a	B	*	b	*	b	40	23	*	*
	Germany	Minimum	*	*	26	b	b	b	b	b	b	b	b
		Maximum	*	*	59	b	b	b	b	b	b	b	b
		Average	*	41	*	b	b	b	b	b	b	b	b

Source: EMCDDA, accessed via <http://www.emcdda.europa.eu/data/2014> (last accessed 5 September 2014)

* No data available.

a Figures reported as averages are actually middle points between minimum and maximum prices.

b Only data for undifferentiated heroin.

4. Methodological approach

4.1 Overall approach and study sample¹¹

This study relies primarily on face-to-face interviews with imprisoned drug dealers in Italy, Slovenia and Germany. In addition, the research team conducted desk research to complement and contextualize the findings from the interviews.

The research team conducted a total of 135 interviews¹² with dealers in the three selected countries (72 interviews in Italy, 44 interviews in Slovenia and 19 interviews in Germany), as presented in Figure 1 below.

⁹ As Ciccarone (2009) put it: “heroin has several characteristics that affect how it is used and even how it is distributed: colour, physical state; water solubility, pH balance, heat stability, weight/volume and purity” (p. 6).

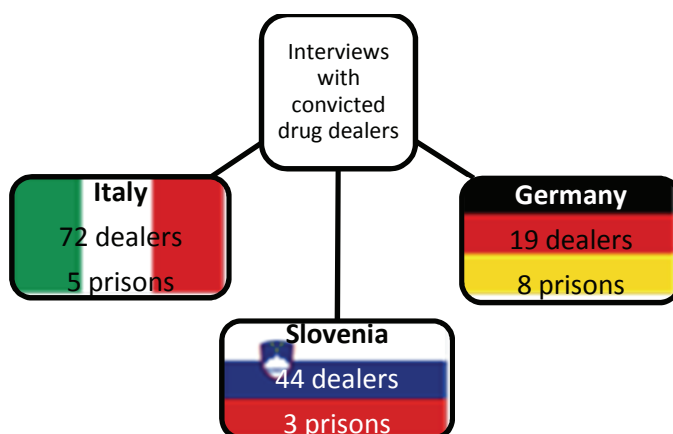
¹⁰ Slovenia is not included in this table as there was no data available on the EMCDDA database or it was indicated that only data for undistinguished heroin had been collected.

¹¹ The overall approach to collecting and analysing the data in this study is taken from chapter 4 of Tzvetkova, M., Pardal, M. et al. (2014). *Drug dealers’ careers, behaviours and strategies – in their own words. A study of imprisoned drug dealers in Italy, Slovenia and Germany (ALICE RAP D10.2; RR-826-EC)*.

¹² The interview protocol used in the interviews can be found in Appendix B.



Figure 1. Number of interviews conducted in the selected countries.



The study samples in each country are relatively small and included only imprisoned drug dealers. It is worth noting that the nature of the sample could potentially generate skewed understanding of drug dealing in those countries if those convicted have employed systematically different, and for example potentially less effective, business strategies than their counterparts who have managed to avoid arrest and conviction. Moreover, the imprisoned drug dealers volunteered to participate in the interviews. However, this is not intended to be a representative study of all drug dealers generating findings generalizable to the wider population of drug dealers. It is an exploratory study whose aim is to identify, to the extent possible, some of the career trajectories, business and risk management strategies of dealers and to find out what these dealers can tell us more broadly about the drugs markets in which they operate. In order to do so, we adopted a case study approach, in which each dealer is taken as a case. In order to target individuals that could offer insightful information into dealers' business strategies, the research team employed purposive sampling (Bryman, 2012). Interviewees were thus selected taking into account a number of criteria which related to the research goals of the study.¹³ Generally, only adult males¹⁴ convicted of at least one drug offence related to distribution/sales of either heroin or cocaine were included. Furthermore, only offenders who were in prison at the time of the interview were able to take part in this research. We did not include people who were in prison for other offences and who had been convicted of drug dealing in the past. Other more specific criteria are presented in more detail in the next sections.

Interviewers took steps to ensure that interviewees' decisions to participate were voluntary and taken with a good understanding of the study – thus constituting informed consent to participate. The steps taken to ensure this are outlined in Appendix A. The interviews were conducted in prisons in the three countries between September 2012 and October 2013. In the following sections we provide more detail about the ethics procedures and other aspects of the data collection process in each of the countries.

¹³ In the following sections we provide further detail as to the inclusion criteria adopted in each of the countries.

¹⁴ This research interviewed male dealers only. This was for practical reasons, since the incarcerated male population of dealers is larger than that of women (see for example Grundetjern and Sandberg, 2012), making it easier to recruit sufficient numbers of interviewees. Also, the inclusion of female interviewees would have involved negotiation of access to female prisons in each of the three countries, in addition to male prisons.



4.1.1 Data collection in Italy¹⁵

Number of interviews

A total of 72 interviews were conducted in five Italian prisons (Table 4).

Table 4. Distribution of interviews per prison in Italy.

Prisons	Interviews	Italian nationals	Other nationalities
Prison 1	15	12	3
Prison 2	14	10	4
Prison 3	11	8	3
Prison 4	14	11	3
Prison 5	18	11	7
Total	72	52	20

Inclusion criteria

Given the peculiar characteristics of the drugs market in Italy, which includes strong connections with local organised crime (see for ex. Calderoni, 2011, 2012; Dorn et al., 2005), two main criteria were applied in the selection of the prisons:

- 1) their geographical position within metropolitan areas, characterized by high rates of drug-related crime; and
- 2) their concentration of relevant prisoners to have a significant sample of prisoners convicted for drug related offences.¹⁶

According to the research protocol, only prisoners with the following characteristics were to participate in the interviews:

- 1) Convicted for at least one drug-related offence, as regulated in articles 73 and 74 of the Decree of the President of the Republic 309/90¹⁷, respectively regulating crimes involving the illicit production, trafficking and detention of drugs (article 73) and criminal association for drug trafficking (article 74) among street level dealers, high level dealers and producers;
- 2) Enough fluency in the Italian language to be able to understand interview questions and articulate interview responses;

¹⁵ This section closely follows: Tzvetkova, M., Pardal, M., Rena, A. Disley E., Liquori, A., Libianchi, S. (forthcoming). *Dealing in cocaine and heroin in Italy: business strategies and operations*.

¹⁶ The identification of relevant prisons (i.e., in accordance with the selection criteria outlined above), for the implementation of the interviews was based on an in depth analysis of relevant data on the Italian drugs market, presented by the Direzione Centrale Servizi Antidroga of the Italian Home Office in the 2011 Annual Report. The analysis included data on the number of anti-narcotics police operations and drug seizures within the Italian territory; the amount of seized drug; the regional distribution of subjects reported to the judicial authorities for drug related offences and all the above data in relation to the number of inhabitants per region.

¹⁷ The Decree of the President of the Republic 309/90 is available on the website of the Italian Home Office at:

http://www.interno.gov.it/mininterno/export/sites/default/it/assets/files/13/Legge_309_90.pdf
(last accessed 7 August 2014)



- 3) No known physical and/or relevant psychiatric disorder which could impede or interfere with the conduct of the interview.

Process to identify interviewees

Once authorizations to conduct the interviews were obtained, appointments with the five selected prison administrations were scheduled in order to develop relationships and processes as well as gather information that would maximize efficiency and effectiveness in the initial prisoner sampling. Each prison administration was requested to identify an initial sample of 30 inmates who met the above characteristics and could be approached about the interviews. Administrations were told that the research team sought to complete at least 14 interviews per prison. The research team also asked that the initial sample suggestions from the prisons include a mix of those who were Italian and those of other nationalities.

Prison personnel, including educators, were actively involved in the sampling process because of their familiarity with the inmates' backgrounds and personalities. This was particularly important to facilitate the identification of inmates who met the inclusion criteria listed above, and to minimise last minute interview drop-outs. Prison educators had a crucial role in approaching the selected prisoners, once they agreed to participate in the study, to inform them of the research subject matter and objectives, discuss privacy issues and to obtain informed consent. Prison educators also acted as facilitators between the prisoners and the interviewers in their first contact.

A team of four drug addiction professionals, including three psychologists, conducted the interviews. All interviewers underwent a brief training in which interviews were simulated with experienced drug addiction professionals, to cope with any challenges that might arise during the interview. This training also helped the interviewers to be aware of and to minimise any manipulative behaviours on the part of the detainees which could affect the reliability of the interview results, especially those in high security wards. Throughout the organisation and the administration of the interviews, the research team and the interviewers carefully reviewed and ensured the application of the most rigorous ethical standards, especially with regard to the protection of the privacy and safety of the prisoners who agreed to be interviewed. Before the interviews an outline explaining the purpose of the research study was shared with interviewees, doubts or concerns expressed by interviewees were addressed and clarified, and the confidentiality protocol was discussed. An informed consent form was also read and signed by participating prisoners.

Each interview was conducted by two interviewers, and interviews lasted between one and four hours with an average duration of one hour and thirty minutes. Interviews were conducted in areas of the prison which had non-acoustic surveillance but which were private to the extent that other prisoners and staff could not walk through. This arrangement was to avoid unexpected interruption and to protect confidentiality. Prison officers were not present during the interviews.

Prison officers involved in the prisoners' initial sampling were explicitly requested not to disclose the names of the selected prisoners to the interviewers, to help in protecting confidentiality. In order to minimise the risk of harm to inmates who participated, participants' names, offences, attributes and birthdates were not recorded.

Since audio-recording of the interviews was not authorised by the Department for Prison Administration, one interviewer was responsible for conducting the interview and another was responsible for making detailed notes of the interviewees' responses – as close to verbatim transcription as possible. No names were included in the transcripts.



4.1.2 Data collection in Slovenia

Number of interviews

The research team conducted 44 interviews with convicted drug dealers in three Slovenian prisons (Table 5).

Table 5. Distribution of interviews per prison in Slovenia.

Prisons	Interviews	Slovenian nationals	Other nationalities
Prison 1	26	20	6
Prison 2	10	7	3
Prison 3	8	6	2
Total	44	33	11

Inclusion criteria

There are six prisons in Slovenia, including a prison for women and one for youth offenders. From the four eligible prisons with adult male prisoners, three were willing to collaborate with the present study. Prisoners convicted in accordance to Article 186 (“unlawful manufacture and trade of narcotic drugs, illicit substances in sport and precursors to manufacture narcotic drugs”) and Article 187 (“rendering opportunity for consumption of narcotic drugs or illicit substances in sport”) were deemed eligible to participate in this study. As the total number of eligible convicted drug dealers across the three prisons was n=70 (which was in line with the pre-defined target number of interviews per country) all prisoners were contacted. From the total of 70 prisoners who met the inclusion criteria, 44 were interviewed (62.9%).¹⁸

Process to identify interviewees

The research team presented the study to the prison administration of each prison and agreed to deliver a number of lectures about drugs to all prison staff. The prison administration staff was also asked to explain the aims of the project and interviews to the prisoners in advance.

Before undertaking the interviews, the research team met with prisoners and did a short presentation clarifying the purpose of the project, and emphasising the interviewees’ role in this research. Prisoners were assured that all information would be confidential and that no names or dates would be requested or linked to the information they provided. Subsequently, the interviews were conducted by six volunteers. All the interviewers had interviewing experience and three of them were former students of the Faculty for Criminal Justice and Security. The interviewers got to know the questionnaire in advance and discussed questions and concerns with the research team prior to the interviews. The prison administration permitted the use of audio-recorders, but not all interviewees agreed to be recorded. Therefore, when audio-recording was not allowed, the interviews were conducted by two interviewers. The interviews took place in prison offices, and other meeting rooms within the prison. The interviews lasted between one and four hours. All prisoners and prison employees expressed interest in the final report and in interview data collected from other countries.

¹⁸ Seven imprisoned drug dealers did not want to participate in the study. The remaining 19 imprisoned drug dealers agreed to participate, but claimed they did not deal drugs and were imprisoned for no reason. The latter were excluded, as they were not willing to disclose information about their role and activities as drug dealers and thus the added-value of such discussions was seen as limited.



4.1.3 Data collection in Germany

Number of interviews

The research team conducted a total of 23 interviews with convicted drug dealers in eight German prisons (Table 6). However, as explained below, only 19 interviews were analysed in the current study.

Table 6. Distribution of interviews per prison in Germany.¹⁹

Prisons	Interviews
Prison 1	5
Prison 2	1
Prison 3	1
Prison 4	6
Prison 5	2
Prison 6	4
Prison 7	2
Prison 8	2
Total	23*

*Four interviews were excluded, amounting to a total of 19 interviews.

In the eight participating prisons, all prisoners were informed about the study and were asked to participate. While a total of 46 prisoners indicated interest in participating, nine were a priori excluded as they were not involved in heroin and/or cocaine dealing. Another 14 prisoners withdrew their interest before the interviews took place, and thus 23 interviews were conducted. At the interview stage, four other interviewees were excluded (N=3 had no involvement in heroin and/or cocaine dealing, N=1 technical problem with audio file). The dataset thus consists of 19 interviews with imprisoned German drug dealers.

Inclusion criteria

All prisons in Bavaria and Saxony were approached (N=30). Bavaria and Saxony were selected due to the similarities of the prison systems and political structure of the two states (Justizvollzug Bayern, n.d.; Ministerium für Justiz und Gleichstellung, 2014). The research team had also relevant contacts in these regions, which were helpful in establishing a first contact with the prisons. From these, four prisons did not respond to our request, nine had no eligible prisoners (i.e., only held persons under 18 years old or on pre-trial custody), and in nine other prisons the prisoners did not show an interest in participating in this study. The research team thus conducted interviews in eight prisons in Bavaria and Saxony. Male prisoners, over 18 years old and with a sentence in relation to heroin and/or cocaine dealing or trafficking were deemed eligible to participate in the study. The interviews were conducted in German and therefore the interviewees had to be able to understand the questions and respond in German.²⁰

¹⁹ Due to the small number of interviewees per prison and the potential risks to confidentiality, we have not included information in relation to the number of German versus foreign nationals for each prison in Germany. For overall information about nationality within the German sample please see section 6.3.1.

²⁰ In one case an interpreter was made available.



Process to identify interviewees

The research team prepared a number of informative materials about the study, as well as declarations of consent and participation. These materials were submitted to the University ethics committee²¹ in order to obtain the committee's approval to approach the prison services. The research team contacted also the Federal Drug Commissioner of Bavaria and Saxony and presented the study. Further to these contacts, we obtained a support letter from the criminological services of both federal states, which allowed the research team to directly approach the directors of the different prisons. As the research team was not allowed to contact the prisoners directly, the prison staff distributed the informative materials and asked for volunteers to participate in the study. The research team was then informed of any interested prisoners and arranged the interview schedule with the prison staff.

Before the interview took place the interviewees signed the declarations of informed consent and participation, which were kept by the prison staff. To ensure the protection of confidentiality of the interviewees, the research team was not informed of dealers' names. The interviews were audio-recorded and coded using a randomised number.

The interviews were conducted by a trained clinical psychotherapist. The interviewer was assisted by a student who offered support in recording and transcribing the interviews. A pilot interview with a non-heroin/cocaine drug dealer was conducted in order to test and increase familiarity with the questionnaire. The average length of the interviews ranged between one and two hours.

4.2 Approach to drug transaction cycles analysis

This section describes the particular approach taken in relation to the analysis of market levels and drug transaction cycles in Italy, which is presented here in chapters 8 and 9.

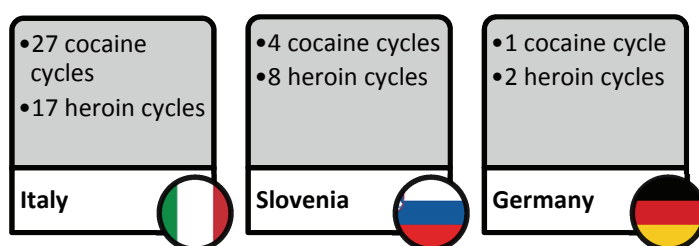
The transaction cycle, defined as the progression from purchase to resale for a single acquisition, is a useful unit of analysis for determining how much revenue is realized at each layer of the market. Specifically, the transaction cycle provides insight into the accumulation of mark-ups throughout the distribution chain, the distribution of revenue across levels of the market, and the variation in market level earnings. As such, this model also lends itself to policy analysis. For example, it facilitates estimating the net revenues and, hence, to some extent the power of the large drug dealing organisations. It helps one understand what market levels and what types of criminals retain the bulk of the net revenues from the drug distribution business.

A thorough transaction cycle analysis requires complete and reliable data on four pieces of information: a typical purchase quantity and price and a typical sales quantity and price. Taken together, these data points form a complete transaction cycle and can be used to analyse basic costs and revenues in the drugs market. Some interviews generated descriptions of more than one cycle, e.g., from different stages of the respondent's career. Conversely, not all interviews provided usable information. Information on a complete cycle is needed in order to conduct a thorough and robust cycle analysis. Figure 2 below provides an overview of the number of cycles identified in each of the samples.

²¹ For more information about this Committee please see: http://tu-dresden.de/die_tu_dresden/gremien_und_beauftragte/kommissionen/ethikkommission/index_html/document_view?set_language=de (last accessed 14 October 2014).



Figure 2. Overview of the drug transaction cycles data across the three samples.



Given the limited data on drug transaction cycles in both the Slovenian and German samples, we focused our analysis on the largest and most robust subset of the samples, i.e., the cocaine dealers incarcerated in Italian prisons. Out of the 72 interviewees from the Italian sample, 21 subjects were excluded because they did not provide complete information about one of their dealing “cycles” (i.e., they described the amount purchased but not the size of one of their selling transactions, or vice versa). Other interviews addressed all aspects of the cycle, but their statements could not be reconciled. A common reason for this was that the dealer cut the drugs, but did not provide detail as to the dilution factor (e.g., whether a kilogram was cut 1 for 1 to make 2 kilograms or 2 for 1 to make 3 kilograms). This could sometimes be inferred if they made a statement about their total revenue, but when they merely described the (diluted) weight of a sale and its price, it was not possible to reconstruct how many such sales they made per cycle. Others seemed to mix together descriptions of cycles from early in their career with more recent activity at a higher market level. In the end, this left 24 interviews which yielded information on 27 cycles with full and coherent data.

5. Limitations

One of the major limitations of the study is the fact that the dealers who we were able to interview and who agreed to participate in the research in the three countries are not necessarily representative of the overall population of drug dealers in the three countries. Moreover, the samples are small, especially the sample in Germany. As a result of this, the following limitations are worth noting:²²

- Those convicted might employ different, potentially less effective, business strategies;
- Imprisoned dealers in our sample volunteered to participate in this research, so we did not include the perspectives of other dealers (who for different reasons did not agree with the research protocol);
- Different levels of dealing may not be well captured;
- Some dealers were unwilling to respond to all the questions, and some offered generic observations only. Furthermore, the information was not independently verified so may not all be completely accurate.

In addition, the interviews were organised and undertaken by three different teams of local researchers. This was needed in order to facilitate the contact with the local prisons and to enable the communication with the imprisoned dealers. While the same interview protocol was used in the three countries, the involvement of different interviewers may have result in some differences with

²² The more general study limitations are taken from chapter 5 of Tzvetkova, M., Pardal, M. et al. (2014). *Drug dealers' careers, behaviours and strategies – in their own words. A study of imprisoned drug dealers in Italy, Slovenia and Germany (ALICE RAP D10.2; RR-826-EC)*, as they also apply to the research presented here.



regard to the data collected. In order to mitigate this, all interviewers were instructed to follow the same procedures with regard to interviewing, recording and transcribing the interviews.

Finally, it is worth noting a few other more specific caveats relating to the data presented in this report:

- Due to the limited information dealers were able/prepared to report, it was sometimes difficult to understand at what market level interviewed dealers were operating;
- Some of the questions around the purity of drugs, prices, costs, and profits were not answered in much detail;
- There were sometimes inconsistencies in respondents' responses. For example, some indicated profits per month that seemed difficult to reconcile with the amount they reported buying and selling;
- Difficulties arise in comparing profits and costs of independent dealers as opposed to those who worked as part of an organisation. For example, one dealer who worked in the south of Italy for a criminal organisation told us: *"I decided the quantity, the price was agreed by the System. In my area I could decide whether to buy the stuff from the System or not. In other areas you have no choice"* (I17);
- Even when dealers described some business costs, there was no way to ascertain whether that was a comprehensive accounting of all costs or just a selection of them;
- There might have been variations in drug prices, if prices tend to vary over time, across locations, and between market levels.

6. Describing the interviewees²³

In the following sections we describe the interviewees included in the Italian, Slovenian and German sample, including information regarding their age and nationality, drugs sold and used, among other considerations.

6.1 ITALY²⁴

6.1.1 Age and nationality

At the time of the interviews the average age of respondents (when known) was 42 years old (62.5%, N=25 are younger than 46).²⁵ The youngest respondent for whom the exact age was known was 22 and the oldest prisoner was 76 years old. The average age of first involvement with drug dealing was reported to be 25.

Table 7 shows the distribution of prisoners according to their nationality (defined as country of birth). This distribution indicates that just over 70% were Italian. In addition, 46% of the dealers' suppliers (when indicated by the respondents) were Italian.²⁶

²³ The description of the study sample presented here is taken from chapter 6 of Tzvetkova, M., Pardal, M. et al. (2014). *Drug dealers' careers, behaviours and strategies – in their own words. A study of imprisoned drug dealers in Italy, Slovenia and Germany (ALICE RAP D10.2; RR-826-EC)*.

²⁴ This section closely follows: Tzvetkova, M., Pardal, M., Rena, A. Disley E., Liquori, A., Libianchi, S. (forthcoming). *Dealing in cocaine and heroin in Italy: business strategies and operations*.

²⁵ 32 interviewees (44.4%) did not provide information about their age.

²⁶ We were not able to corroborate this finding with information from other sources, as the data analysed drew essentially on interviews conducted with imprisoned dealers.



Table 7. Nationality of respondents based on country of birth data.

Nationality	N	%
Italian	52	72.2
Albanian/Eastern European	5	6.9
North African	5	6.9
Other African	4	5.6
Other European	3	4.2
Latin American	2	2.8
Asian	1	1.4
<u>Total</u>	<u>72</u>	<u>100</u>

6.1.2 Drugs sold

45 dealers (62.5 %) reported cocaine as their main drug (for dealing) and 21 (29.2%) reported that they sold mainly heroin. Five other dealers (6.9%) sold mainly hashish, cannabis and amphetamines.

²⁷ 49 interviewees (68%) reported not selling other drugs apart from their main drug.

Interviewees were asked about the first drug they ever sold and the drug which related to their present drug sentence. As presented in Table 8, interviewees' responses indicate some variation between the first drug sold and the current drug sentence. For example, while 23.6% of interviewees (N=17) reported having initially sold heroin, the percentage of interviewees currently sentenced for dealing this substance is approximately 15.3% (N=11).

Table 8. Respondents' drug for which sentenced and first drug they sold.

	Cocaine	Heroin	Cocaine and heroin	Cannabis and hashish
First drug sold	37 (51.4%)	17 (23.6%)	-	15 (20.8%)
Present drug sentence	43 (59.7%)	11 (15.3%)	9 (12.5%)	8 (11.1%)

6.1.3 Dealing as a main occupation and other activities

The majority of the interviewees (N=71) discussed whether dealing was their main occupation. Among these, 43 respondents (59.7%) considered dealing as their main occupation and for 36 (out of those 43) dealing was in fact their only occupation. Other occupations reported by dealers included: owning a shop, engaging in various types of non-skilled work, working in night clubs, restaurants and factories; driving and working in construction/highway maintenance. There were only a few skilled professionals in the sample. About 5.5% of the interviewees (N=4) reported having been involved in other crimes in the past, such as robberies and theft.²⁸

6.1.4 Use of drugs

While the questionnaire used in the interviews did not include any questions about drug addiction, 69 (95.8%) interviewees volunteered information relevant for understanding their drug consumption. Addiction has been determined in this study on the basis of how interviewees described their own use and whether or not they have spent time in rehabilitation. Accordingly, 18 (25%) dealers could be described as addicts (present or former). Of those whom the research team classified as addicted, 9 (50%) were heroin users and 9 (50%) were cocaine users.

Furthermore, while 35 (48.6%) dealers reported using cocaine regularly ('often') or occasionally ('only during the weekend'), only 13 (18.1%) admitted to using heroin regularly. 15 dealers (20.8%)

²⁷ One interviewee (1.4%) did not respond to this question.

²⁸ This is based on dealers' responses only, as the research team did not look into other sentencing information.



did not use any drugs and 5 (7%) used only hashish or cannabis (no addicts among them).²⁹ It is worth noting that the biggest group of dealers in the Italian sample sold cocaine and used mainly cocaine.

6.2 SLOVENIA

6.2.1 Age and nationality

At the time of the interviews, most respondents (86.4%, N=38) were between 25 and 45 years old. Five other respondents (11.4%) were aged 46-62 years old.³⁰ Half of the dealers in the Slovenian sample reported starting dealing below age 20.

75% of the interviewees from this sample (N33) were Slovenian, whereas the remaining interviewees were from other former Yugoslavian countries, as illustrated in Table 9.

Table 9. Nationality of respondents based on country of birth data.

Nationality	N	%
Slovenian	33	75
Bosnian	5	11.4
Serbian	4	9
Bosnian-Slovenian	1	2.3
Montenegrin	1	2.3
Total	44	100

From the 43 respondents in the Slovenian sample who discussed their suppliers' nationality, 72.1% of dealers, (N=31) suggested that the nationality of their supplier was different from their own,³¹ which may suggest that the majority of suppliers in Slovenia were foreigners or that the dealers in this sample travelled out of Slovenia to buy their drugs from people who were nationals in those countries.

6.2.2 Drugs sold

For 24 dealers in our sample (54.5%), the self-reported main drug sold was heroin, and for 15 (34.1%) it was cocaine. Four other drug dealers (9.1%) considered both cocaine and heroin as their main drugs. Synthetic drugs were reported to be the main drug sold by one interviewee (2.3%).

The drug dealers suggested some variation between the first drug sold and the current drug sentence, as indicated in Table 10. While the majority of the respondents indicated having initially sold cannabis (54.5%, N=24), most of the respondents (N=24, 54.5%) were sentenced in relation to dealing both cocaine and heroin.

Table 10. Respondents' drug for which sentenced and first drug they sold.

	Cocaine	Heroin	Cocaine and heroin	Synthetic drugs	Cannabis	Other (not specified)	No information
First drug sold	4 (9.1%)	10 (22.7%)	-	2 (4.5%)	24 (54.5%)	1 (2.3%)	3 (6.8%)
Present drug sentence	9 (20.5%)	10 (15.3%)	24 (54.5%)	1 (2.3%)	-	-	-

²⁹ One other interviewee (1.4%) reported not having a main drug (for consumption).

³⁰ The age of one interviewee (2.3%) was not reported.

³¹ 12 other respondents (27.9%) reported having the same nationality as their suppliers. One interviewee did not respond.



6.2.3 Dealing as a main occupation and other activities

Among the 42 respondents who told us about their occupation(s), 19 (45.2%) reported that dealing was their main occupation. For the majority of these respondents (N=17), dealing was their only stated occupation. 23 other dealers (54.8%) indicated having other main occupation(s). These included for example business-related work (N=5).³²

6.2.4 Use of drugs

Only six respondents (13.6%) from the total (Slovenian) sample volunteered information about their own drug consumption. From these, three reported using heroin, two indicated using cocaine, and one declared not using any drugs.

6.3 GERMANY

6.3.1 Age and nationality

All the respondents in the German sample (N=19) reported their age at the time of the interview. Accordingly, most dealers (73.7%, N=14) were between 25 and 45 years old. Three (15.8%) respondents were aged 46-62 years old. The youngest dealer in the sample was younger than 25 years old (5.3%) and the oldest dealer was older than 62 (5.3%).

The distribution of convicted dealers according to their nationality is presented in Table 11 below. According to the interview data, 78.9% of the respondents were German.

Table 11. Nationality of respondents based on country of birth data.

Nationality	N	%
German	15	78.9
Former Yugoslavia	1	5.3
Other European	1	5.3
Asian	1	5.3
Latin American	1	5.3
<u>Total</u>	<u>19</u>	<u>100</u>

Findings from the interviews with the German sample are more in line with those from the Slovenian sample as a total of 14 dealers (73.7%) indicated that their suppliers were of a different nationality from their own.

6.3.2 Drugs sold

In terms of the drugs sold by the dealers in our sample, six (31.6%) reported not having a particular main drug. Cocaine was the main drug sold by three respondents (15.8%) and heroin was reported by four other interviewees (21.1%). Additionally, six respondents (31.6%) considered both heroin and cocaine as their main drugs.

As in the Italian and Slovenian sample, we found some discrepancy between the first drug sold and the drug in relation to which dealers had been sentenced at the time of the interview, as reported by the respondents and presented in Table 12.

³² While the interviewees did not provide much detail regarding such occupations, one of them reported owning a fitness club.



Table 12. Respondents' drug for which sentenced and first drug they sold.

	Cocaine	Heroin	Cocaine and heroin	Synthetic drugs	Cannabis	Other (not specified)	No information
First drug sold	5 (26.3%)	5 (26.3%)	-	1 (5.3%)	6 (31.6%)	-	2 (10.5%)
Present drug sentence	3 (15.8%)	4 (21.1%)	6 (31.6%)	-	-	6 (31.6%)	-

6.3.3 Dealing as a main occupation and other activities

Most dealers discussed whether dealing was their main occupation (89.4%, N=17). While the majority of these (76.5%, N=13) declared having other key occupations, four respondents (23.5%) considered drug dealing as their main occupation. Other occupations mentioned by dealers included real estate jobs (N=2) and scrap dealing (N=1).

6.3.4 Use of drugs

Only four drug dealers in our sample (21.1%) discussed the extent to which they consumed any drugs, and which substances they used. Three respondents reported using cocaine and one respondent indicated using heroin. Drawing on information provided by these dealers about their use patterns and whether or not they have spent time in rehabilitation we identified two addicts in the sample.

7. The business side of drug dealing – in dealers' own words³³

7.1 Economic motivations are one of the factors explaining involvement in drug dealing³⁴

A literature review from Dorn et al. (2005), which looked at sources in several languages³⁵ to improve understanding of 'upper level drug trafficking'³⁶, found that one of the key objectives or motivations of dealers related to personal enrichment and profit. This was also the case in the Italian and German studies reviewed by Dorn et al. (2005). Gruter and Van de Mheen (2005) identified financial gain as a strong motivation for cocaine dealers in the Netherlands at both retail and upper levels of the market.³⁷ Other research has pointed to a focus on profit as a motivating factor for dealers as well (Desroches, 2005, 2007; Reuter & Haaga, 1989).

³³ Please note that interviewees' responses from the Italian sample have been coded as I[number], responses from the Slovenian sample as S[number], and from the German sample as G[number].

³⁴ The interviewees discussed also the role played by friends and family when explaining their involvement in drug dealing. Other dealers reported dealing to support their own drug consumption. For a complete overview of the motivations mentioned by dealers in our samples please see chapter 7.1 of Tzvetkova, M., Pardal, M. et al. (2014). *Drug dealers' careers, behaviours and strategies – in their own words. A study of imprisoned drug dealers in Italy, Slovenia and Germany (ALICE RAP D10.2; RR-826-EC)*.

³⁵ The authors reviewed literature in English, French, Dutch, German, Italian and Spanish.

³⁶ Dorn et al. (2005) defined 'upper level drug trafficking' as including "source zone traders' relationships and transactions, including wholesale distribution within the source countries; export, international transit, entry into Europe and particularly the UK; and connections downwards to city level" (p. 1).

³⁷ The authors discussed three different market levels. Firstly, the authors referred to retail level, considering those dealers who supplied small quantities of drugs and directly to users. Gruter and Van de Mheen (2005) referred also to the middle market, pointing to the definition adopted by



We asked interviewees about their motivations to start dealing.³⁸ A significant proportion of respondents across the three samples (Italy: 40.2%; Slovenia: 24.4%; Germany: 10.5% mentioned economic reasons, and 31.6% mentioned both economic reasons and friends in describing how they got involved in drug dealing) broadly discussed their involvement in drug dealing in relation to the achievement of financial gains. Some dealers indicated experiencing economic difficulties and perceived drug dealing as an alternative means to earn money (S16, I71, G91, S8, I64, I61, I32, S39, I36, I47, I50). Others acknowledged wanting or needing “to have more money” (S29, I31, I63, G107, I65, I70, G100, G101, I16, I69, S42, S43, I6, S45, I37, I45, S33, S38, I71, I43, I60, I8, G99, S6, S8, S9, S31, S14, S17, S10, S20) or admitted to starting to deal in order to be able to afford a different type of lifestyle (S29, I70, S38, G96, G106, I12, I8). In relation to these issues, some dealers observed that: *“We (my family) didn’t have lot of money, we were poor. And the easiest way to earn some money was selling drugs”* (S16)

“I wanted to have more money. We have family business, but that wasn’t enough for my needs” (S17)

“I saw that others from my country wore expensive designer clothes, used taxis and went to trendy clubs. I wanted to do the same... and that’s how I got into it” (I70)

7.2 High and low quantity dealers in our study

There is no consensus around one particular classificatory framework of the levels and actors of drug markets (Desroches, 2007; Dorn et al., 2005). Prior studies have applied a range of such classifications, taking into account the specificities of the market being analysed. For example, a study of the illicit drug trade in the UK (Matrix Knowledge Group, 2007) defined four different market levels, based on “the level in the supply chain where they operated” (p. 16): international level dealers, national level dealers, local level dealers, and retail level dealers.³⁹

In this chapter we distinguish two categories of dealers, attending to the reported quantities of drugs dealt by dealers on a monthly basis:⁴⁰

- ‘High quantity dealer’: any dealer who bought a total (per month) of 10kgs or more to sell
- ‘Low quantity dealer’: any dealer who bought a total (per month) of less than 10kgs to sell

Based on this classification, 25.7% (N=18) of the interviewees from the Italian sample were high quantity dealers and 74.3% (N=52) were low quantity dealers.⁴¹ The majority of the high quantity

Pearson and Hobbs (2001) as the “sphere of activity that lies between bulk importation traffickers/wholesalers and retail level dealers” (p. vi). Finally, at the higher level of the market, Gruter and Van de Mheen (2005) included importers and drug traffickers.

³⁸ For a complete overview of these motivations, as reported by drug dealers in our samples, please see chapter 7.1 of Tzvetkova, M., Pardal, M. et al. (2014). *Drug dealers’ careers, behaviours and strategies – in their own words. A study of imprisoned drug dealers in Italy, Slovenia and Germany (ALICE RAP D10.2; RR-826-EC)*.

³⁹ According to the Matrix study (2007), international level dealers were those “who brought drugs into the UK”, national level dealers were those “who distributed drugs at a national level, i.e., dealers who buy drugs in one city and sell in another”, local level dealers were those “who bought and sold drugs within the same small region or town” and retail level dealers were those “who sold to users at the street level” (p. 17).

⁴⁰ This classification is used also in relation to the two substances included in the study (i.e., cocaine and heroin).

⁴¹ Two other interviewees did not provide sufficient information to apply this classification.



dealers (N=14) reported not selling on the streets. From the total (Italian) sample, 61.1% (N=44) reported being involved in street dealing. Thirty-two of the 44 interviewees in the Slovenian sample (72.7%) offered sufficient information to classify their role in the market: four of the 32 (12.5%) were high quantity dealers, 27 (84.4%) were low quality dealers, and the last was a courier.⁴² We were able to apply the market classification to 14 of the dealers in German prisons (73.7%). Among these, one dealer reported buying a total (per month) of 10kgs or more to sell and thus was considered a high quantity dealer, 12 (85.7%) reported selling less than 10kgs per month, and the last was described as a courier. Among the total German sample, five dealers (26.3%) indicated being involved in street dealing. Thus, dealers in our samples sold by and large less than 10 kilograms per month.

7.3 Drug dealing profits and revenues

One objective of this study is to learn more about drug dealers' reported profits. Some dealers thought that drug dealing was the most profitable business and that, in comparison to other illegal trades, it was possible to make large profits in a relatively short time (I10, I29, I30, I58). Respondents did not all agree on which particular drug offered the greatest profit potential. For example, one Italian dealer discussed the profitability of the different types of drugs:

"Heroin is risky because of overdosing. Hashish is no good because the amounts are big, you need lorries, it is cheap, you make too little money on it and the sentences are the same" [as with less demanding/more profitable drugs] (I12).

Another Italian dealer commented that *"hashish takes longer to sell and you make less money" (I23)*. Selling cocaine was considered to be the most profitable by 14 dealers (I12, I18, I20 [together with synthetic drugs], I28, I29, I38, I39, I45, I49, I52, I55, I62, I70 and I71). Yet one dealer from the Italian sample suggested that profitability depended on the quantities sold and that *"if you have a good market for marijuana and hashish you can make more with these than with cocaine"* (I17). Two other dealers also thought that one could earn more by selling hashish (I57, I63), especially at street level (I57). One dealer from the German sample suggested that cannabis was most profitable (G17). Three other interviewees from the Italian sample thought that heroin was most profitable (I35, I46, I72). One dealer also suggested that it could be profitable to sell *"drugs that law enforcement does not know about"* (I60).

Interviewees were asked about:

- the price typically paid for a particular amount of drugs;
- the minimum and the maximum paid (for the typical amount they bought);
- earnings per hour for trafficking/selling/or per unit drug sold;
- costs relevant to dealing drugs;
- typical weight sold to one buyer and the price of that weight.

There are several issues in relation to these data which limit estimation of profit and earnings, as discussed in chapter 5. For those reasons, we do not present data on dealers' profits per se, but rather include data on prices of cocaine and heroin bought and sold as well as the average quantities bought and sold per month, and estimated costs.

⁴² Information in relation to street dealing was limited. 11 dealers (64.7%), out of 17 respondents who were willing to discuss this topic, reported being involved in street dealing.



7.3.1 Prices of cocaine and heroin as reported in the Italian sample^{43 44}

Table 13 below shows the average quantities of cocaine and heroin bought and sold and the mean prices in Euro.

Table 13. Prices of cocaine and heroin in Italy (2003-2011), according to imprisoned drug dealers.⁴⁵

	Price per kg bought (in Euro)	Price per gram bought (in Euro)	Sale price per kg (cut) (in Euro)	Sale price per gram (in Euro)
Cocaine (mean)	27,400€	42€	46,400€	70€
Heroin (mean)	18,900€	25€	41,300€	72€

One dealer suggested that generally if you paid 50,000€, you could make 100,000€ (I39). Based on the very diverse responses with regard to dilution, dilution 1 to 3, while common in the chain, is rare within the operations of one individual.⁴⁶ Analysis by Caulkins et al. (1999) found that entrepreneurs (own organisation), on average, received higher profits. The authors distinguished four levels of involvement and related profits: entrepreneurs who own the drugs (retain 50% of the shares), independent consignment sellers (retain about 25% of the shares), consignment sellers who operate at fixed locations (retain 10% of the shares) and sellers paid hourly (3% of the shares).

Table 14 shows the prices at which dealers of various levels in the sample bought and sold cocaine and heroin. The table also includes an estimate of dealers' costs. The estimation of costs is not precise due to the incomplete information provided by interviewees.⁴⁷ Nevertheless, previous research has concluded that the costs of doing business correspond to a small proportion of drug dealers' revenues (Caulkins et al., 1999). A study of drug dealers in the UK suggested that "dealers' profits primarily came through revenue generation (sales) rather than cost control" (Matrix Knowledge Group, 2007, p. 40). In fact, according to this study, only a small minority of dealers in the UK had precise knowledge of their costs. The Matrix study thus concluded that "dealers generally did not require this knowledge as the revenues were so large and the operational costs and unskilled staff wages were small" (Matrix Knowledge Group, 2007, p. 40).

⁴³ This section closely follows: Tzvetkova, M., Pardal, M., Rena, A. Disley E., Liquori, A., Libianchi, S. (forthcoming). *Dealing in cocaine and heroin in Italy: business strategies and operations*.

⁴⁴ A more refined analysis of prices and profits was possible in relation to drug dealing of cocaine in Italy. This is presented in chapter 9.

⁴⁵ We include price per gram and price per kg to illustrate the difference in prices of purchase/sale at different quantities. For a more detailed consideration of this issue please see chapter 9.

⁴⁶ According to Caulkins (2005), "typically cocaine [distributed in the U.S.] undergoes something like 5 transactions between its import in multi-kilo to multi-hundred kilo to multi-hundred kilo lots and its retail sale in units of 0.1 gram to a few grams" (p. 9).

⁴⁷ While the interviewees discussed some of the types of costs and we have rough estimates for some of these, we do not have a full list of trade-related costs for each dealer per month. In chapter 7.4 we offer more detail with regards to the types of costs reported by drug dealers in the three countries.



Table 14. Average amounts purchased and prices of heroin and cocaine (according to dealers in Italy) during the period 2003-2012.

	Bought per purchase (Kg)	Bought on average per month (in kg)	Price at which bought per kg (in Euro)	Price at which bought per gram (in Euro)	Sale price per kg (in Euro)	Sale price per gram (in Euro)	Estimated earnings per month (in Euro)	Estimated costs per month (in Euro)
Cocaine sellers 10kg and more (N=10)	51kg (med=12) (N=9)	49kg (med 19kg) ⁴⁸ (N=8)	31,105 (N=10)	35.7 (N=2)	35,283 ⁴⁹ (N=10)	56 (N=2)	40,816 (N=4)	26,000 (N=6)
Cocaine sellers less than 10kg (N=34)	0.9kg (N=32)	1.6kg (N=32)	26,241 (med 31,250)(N=16)	43 (n=24)	47,238 (n=7)	71 (n=25)	21,610 (N=10)	4,900 (N=15)
Heroin sellers 10kg and more (N=4)	10.8kg (N=4)	18kg (N=4)	19,130 (N=4)	8 (N=1)	40,833 (N=3)	46 (N=2)	144,480 ⁵⁰ (N=3)	10,900 (N=3)
Heroin sellers less than 10kg (N=17)	0.878kg (N=16)	3.6kg (N=15)	17,628 (N=9)	29 (n=11)	42,000 (n=2)	77 (n=11)	47,794 (med 35000) (N=8)	44,000 (med 3875) (n=10)

Note: Due to the discrepancies in terms of the number of respondents reporting quantities and prices of bought and sold drugs (per gram/kg) the data here presented should be interpreted with caution, especially estimated profits and costs.

7.3.2 Prices of cocaine and heroin as reported by dealers in the Slovenian sample

Table 15 shows the prices at which drugs were bought and sold by respondents in the Slovenian sample (the information is relevant for the period 2008-2012), according to the low quantity dealers in our sample. Due to the small number of high quantity dealers, we do not have information on the prices at which dealers bought and sold when larger amounts were traded.

⁴⁸ Median prices are also reported in some instances when the distribution is skewed and the mean value might not be the best way to accurately reflect the typical costs of dealers. At the same time, both estimated earnings and costs have to be interpreted with caution because dealers did not provide great detail regarding their profits or costs.

⁴⁹ Please note that these figures should be interpreted with caution. While the average price at which dealers bought per kg and the average price at which dealers sold per kg may not appear very different, we have limited information on this, and are not considering here any possible dilution of the drugs bought and/or sold.

⁵⁰ This figure is based on the information by three dealers who reported selling 30kg, 22kg and 10kg per month each, and thus the large earnings indicated in Table 14. What is more, one of these dealers did not offer any information about the costs associated with dealing. Additional information on costs from other dealers is also limited.



Table 15. Average amounts purchased and prices of heroin and cocaine (according to dealers in Slovenia).

	Bought per purchase (Kg)	Price at which bought per kg (in Euro)	Price at which bought per gram (in Euro)	Sale price per kg (in Euro)	Sale price per gram (in Euro)	Estimated earnings per month (in Euro)	Estimated costs per month (in Euro)
Cocaine	0.9kg (N=13)	27,571 (med 20,000) (N=7)	28 (N=7)	50,000 (N=1)	35 (N=7)	14,285 (N=7)	868 (N=11)
Heroin	1.9kg (N=20)	12,714 (N=14)	14 (N=8)	18,667 (N=6)	33 (N=11)	5350 (N=6)	666 (N=8)

Note: Due to the discrepancies in terms of the number of respondents reporting quantities and prices of bought and sold drugs (per gram/kg) the data here presented should be interpreted with caution, especially the estimated revenues and costs.

7.3.3 Prices of cocaine and heroin as reported by dealers in the German sample

Data relative to amounts purchased, prices and costs of cocaine and heroin dealing, as reported by the dealers in the German sample is presented in Table 16. Due to the small number of high quantity dealers, we do not have information on the prices at which dealers bought and sold when larger amounts were traded in Germany. In relation to cocaine, we identified three dealers and one courier.⁵¹ One of these dealers reported selling 200g, and in exchange would receive 80-100g for his own consumption, indicating not having any additional earnings on top of this; the second dealer told us he was selling cocaine in Brazil and thus the prices he referred to may not be relevant in the context of the German cocaine market. Therefore, in Table 16 we include the estimated profit per month and costs of the third dealer for illustrative purposes only. We were also not able to gather any information regarding the sale price of cocaine per month from these dealers.

Table 16. Average amounts purchased and prices of heroin and cocaine (according to dealers in Germany).

	Bought per purchase (gram/Kg)	Price at which bought per kg (in Euro)	Price at which bought per gram (in Euro)	Sale price per kg (in Euro)	Sale price per gram (in Euro)	Estimated earnings per month (in Euro)	Estimated costs per month (in Euro)
Cocaine (median)*	2.25kg (N=3)	30,000 (N=1)	52 (N=1)	n.a.	60 (N=1)	10,000 (N=1)	5000 (N=1)
Heroin	0.65kg (N=7)	14,037 (N=4)	18.75 (N=4)	37,500 (N=2)	47.00 (N=3)	39985 (med 30,000) (N=7)	1290 (N=4)

*Due to the small number and the very different type of dealers who reported selling cocaine as a main drug in the German sample (N=3), median values for prices are included in this table for cocaine dealers.

7.4 Operating costs

Previous qualitative research has noted that dealers may have a limited knowledge (or willingness to discuss) their operating costs (Matrix Knowledge Group, 2007). Similarly, dealers in our sample offered limited information in relation to this topic (Table 17), thus hampering the development of a more comprehensive and accurate understanding of dealers' costs. While most dealers from the Italian and Slovenian sample quantified at least some of their incurred costs, it should be noted that the level of detail of the information provided varied significantly among this group of respondents:

⁵¹ The courier reported receiving 7000€ for every 1kg of cocaine trafficked.



- Some respondents quantified only a part of their costs;
- Some respondents quantified their costs without providing a unit of measurement;
- Some respondents quantified their costs in relation to different units of measurement, i.e., costs per week/costs per month/costs per purchase/costs per activity.

Table 17. Information provided by dealers in relation to their operating costs.

	Number of dealers (Italian sample)	Number of dealers (Slovenian sample)	Number of dealers (German sample)
No information	24	7	3
Indicated having no costs	5	1	3
Indicated broad types of cost	16	9	10
Quantified at least some costs	27	27	3

Based on an analysis of the responses of dealers across the three samples, the research team has identified the following types of costs:

Table 18. Broad types of costs of drug dealing and examples.

Type of costs	Examples (mentioned by dealers across the three samples)
Staff	Payment of couriers, street dealers, “workers for mixing”, chemists, “drivers” and pilots, “front men”, other unspecified staff
Direct sales-related costs	Payment of packaging materials (foil, bags, etc.), other products used to mix/cut the drugs, rental of storage location, rental of “flat for mixing”, other apartments
Communication	Payment of phones and phone bills
Travel and transport	Payment of rental/purchase of vehicles to transport drugs/travel, public transport costs, fuel, postage, other unspecified costs
Accommodation and leisure	Payment of hotel bills, meals
Legal and administrative	Payment of lawyer services, car insurance, taxes
Corruption and crime	“Small gifts”, bribes, fake IDs, other unspecified costs

Additionally, a few dealers (N=7) seemed to include, in their consideration of operating costs, other costs which were not directly business-related. For example, dealers talked about costs related to “personal expenses” (I34, I66), “clothes” (I57, S30) “lifestyle” (I66, S29) and “luxury” (S10). One of the dealers commented that:

“When you work like this you don’t keep an eye on expenses. Since you make money illegally, you don’t really take care. You might need two full tanks of petrol a day because you are always on the road. Then you have your personal expenses. And I used coke, and it would make me do strange things – I would walk into a place and pay for everyone’s bill” (I66)



7.5 Discounting practices and reported constraints to price setting

While dealers may often seek to maximise profits by cutting the drugs,⁵² they are at the same time concerned with the quality of the product being sold – as this is perceived as a factor that could affect their reputation and thus their profits and position in the market (Coomber, 2003; Coomber & Maher, 2006; Matrix Knowledge Group, 2007; Grundetjern & Sandberg, 2012; Reuter & Haaga, 1989). Findings from this study, discussed elsewhere,⁵³ also support this idea. Other tactics dealers employ to maintain a relatively stable customer base and discussed in previous research include offering discounts, providing credit, ‘freebies’ or ‘extras’ to regular customers (Coomber, 2003; Coomber & Maher, 2006; Matrix Knowledge Group, 2007). For example, according to Matrix Knowledge Group (2007), “others [dealers] explained charging less to regular users as ‘loyalty bonuses’” (p. 37). Also Coomber (2003), relying on interviews with convicted drug dealers and opiate users recruited from treatment centres in London, found that the majority of the dealers in that study sample admitted providing free drugs, mostly “within existing and trustworthy relationships” (p. 950).

We asked interviewees whether they had used ‘freebies’ or discounts, particularly as an incentive to new clients. While most dealers in the Italian and Slovenian samples admitted providing discounts to customers, not specifying whether these were new or regular customers, in the German sample most dealers indicated not engaging in such practices. One quarter of the respondents in the Italian sample reported offering free drugs to new customers, and discounts to friends were also reported by dealers in the three samples, as illustrated in Table 19.

Table 19. Discounting practices as reported by dealers in our samples.⁵⁴

	% of Italian sample	% of Slovenian sample	% of German sample
Discount (in general)	48.6%	40.9%	10.5%
	(N=35)	(N=18)	(N=2)
Discount to friends only	4.2%	6.8%	26.3%
	(N=3)	(N=3)	(N=5)
No discount	12.5%	31.8%	36.7%
	(N=9)	(N=14)	(N=7)
Freebies to new customers	25%	6.8%	0%
	(N=18)	(N=3)	(N=0)
No information	9.7%	13.7%	26.3%
	(N=7)	(N=6)	(N=5)

While the issue was not systematically or extensively discussed by the interviewees, we have limited indications from dealers in our samples (in particular from the Italian sample) that dealers may coordinate prices at which drugs are sold to customers. For example, a few dealers acknowledged that they did not change the price of the drugs significantly, due to pressure from competitors:

⁵² For a discussion of this and other ‘rip-offs’ please see Jacques et al. (2014).

⁵³ Please see chapter 7.5 of Tzvetkova, M., Pardal, M. et al. (2014). *Drug dealers’ careers, behaviours and strategies – in their own words. A study of imprisoned drug dealers in Italy, Slovenia and Germany (ALICE RAP D10.2; RR-826-EC)*.

⁵⁴ Dealers were asked: “Would you use freebies or discounts or anything to get new clients?”. This table is based on our analysis of interviewees’ responses: while the question referred to freebies or discounts for new customers, dealers discussed also discounts in general or to friends only. A single dealer may have discussed several discounting practices, in which case his response was coded as ‘Discount (in general)’. When dealers reported only giving freebies to new customers, or discounts for friends only, their responses were coded separately to those specific categories of discounting practices.



“There is respect. In Turin the heroin market is managed by Moroccans. The only problem may occur when somebody reduces too much the prices” (I61)

“It’s not a good idea to lower the prices too much, otherwise you can’t make a profit. There are serious problems between competitors for all drugs” (I65)

“There’s no competition, there’s a cartel. Prices must never go below or above an agreed limit. If your prices are too low, you are asked why and generally get some help” (I38)

However, one dealer thought that such constraints to price setting were context-specific:

“No, because those things happen mainly in southern Italy. Now there’s a free market. You beat your competitors giving a good price/quality ratio” (I60)

It is however worth noting that given the significant proportion of low quantity dealers in our samples, this reported inability to set prices by a few dealers may be explained by their position in the market and should thus be interpreted with caution.

7.6 Dealers’ relationship with customers and the addicts among them

As mentioned in the previous section,⁵⁵ drug dealers’ relationship with customers tends to revolve around trust and reputation. Some dealers were willing to discuss some of the dynamics of that relationship, their impressions of customers in general, and of the addicts among them in particular. A number of dealers commented that while drug addicts are important customers and a valuable source of income, they are also seen as a nuisance – being described by several dealers as unreliable,⁵⁶ often tipping off the police and experiencing difficulties with payment (I61, I60, G99, I69, G93, G95, G97, I14, I50, I21, I15, I32, I33, I44, I45, I46, I37, I15, I57, S20, I15, I16, G102, S33, I41, I48, I31, I2, I7, S40, G109, I17, S40, I7, I2, I31, I66, S43, I18, I19, I29, I28, I25, I27). One of the dealers reflected on this apparent contradiction:

“Good customers because they bring money, but they can also be trouble, they are like a bugging device” (I18)

Another dealer emphasised the unreliability and fear of being denounced by addicts:

“About addicted people. Police offers 50 euro to some addicted person to call dealers and to buy drugs from him. Addicted person is ready to do anything for money” (S20)

One other interviewee seemed to sympathise with the addicts:

“I felt very uncomfortable. Every day I was facing people who were addicts and I felt sorry for them. I started to think about quitting” (S33)

⁵⁵ This is also explored by Tzvetkova, M., Pardal, M. et al. (2014). *Drug dealers’ careers, behaviours and strategies – in their own words. A study of imprisoned drug dealers in Italy, Slovenia and Germany (ALICE RAP D10.2; RR-826-EC)*.

⁵⁶ Our interviewees also reflected about some of these issues when discussing customers more broadly (I15, I23, I38, I9, I1, I11, I14, S10, I1, I23). As one interviewee put it: “If pushed, any customer can give you away” (I23).



Only three dealers (I62, I38, I20) across the three samples admitted treating addicts in a more negative way than they would other customers. One of these dealers acknowledged that he “treated them worse” (I20), and another indicated selling them lower quality drugs:

“You could give them worse quality stuff since they are always stoned. You can give them anything at all and they will get high on it” [addicts] (I38)

Another distinction made by several dealers related to the type of substance used by the customers. Some indicated a preference for cocaine users, who were perceived as less problematic (I23, I38, S45, I10, G100, G107, I36, I47, I70). The following are observations from our dealers as to the reasons for this distinction:

“Cocaine addicts are the easiest in the world, because they only have a psychological addiction. They are different” (I23)

“They usually sell heroin and if you become addicted from it, then it is a huge problem because you are addicted physically and mentally. It is not the same with cocaine. Cocaine is a drug for rich, successful people who need it for more energy.” (S45)

“Cocaine users are not difficult because they are middle-class people and cocaine is not really addictive” (I10)

7.7 How dealers spend their money

Another interesting aspect in relation to dealers’ profits is the investments made by dealers with their drug dealing profits. Prior research has found that these investments tend to be made in the countries of origin of the traffickers (or outside of the country where these profits have been generated, to help avoid detection), and often involve an investment in the legal economy, for instance in support of close family members (Zaitch 2002; Van Dun 2013; Paoli 2013). While this was not a central point of our interview, the research team asked dealers about how they invested their money. Several dealers, particularly within the Italian sample, volunteered useful information in relation to this issue.

Interestingly, while economic motivations (as discussed above) seemed to play an important role in dealers’ involvement in drug dealing, several dealers admitted spending their dealing profits on immediate consumer goods, in the “lifestyle” and in “having a good time” (I10, I15, I16, I20, I26, I28, I3, I38, I4, I40, I41, I42, I43, I44, I47, I49, I5, I57, I6, I8, I9, S33). This behaviour is not in line with one of the risk avoidance strategies discussed by dealers in our samples, which involved keeping a low profile.⁵⁷ For example two of these dealers told us:

“I would buy more stuff and spend it to have a good time (restaurants, bingo, cars, cabaret shows). I spent €3,000 a month” (I57)

“I spent a lot of money. I could have lot of it but I didn’t handle it in a responsible way” (S33)

Other dealers reported investing their profits in the purchase of residential property (I10, I13, I14, I27, I28, I37, I38, I41, I47, I5, I6, I9) and/or in other licit activities (I46, I14, I13), as explained by one of the dealers:

⁵⁷ Dealers’ risk management strategies are discussed in more detail in chapter 7.4 of Tzvetkova, M., Pardal, M. et al. (2014). *Drug dealers’ careers, behaviours and strategies – in their own words. A study of imprisoned drug dealers in Italy, Slovenia and Germany (ALICE RAP D10.2; RR-826-EC)*.



“Legal activities: shops, property, poker. The money had to circulate. Some was invested and some was invested in drugs” (I14)

Some dealers told us they would move the money earned in dealing to bank accounts abroad (I10, I38, I46, I6, I61) or into someone else’s account (S19). For example, a dealer from the Slovenian sample suggested that:

“All earned money should be transferred to the bank account of wife, parents” (S19)

A few other dealers told us they spent their money on holidays or trips (I3, I42, I44, I49) or supporting their families (I1, I17). One dealer suggested being cautious with regards to investments:

“You have to hide your money. Use a little at a time. No investments because they will seize everything” (I23)

7.8 Other profitable businesses according to drug dealers

The research team enquired about the types of products, other than drugs, that dealers would recommend, how much profit could be made, and why they would recommend involvement with those products and businesses.⁵⁸ 59.7% of all Italian respondents, 11.4% of all Slovenian respondents and 58% of the dealers in Germany gave suggestions regarding businesses and products they viewed as profitable (see Table 20).

With regards to the Italian sample, trafficking and sale of firearms was mentioned as a potentially profitable business by more than one third of all dealers who responded to this question. Several Italian dealers mentioned that firearms were transported from Eastern Europe, in particular from Albania and the countries of former Yugoslavia (I15, I39, I51, I63, I64). Among dealers in Italy, involvement with prostitution was seen as profitable by 13 (22% of all dealers) who responded. Ten talked about prostitution in general and three mentioned human trafficking in particular. One Italian dealer explained that even when prostitution is legal (as in the Netherlands), *“there is always an illegal circuit with many girls who work illegally” (I24)*. Differently, one other dealer from that sample disapproved of profiting from prostitution: *“No prostitution, women and children must be left alone” (I51)*.

Counterfeit currency, fraud, robberies, trafficking/sale of diamonds and the sale of counterfeit goods were also suggested as profitable trades predominantly by the Italian dealers. It is also worth noting that 72.7% of all dealers in Germany who responded to this question suggested that trafficking in medical drugs (including painkillers, steroids, and substances such as Subutex and methadone) was profitable. Dealing in medicines was not mentioned by Italian or Slovenian dealers.

Our interviewees did not provide much information on how these other potentially profitable businesses compared with drug dealing. One Italian dealer compared drugs and firearms trafficking and told us that with firearms *“you can make money but not as much as with drugs” (I39)* and another dealer commented that *“you’d have to traffic shiploads of firearms to make money” (I40)*. A Slovenian dealer also suggested that selling firearms was not a good business anymore (S2). Finally, some legal businesses were mentioned by two dealers, for example, construction, waste disposal and contracts for public services (I17, I54), but dealers thought that these areas were reserved *“for big players, who have agreements with the Government” (I17, I54)*.

⁵⁸ The dealers in our study were also asked about what advice they would give to an aspiring young guy who wanted to sell illegal things.



Table 20. Other profitable products and businesses as suggested by dealers in our samples.

Suggested products and businesses ⁵⁹	Number of dealers			
	Italy (N=43/72)	Slovenia (N=5/44)	Germany (N=11/19)	Total (N=59)
Trafficking and sale of firearms	17	2	2	21
Prostitution and human trafficking	9	2	2	13
Smuggling people	2	1	-	3
Trafficking and sale of medical drugs (incl. subutex, methadone, steroids and painkillers)	-	-	8	8
Counterfeit money and goods	8	-	-	8
Trafficking/sale of diamonds	4	-	1	5
Public procurement (using bribery)	2	-	-	2
Smuggling cigarettes	1	-	1	2
Waste disposal	1	-	-	1
Construction	1	-	-	1
Gambling	1	-	-	1
Illegal internet sales	1	-	-	1
Dutch tulip market	1	-	-	1
Sale of stolen car parts/cars	1	-	1	2
Cash transportation	1	-	-	1
Planting cannabis	-	1	-	1

8. Market level demarcation in the Italian sample

Within a single domestic drug market dealers occupy several levels of operation, each performing different functions. It is useful to examine variation across these operational levels to better understand how illicit drugs pass from importer to user. Identifying patterns within these levels of operation can offer insight into how drug businesses operate and how dealers earn a profit. In this chapter we focus on the Italian cocaine data, the most robust subset of the sample, and discuss market level demarcation in relation to that particular sample.⁶⁰

Here we use as a proxy for the operational level of a drug trafficker the quantity of drugs bought or sold in a single transaction – as opposed to the quantity sold per month, as in the previous chapter.⁶¹ Using the interview data and research on the operations of drug dealers, we defined quantity cutoffs that denote a dealer's operational level within the drug market. *Multi-kilo traffickers* are defined as those who report purchasing more than one kilogram of cocaine per transaction. Most traffickers at this level have an international component in their operations, either purchasing drugs outside Italy or receiving shipments directly from other organizations that are based abroad. *Retailers* are defined as those who sell cocaine to end users. Given that typical cocaine users purchase one gram or less for personal use, we operationalise this definition of retailers as those who make sales at or below a one gram threshold. Operating between traffickers and retailers are a number of wholesalers, who move drugs from multi-kilo traffickers to retailers. We segment wholesalers into two categories:

⁵⁹ Dealers mentioned also robberies (N=4 in the Italian sample), fraud (N=4 in the Italian sample), hacking bank accounts (N=1 in the Italian sample), tax evasion (N=1 in the Italian sample) and faking invoices (N=1 in the Italian sample). One other dealer from the Italian sample talked about the transfer of capital. In addition, dealers referred to stealing articulated lorries (N=1 in the Italian sample), and transporting drugs as a courier (N=1 in the Italian sample).

⁶⁰ Please see chapter 4.2 for further information about the approach to drug transaction cycle analysis.

⁶¹ Please note that in this chapter market level definitions are based on quantity *per transaction*. In chapters 7.2 and 7.3, when presenting data from all three countries, we used a different criterion for market level classification. In those chapters, we define high and low quantity dealers based on the quantity sold *per month*.



high-level and low-level. *High-level wholesalers* are defined as those who purchase between 100 grams and one kilogram of cocaine. *Low-level Wholesalers* as those who purchased less than 100 grams and sell more than a gram at a time, a quantity too large for the typical user. These market level cutoffs are clarified in the table below.

Table 21. Market level demarcation.

Market level	Quantity cutoffs (per transaction)
Multi-kilo trafficker	Purchase more than 1 kilogram
High-level wholesaler	Purchase 100 grams to 1 kilogram
Low-level wholesaler	Purchase less than 100 grams and sell more than 1 gram
Retail-level dealer	Sell 1 gram or less

8.1 Characteristics of dealers at different market levels

When Italian cocaine dealers⁶² were categorised into these four market levels, differences emerged among them in terms of demographic characteristics and in terms of business strategies and behaviours, as illustrated in Table 22. For example, multi-kilo traffickers expressed less willingness to associate with addicts or to use the drugs they sell than do dealers at lower market levels, and retailers were the most likely to carry a gun when conducting business. The data also suggested that dealers at each market level vary in their reliance on dealing as a main source of income.

Table 22. Cocaine dealers' characteristics by market level.

	Multi-kilo trafficker (n=7)	High-level wholesaler (n=8)	Low-level wholesaler (n=3)	Retail-level dealer (n=6)
Italian	3 out of 7 (43%)	5 out of 8 (63%)	2 out of 3 (67%)	4 out of 6 (67%)
Current age	25 to 71	25 to 68	25 to 45	25 to 71
Age at the start of dealing	17 to 46	16 to 63	17 to 28	18 to 60
Dealing as a main source of income	3 out of 5 (60%)	4 out of 8 (50%)	3 out of 3 (100%)	4 out of 5 (80%)
Associate with addicts	0 out of 6 (0%)	3 out of 8 (38%)	2 out of 3 (67%)	5 out of 6 (83%)
Use drugs	2 out of 6 (33%)	7 out of 8 (88%)	3 out of 3 (100%)	5 out of 6 (83%)
Carry a gun	2 out of 6 (33%)	3 out of 8 (38%)	0 out of 3 (0%)	5 out of 6 (83%)

There are also differences in their business operating practices, such as typical amounts purchased, and what was paid for that purchase, and typical lot sizes for sales, and what price they charged, as well as related quantities – such as whether those buying and selling cycles happened daily, weekly, or monthly and the dealer's 'branching factor'. The branching factor is the number of sales a dealer makes per purchase from the higher-level supplier (i.e. sales per cycle) (Caulkins, 1997). The name comes from envisioning the drug distribution network as a tree, with its root at the ultimate source and dealers within the distribution network being forks in the tree where a main branch splits into many smaller branches.

The branching factor is often the same as the number of customers to whom the dealer sells. For example, if a dealer bought 1 kilogram, broke that kilogram into 10 packets of 100 grams each, and

⁶² As described in more detail in chapter 4.2, for the market levels and transaction cycles analysis we focused on cocaine only.



sold one packet each to 10 different people, then both the branching factor and the number of customers are both 10. However, it is possible for one customer to make two separate buys within a given cycle. For example, if the dealer obtains a kilogram each Sunday and one customer buys 100 grams on Monday and another 100 grams on Thursday, then that one customer contributes two not one to the branching factor. Conversely, a dealer could have customers who only buy every second or third cycle. In that case, the number of customers could be larger than the branching factor. Dealers were not asked directly how many customers they sold to, but we can compute the branching factor by dividing the quantity purchased by the quantity sold per transaction (after adjusting for any cutting).

The next four tables (Tables 23-26) report those quantities by market level. Even within a single market level, these quantities varied widely. For example, dealers who bought multiple kilograms at a time sold those drugs in lot sizes as small as 60 grams and as large as multiple kilograms (Table 14). For that reason, we represent the central tendency with the median, not the mean, to prevent one outlier from having undue influence, and also report the ranges of values reported.

Table 23. Operational characteristics of multi-kilo cocaine traffickers.

Multi-kilo trafficker (n= 7)		
	Median	Range
Cycle frequency per month	2 times per month	0.33 to 4 times per month
Quantity purchased per transaction	4 kilograms	3 to 50 kilograms
Monthly quantity purchased*	8 kilograms	1 to 200 kilograms
Purchase price	€30,000 per kilogram	€2,400 to 48,000 per kg
Quantity sold	1 kilogram	60 grams to 7.5 kilograms
Sale price	€47,000 per kilogram	€37,000 to 100,000 per kg
Branching factor	5 sales per package	1 to 50 sales per package

*For monthly quantity purchased, we report the product of the medians in the two preceding rows (quantity purchased per transaction times number of purchases per month).

Table 24. Operational characteristics of high-level cocaine wholesalers.

High-level wholesaler (n=8)		
	Median	Range
Cycle frequency per month	2 times per month	0.4 to 15 times per month
Quantity purchased per transaction	1 kilogram	0.25 to 1 kilogram
Monthly quantity purchased*	2 kilogram	200 grams to 15 kilograms
Purchase Price	€37,000 per kg	€30,000 to 52,000 per kg
Quantity Sold	100 grams	8 grams to 1 kilogram
Sale Price	€52,000 per kg	€37,000 to 100,000 per kg
Branching Factor	10 sales per package	1 to 67 sales per package



*For monthly quantity purchased, we report the product of the medians in the two preceding rows (quantity purchased per transaction times number of purchases per month).

Table 25. Operational characteristics of low-level cocaine wholesalers.

Low-level wholesalers (n=3)		
	Median	Range
Cycle frequency per month	4 times per month	2 to 4 times per month
Quantity purchased per transaction	75 grams	5 to 100 grams
Monthly quantity purchased*	300 grams	20 to 300 grams
Purchase Price	€48,000 per kg	€45,000 to 58,000 per kg
Quantity Sold	15 grams	2.5 to 20 grams
Sale Price	€70,000 per kg	€55-70,000 per kg
Branching Factor	5 sales per package	2 to 5 sales per package

*For monthly quantity purchased, we report the product of the medians in the two preceding rows (quantity purchased per transaction times number of purchases per month).

Table 26. Operational characteristics of retail-level cocaine dealers.

Retail-level dealers (n=6)		
	Median	Range
Cycle frequency per month	15 times per month	4 to 30 times per month
Quantity purchased per transaction	50 grams	2.25 to 100 grams
Monthly quantity purchased*	750 grams	67.5 to 300 grams
Purchase Price	€45,000 per kg	€20,000 to 52,000 per kg
Quantity Sold	0.8 grams	0.5 to 1 grams
Sale Price	€82,000 per kg	€75,000 to 170,000 per kg
Branching Factor	55 sales per package	2 to 200 sales per package

*For monthly quantity purchased, we report the product of the medians in the two preceding rows (quantity purchased per transaction times number of purchases per month).

In addition to the tables of statistics, we developed vignettes describing a prototypical dealer from our sample, for each market level. The vignettes do not describe any one interviewee; rather they are constructed as a composite representative of what we think of as a “typical” dealer at each level.⁶³

⁶³ In constructing these profiles we selected the measures of central tendency that appeared most appropriate for each dealer attribute and rounded the numbers so that the figures are memorable and do not connote a level of greater precision that exists with the small data set.



Textbox 1. Prototypical incarcerated multi-kilo cocaine trafficker.

The prototypical multi-kilo trafficker is a 40-year-old Italian man who is serving seven years in prison for drug crimes. He began trafficking around age 28 when he became acquainted with drug traffickers. In his thirties, he rose to his current position as a multi-kilo trafficker.

In a typical sales cycle, the prototypical multi-kilo trafficker purchases 4 kilograms of cocaine powder from importers at a price of around 30,000 euros per kilogram and sells one kilogram packages to four customers at a price of about 40,000 euros per kilogram. He considers drug trafficking to be his main source of income, earning about 45,000 euros monthly by working at it for approximately two weeks out of every month. He reports a number of costs associated with moving drugs and communicating with sellers and buyers, including the cost of hiring couriers, renting apartments for cocaine and cash storage, renting cars to transport cocaine, and salaries for employees. He does not use drugs or alcohol and does not associate with drug addicts or carry a gun while working.⁶⁴

Textbox 2. Prototypical incarcerated high-level cocaine wholesaler.

The prototypical high-level wholesaler is an Italian man in his mid-thirties who is serving six years in prison for drug crimes. He began trafficking at age 25 and by 32 had risen to his current level within the cocaine market. He does not use alcohol but does report using drugs. He does not do business with drug addicts or carry a gun.

In a typical sales cycle, the prototypical high-level wholesaler purchases 1 kilogram of cocaine powder at a price of 37,000 euros per kilogram, divides that into 10 packages of 100 grams, which are each sold for about 53,000 euros, yielding an approximately 50% mark-up. He considers illicit drug sales to be his main source of income and works at it nearly every day of the week. To transport and sell packages of cocaine, he employs dealers and hires couriers, often at a cost of 2,000 euros per trip. In all, he reports an income of 25,000 euros per month.⁶⁵

Textbox 3. Prototypical incarcerated low-level cocaine wholesaler.

The prototypical low-level wholesaler is a 35-year-old Italian man who is serving a six year sentence. He began dealing drugs before he was 30, and it is now his main source of income. He works selling cocaine as his full time source of income, every day of the week. His costs are minimal, limited to things like packing materials and mobile phones which are not very expensive. As a result, he is able to pay himself between 20-25 euros per gram sold, for an income of approximately 4000 euros per month. He uses drugs but does not like to sell small quantities to addicts. He does not carry a gun when conducting business.

He purchases about 100 grams of cocaine two times per month and pays 50 euros per gram. This dealer is categorized primarily by the nature of his customers. He sells roughly 15 grams at a time for 70 euros per gram, rather than selling in the usual retail quantities. He does not report cutting cocaine before selling it.⁶⁶

⁶⁴ Composite based on interview I4, I10, I24, I27, I36, I51, and I67.

⁶⁵ Composite based on interview I5, I12, I18, I35, I43, I48, I55, and I63.

⁶⁶ Composite based on interviews I3, I20, and I44.



Textbox 4. Prototypical incarcerated retail-level cocaine dealer.

The prototypical retailer is a 50-year-old, white, Italian man serving a five year sentence. Dealing drugs was his main source of income and he works every day to earn his living. He associates with addicts and uses drugs himself; in fact selling drugs supports his own drug habit. His costs are minimal and often include only mobile phones and the cost of packaging.

This retailer sells directly to users, usually no more than one gram at a time. Some retailers also buy in relatively small quantities, e.g., purchasing approximately 2.5 grams each cycle for 50 euros per gram. Others buy in larger lots, selling as many as 50 or even 100 packages in each transaction cycle.

These higher-volume retailers can produce a considerable income. For example, a dealer may buy up to 100 grams at a time, four times a month, paying just 50 euros per gram and reselling retail quantities at approximately 80 - 100 euros per gram, for an income net of the cost of goods sold that can reach 20,000 euros per month.⁶⁷

8.2 Connections between market levels

While the discussion above focused on differences between market levels, we now shift the emphasis to the connections among market levels.

Figure 3 situates each dealer - or more specifically, each dealing cycle for which we have complete data, drawing on the quantities purchased (x-axis) and the quantities sold (y-axis). Each plotting point corresponds to one of the 27 cycles we analyzed. However, due to the wide range of quantities purchased (reaching 50kgs), the wholesale and retail dealers' cycles appear condensed near the origin.

Figure 3. Quantity analysis by market levels.



One way to avoid that issue is to log the quantities purchased and the quantities sold and then plot the logged quantities.⁶⁸ Figure 4 depicts the results of this conversion. The figure also presents

⁶⁷ Composite based on Interviews I17, I19, I22, I23, I49, and I70.

⁶⁸ For example, a dealing cycle that involved purchasing 5 kilograms would have its dot appear with a horizontal coordinate of 1.609 since $\ln(5) = 1.609$. The benefit of this conversion is that the relationship between the data remains the same, but the dots are spread out spatially in a manner that makes those relationships more visually interpretable within limited space.

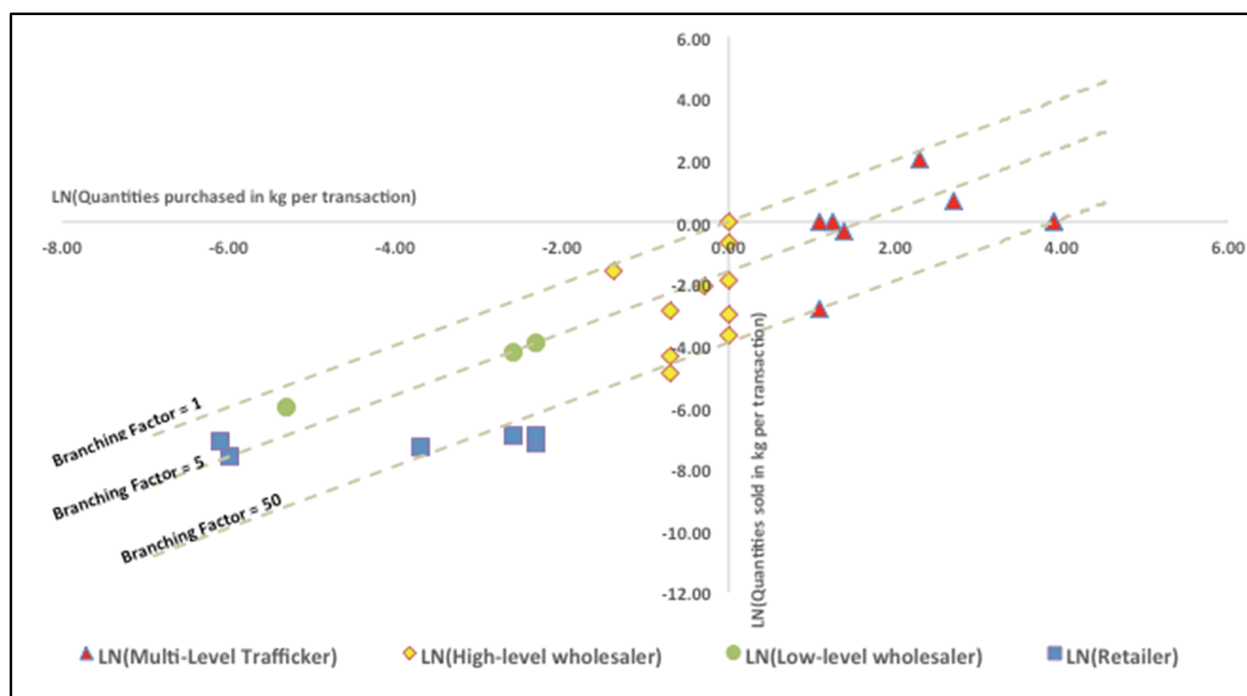


dashed lines representing different branching factors,⁶⁹ which will be discussed in more detail in the next paragraphs.

On Figure 4, the triangles depicting multi-kilo trafficking are all alone on the right hand side because, by definition, those are the cycles with the largest purchase quantities. Likewise, the squares to the lower left are all below any of the other dots because we have defined retailers as those who sold in lots of one gram or smaller. All the other dots are wholesale dealers, but the subdivision into high- and low-level wholesale dealers (diamonds and circles, respectively) seems useful. The high-level wholesale dealers (diamonds) look like smaller versions of the multi-kilogram traffickers. We know from above that they differ in other ways; for example, the multi-kilo traffickers are more likely to source internationally, and high-level wholesalers to source domestically. But in terms of quantities bought and sold, they are only a half-step away. By contrast, the three low-level wholesale dealers (circles) look quite a bit like the retailers. In particular, the range of quantities purchased overlaps substantially with that of the retailers, as is seen by the green dots being above the blue squares (larger sale sizes), but not appreciably further to the right (similar quantities being purchased).

Relative to other datasets from other countries (Caulkins, 1997, 2005; Caulkins et al., 2009; Caulkins et al., 1999; Johnson et al., 1991; Natarajan & Hough, 2000) the surprise is not so much that the green circles are where they are, but rather that there are squares for retail sellers so far to the right. In particular, the rightmost two of the six retail cycles involve purchases of 75 and 100 grams per transaction. If one buys 100 grams and sells in lots sizes of a gram or less, that implies making a very large number of sales per cycle. Relative to other markets that have been studied (Caulkins, 1997, 2005; Caulkins et al., 2009; Matrix Knowledge Group, 2007), these two dealers seem to be “skipping a step”; they are retailers who buy directly in fairly large quantities, rather than purchasing from someone else who buys in those quantities.

Figure 4. Quantity and branching factor analysis using log values.



⁶⁹ Branching factors = quantity purchased/quantity sold. This is an aid in analysing the number of customers a given dealer will have over the course of his drug cycle.



The dashed lines indicate combinations of purchase and sales sizes that correspond to a particular branching factor. As mentioned earlier, the branching factor corresponds to the number of sales a dealer makes per purchase from the higher-level supplier (i.e. sales per cycle). It is calculated as quantity purchased divided by quantity sold per transaction after adjusting for cutting, if any. For example, a dealer with a branching factor of 1 would be a broker who sells the entire lot in a single transaction, perhaps arbitraging differences in price between different locations. Likewise, someone who bought a kilogram and sold five 200-gram packets would have a branching factor of 5.

The three dashed lines on Figure 4 correspond to branching factors of 1, 5, and 50.⁷⁰ The wholesaler and trafficker level dealers are typically expected to have low branching factors. Given that at those levels dealers work with larger quantities, they do not need to make a very large number of transactions (which could increase the risk of exposure and being caught) in order to make a lot of money per selling cycle. Dealers at retail and low-level wholesale are expected to sell to multiple buyers and hence, to have higher branching factors.

What is surprising in our analysis is that there appear to be quite a few cycles that involve large branching factors of 50 or higher, including for some high multi-kilogram traffickers and high-level wholesalers. If one thinks of a typical dealer as selling down one order of magnitude by buying kilograms and selling hundreds of grams or buying hundreds of grams and selling tens of grams, then anyone whose branching factor is closer to 100 than to 10 (in log terms), might be thought of as someone who is skipping a market level.

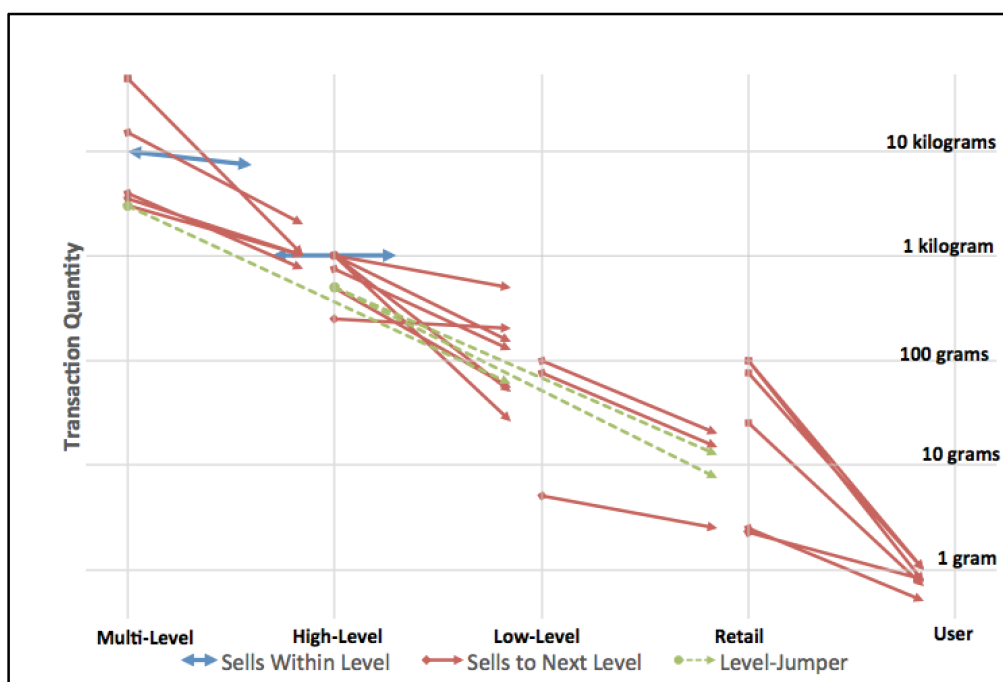
Figure 5 provides additional information on the interactions between different market levels. Each of the 27 line segments represents a transaction cycle in the sample, with the height of two end points indicating the (logged) purchase quantity and the (logged) sale quantity, respectively. The horizontal coordinates indicate the market level, from multi-kilogram trafficking down through retailing and the additional level of “User”. For the sake of clarity, segments stop just short of the next market level. There were two cycles whose branching factors were so small that they remained entirely within one market level.⁷¹

⁷⁰ Therefore, the region between the top and the second line corresponds to branching factors between 1 and 5, and the region between the 2nd and the bottom dashed lines corresponds to branching factors between 5 and 50.

⁷¹ These are depicted with double-headed blue arrows. E.g., the first one corresponds to a dealer who reported buying 10 kilograms and selling 7.5 kilograms; the second corresponds to a broker who bought a kilogram for 37,000 euros and sold that entire kilogram in one sale for 42,000 euros.



Figure 5. Transactions between market levels.



Most respondents (22 out of 27) buy at one level and sell the drugs in smaller package sizes to multiple customers at the next lowest market level.⁷² Three dealers exhibit a level-skipping practice, in which they cut out the middleman by reaching further down the distribution chain. The result is that they have a larger branching factor than other dealers who buy similar quantities.

9. Analysis of drug transaction ‘cycles’ in the Italian sample

We next explore the profit potential at each level of the drug market, drawing on those in the Italian sample who reported being involved in cocaine dealing.

9.1 Sale price and purchase price by market level

An understanding of the distribution of prices at each market level can provide insights into the mark-ups at each level of the trade and the overall net revenues at each level. The columns in Figure 6 represent the spread of data within each market layer.^{73 74} The distribution of purchase prices is depicted by the chart on the left and the distribution of sales prices is depicted by the chart on the right.

⁷² Please note that some retailers employ ‘runners’ to do the street dealing for them and pay the runners a certain amount of money per unit sold (piece rate compensation); the runners never own the drugs. This may help explain the larger branching factors for some retailers.

⁷³ There are only three drug transaction cycles for low-level wholesalers, which is not sufficient to depict their distribution with a box and whisker plot.

⁷⁴ The central box represents the inter-quartile ranges of the data spread, or where the middle half of the data lie – meaning those with values between the first and third quartiles. The demarcation within the central box represents the median of the data within each column, and the lines exterior to the central box (the “whiskers”) show the outer-quartile ranges or the 0-25% and 75-100% range of the data.



Figure 6. Relationship between price and market level.

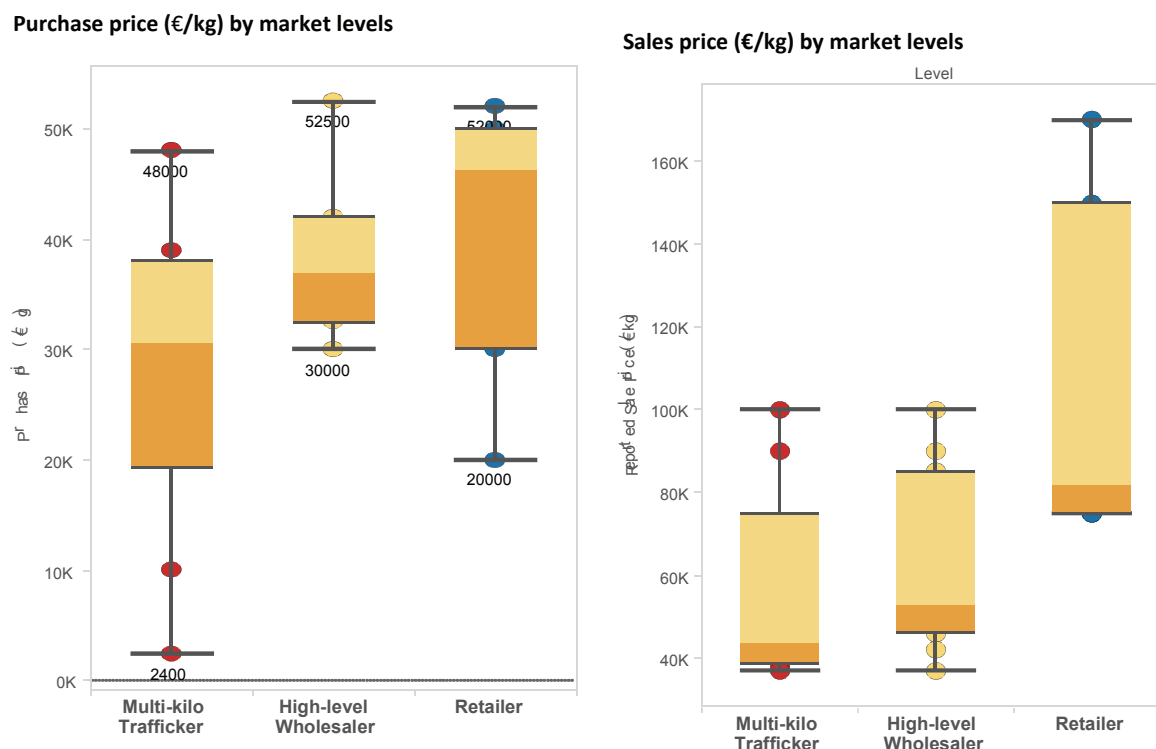


Figure 6 shows that the distribution of purchase prices at the multi-kilo trafficker level is wide and skewed to the left. This is due to the presence of outliers such as a trafficker who purchased in Bolivia at a much lower price than is available in Italy. The median price at the multi-kilo trafficker level is 30,500 euros per kilogram. The median purchase price for high-level wholesalers rises to 37,000 euros per kilogram and for retailers to 46,250 euros per kilogram.

The sale prices at multi-kilo trafficker and high-level wholesaler span the same range from 37,000 to 100,000 per kilogram, but that is mere co-incidence. The distribution of prices at multi-level trafficker is skewed to the right and its central tendency (e.g., median) is lower than for the wholesalers, as one would expect. Indeed, the median sale prices increases from level to level in line with expectations. The sales price distribution for retailers is heavily skewed to the right due to two retailers who mentioned selling 0.5-1 gram quantities at sale prices of 150,000-170,000 euros per kilogram. This is significantly higher than the median sale price of approximately 80,000-85,000 euros per kilogram at retailer level.

9.2 Price mark-up by market level

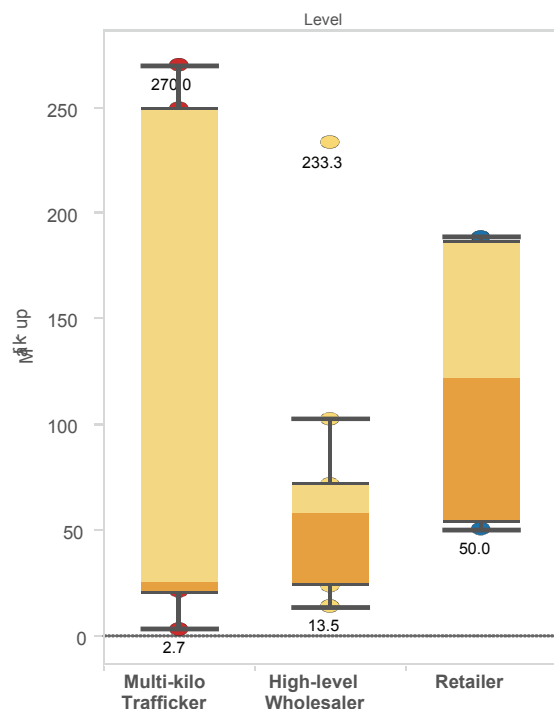
The above understanding of purchase and sale prices supports an analysis of potential mark-ups on transactions at each level. The mark-up is computed as:

$$\text{Mark_up (in \%)} = \frac{(\text{Sale Price per kg} - \text{Purchase Price per kg})}{\text{Purchase Price per kg}}$$

This calculation considers only the cost of goods sold (COGS) and ignores other costs incurred by the dealers. As discussed above, data on other costs were spotty but tended to be relatively insignificant compared to the COGS, except for those involved in international transport. Purchase price appears to be the single major cost component impacting the mark-ups. Figure 7 shows the mark-ups at each level.

Figure 7. Relationship between market levels and price mark-ups.

Mark-ups (in %) by level



The median mark-up at the multi-kilo trafficker level is a relatively modest 26%, although that median falls within a very wide range from 3% to almost 300% mark-up.⁷⁵ The median mark-up at high-level wholesalers⁷⁶ is 57%. Ignoring the outliers, this mark-up appears to be in line with the risk levels associated with selling within the country at smaller quantities. The median mark-up at the retailer level is 121%. As indicated earlier, there are six retail cycles: two involving the purchase of modest quantities, two involving the purchase of surprisingly large quantities, and another two who reported buying quantities that were quite substantial though not quite as large. Hence, the median mark-up is attributed to someone with a rather large branching factor and this particular parameter is sensitive to the particulars of the data examined here.⁷⁷

9.3 Net revenue per month

Mark-ups are an indication of revenue net of COGS on a single cycle, but net revenues per month are also influenced by the frequency with which a dealer conducts his cycle. Some dealers, particularly at lower market levels, repeat their cycles daily or near daily; others conduct only one cycle per month.

Figure 8 compares the cycle frequency (i.e., number of packages of cocaine the dealer purchases each month) across market levels. The median frequency of purchase increases as one moves down the distribution chain, with multi-kilo traffickers purchasing only once per month, high-level wholesalers purchasing twice per month, low-level wholesalers purchasing once each week, and retail-level dealers purchasing approximately every other day. Lower level traffickers tend to

⁷⁵ We are sceptical that extremes of this range reflect typical circumstances. For example, the unusually high mark-ups include a dealer who purchased in Bolivia.

⁷⁶ The low-level wholesalers are left out of the analysis since there are only three drug transaction cycles, which is not sufficient to comment on the median mark-ups.

⁷⁷ As mentioned earlier in the report (for example, please see chapter 4), this should not be viewed as necessarily representative of Italian dealers generally.



purchase smaller packages of cocaine, resell them quickly, and return to a dealer for additional supply.

Figure 8. Median cocaine purchase frequency per month, by market level.

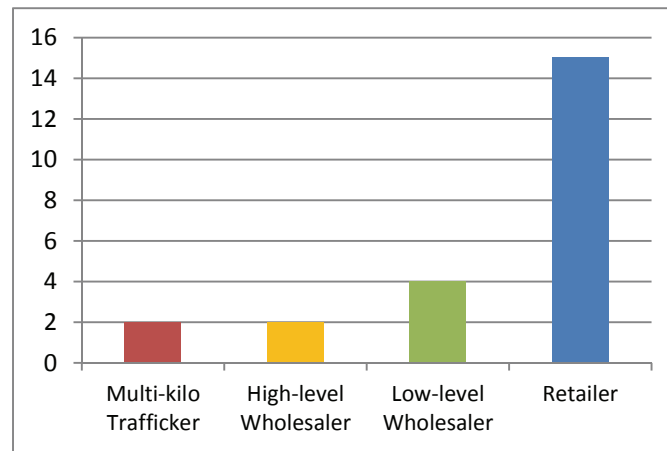


Figure 9 combines this data with the mark-up data to describe the distribution of the (log of) monthly net revenue within each market level, and how revenue varies across levels.⁷⁸ Net revenue per month is computed as:

$$\text{Revenue per month in 1000 euros} = ((\text{Quantity Sold} \times \text{Sale Price} \times \text{Branching Factor} - \text{Quantity Purchased} \times \text{Purchase Price}) \times \text{Cycle Frequency}) / 1000$$

The cycle frequency corresponds to the number of cycles completed per month, and the branching factor represents sales per cycle.

Figure 9. Net revenue per month by market level using log values.

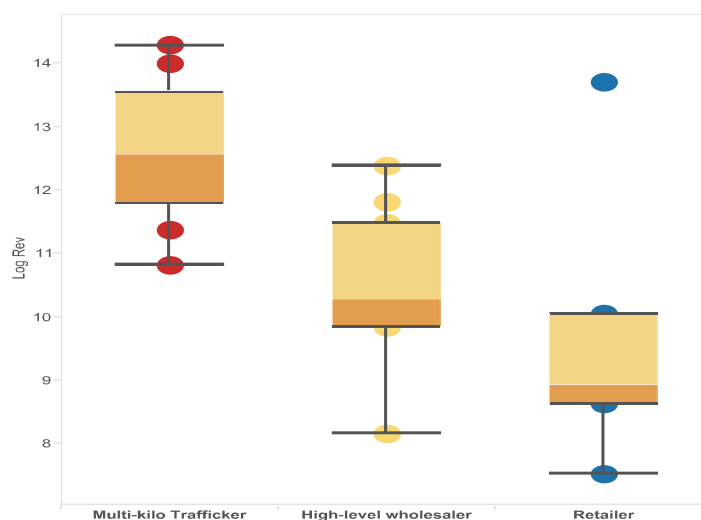


Figure 9 shows that position in the distribution chain influences dealers' revenues in a significant way.⁷⁹ Despite the higher cycle frequency and higher mark-ups for retailers in percentage terms,

⁷⁸ One extreme case is left out from the analysis with revenue per month up to €1,600,000. The data point is based on a second-hand description of an imprisoned dealer. Low-level wholesale dealers are left out of this analysis because there were only three of them.



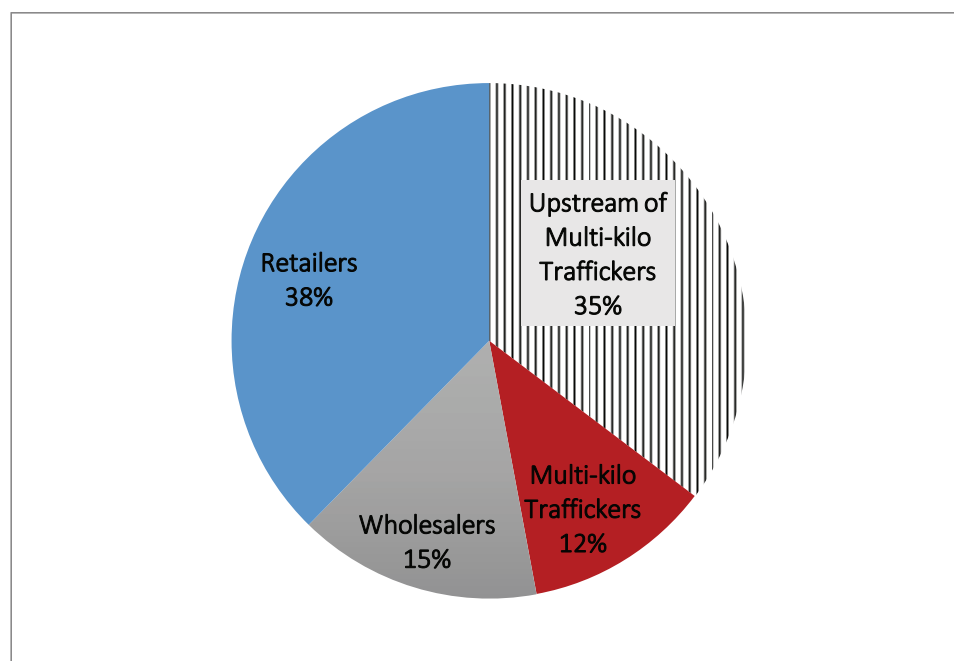
higher-level dealers still make much more money per month by dealing in large quantities. Based on the Italian cocaine sample, median net revenue per month for multi-kilo traffickers, high-level wholesalers and retailers are 250,000 euros, 30,000 euros, and 7,500 euros, respectively. In other words, as one moves up a market level, revenue can increase fourfold to eightfold.

9.4 Share of total revenue by market level

Based on the data presented in section 8.1, we can provide a simplified model of revenues in and out of each market level. This allows us to describe what proportion of the money users spend purchasing drugs is retained at each level. This description is of course specific to this particular set of prices, but its broad outlines – albeit not specific proportions – may hold more generally.

We know from section 8.1 that a typical price paid by the user might be €85 per gram. That in turn becomes revenue for the retailer. If the retailer purchased this gram at a price of €53 per gram from a wholesaler, he retains €32 per gram, which is 38% of the amount the user spent. Likewise, if the wholesaler purchased this gram (in bulk) at a price of €40 per gram from a multi-kilogram trafficker, then the wholesaler retains €13 per gram, which represents 15% of the €85 the user spent. The multi-kilogram trafficker in turn may have purchased at a price €30 per gram. If so, then he retains €10, or 12% of the distribution system's gross revenue. The €30 that the multi-kilogram trafficker paid for this gram goes to a category of dealer that our sample dataset does not represent - 'upstream of multi-kilogram trafficker'. These are the people from whom the multi-kilogram trafficker purchases. Figure 10 depicts this allocation of gross revenue across market players in this vignette.

Figure 10. Gross revenue share by market level.



The specific numerical proportions in Figure 10 reflect just one typical sequence of transactions that cocaine may take as it moves down to the end user. As we are not drawing on a representative sample, one does not know how the proportions in Figure 10 compare to those for the aggregate

⁷⁹ The outlier in figure 9 represents the dealer who reported 'cutting' practice that doubles the quantity of cocaine he bought and dramatically increases his monthly revenue. Drug 'cutting' or dilution is reported in three out of twenty-seven cycles represented here.



market.⁸⁰ Nevertheless, the general character of Figure 9 is robust over a fairly wide range of prices. In particular, even though a single high-level dealer enjoys a far greater income than does an individual retailer, high-level dealers collectively retain a smaller proportion of the distribution system's gross revenue than do retailers as a sector. This is because there are so many more retailers than higher-level dealers and traffickers.

9.5 Relationship between Market Price and Transaction Size

Caulkins and Padman (1993) established a predictive model for the relationship between the drug transaction quantities and their unit prices. This relationship, known as a quantity discount, finds that higher-level drug dealers pay lower per unit prices for their drugs than do lower level dealers. In particular, Caulkins and Padman (1993) contend that the quantity discount phenomenon can be described fairly well using the following power law in which Q measures transaction size and P is defined as the unit price. The coefficient β is a measure of the quantity discount.

$$P = \alpha Q^{\beta}$$

Taking the natural log on both sides of the equation yields a simple linear relationship between $\ln(\text{Price per kg or } P)$ and $\ln(\text{Transaction Size or } Q)$:

$$\ln(P) = \beta \times \ln(Q)$$

Figure 11. Relationship between transaction size and price.

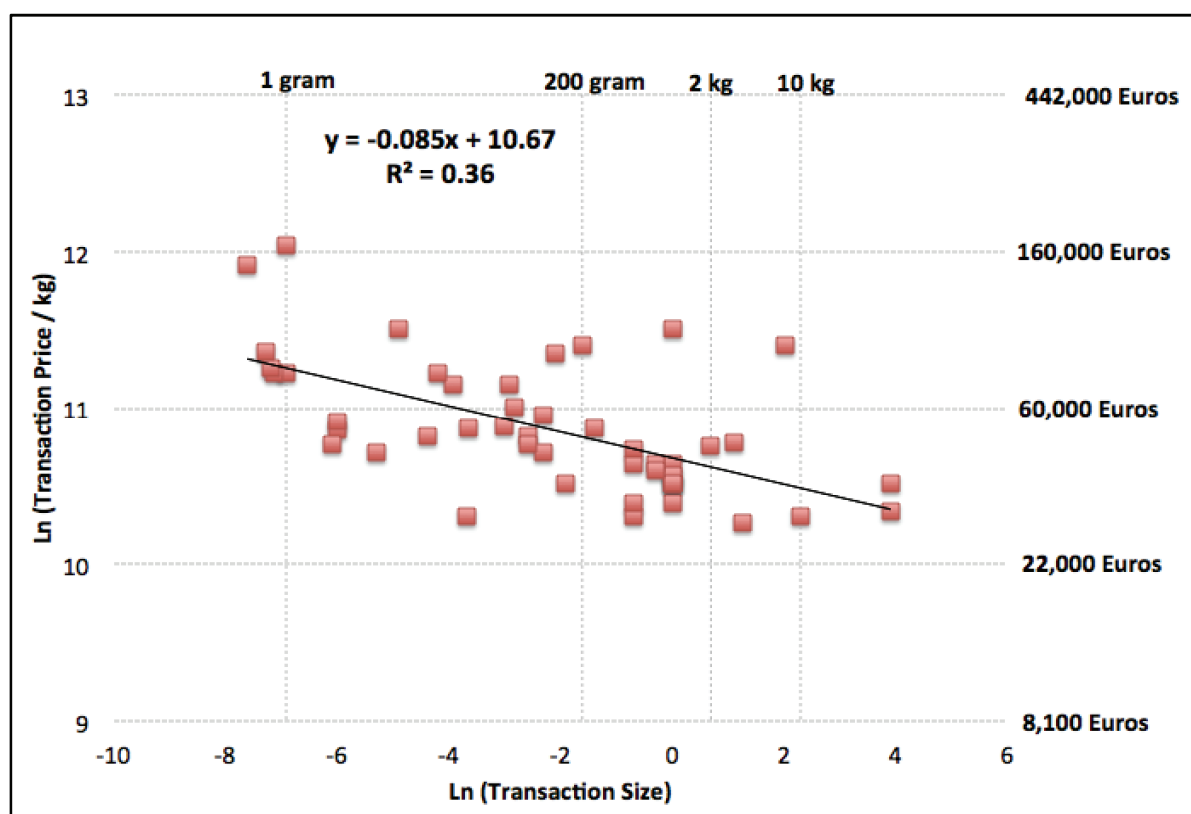


Figure 11 depicts this quantity-price relationship on a log-log scale for all the domestic transactions in the Italian cocaine cycle sample. Despite limitations in the data, the price-quantity model yields a

⁸⁰ In fact, even the number of wedges could vary. When a retailer buys from a low-level wholesaler who buys from a high-level wholesaler, there is one more wedge in the pie chart.



statistically significant coefficient of -0.085 .⁸¹ This slope of -0.085 suggests that the price per kilogram of cocaine falls by 0.85% for every 10% increase in transaction quantity. For example, if we observe that a 100-gram package of cocaine sells for 50,000 euros per kilogram, then we would predict that a 110-gram package will cost approximately 0.85% less per kilogram, or about 49,600 euros per kilogram.

Quantity discount coefficients can vary by drug and region. The steepness of a quantity discount may depend on the structure of a country's drug markets, the strictness of local and national drug enforcement, and the geographic features that inhibit or facilitate the movement of drug within and across borders (Caulkins, 1997). When the movement of drugs from importer to user is especially fraught with risk and challenge, dealers might be expected to increase mark-ups in order to compensate themselves for those additional costs and risks (Caulkins & Reuter, 2010; Reuter & Kleiman, 1986). Mark-ups are the flip side of quantity discounts; so large mark-ups correspond to large discounts experienced by purchasing in larger lot sizes. Our estimate of a -0.085 quantity discount factor in Italy is markedly lower (in absolute value) than those previously estimated for cocaine in the US and UK, which when expressed in the same units have been found to be about -0.19 - -0.28 and -0.13 respectively (Arkes et al., 2004; Caulkins et al., 2009). One possibility is that this simple univariate model does not account for other factors that may cause dispersion in price, including the year in which the drugs were sold or the purity of that batch of cocaine. Omitting such variables would tend to depress the absolute value of the coefficient. However, a lower discount factor in Italy would also be consistent with impressions that drug enforcement is pursued somewhat less aggressively in Italy than in the U.K., and substantially less so than in the US.

10. Conclusions

In line with findings from previous research on drug dealing (Desroches, 2007; Dorn et al., 2005; Gruter & Van de Mheen, 2005; Reuter & Haaga, 1989), profit and personal enrichment seems to play an important role in dealers' involvement in drug dealing. In fact, drug dealers across the three country samples commented on the importance of various economic reasons to explain their involvement in drug dealing. While dealers also discussed other motivations to start dealing, for example in relation to family or friends, or to help support dealers' own drug consumption, a significant proportion of respondents referred to the achievement of financial gains.

While prior studies have pointed out that the costs of drug dealing might be relatively small in comparison to the revenues generated in this business (Caulkins et al., 1999; Matrix Knowledge Group, 2007), we have limited information on this issue, as the dealers in our samples were not able/willing to discuss their costs of doing business in much detail. At best, dealers were able to quantify some of their operating costs, without referring to a specific unit of measurement, or even by alluding to different measurement units (for example, costs per week, costs per purchase or per activity). This seems to be similar to what researchers in Matrix Knowledge Group (2007) study encountered. Nevertheless, some of the broad types of costs mentioned by dealers in our study include direct sales-related costs, staffing, travel and transport, accommodation and leisure or other legal and administrative costs. Dealers also mentioned the payment of bribes and other costs which were not necessarily business-related (for instance, in relation to their 'lifestyle').

Another important finding relates to dealers' discounting practices. With the exception of Germany, the biggest group of dealers in all countries reported providing discounts to customers. As such, discounting in general, but also giving freebies to new customers, seems to be a relatively common practice for dealers. Arguably, this may contribute to developing a relationship of trust with existing

⁸¹ This 95% confidence interval of this coefficient lies between -0.08 , -0.09 .



customers. We also found limited evidence as to price-setting practices among a few dealers in our sample who reported not being able to change the price of drugs significantly, due to fear of pressure from competitors.

Dealers reported mixed views of customers, and of the addicts among them. While dealers commented on the importance of customers, as “they bring money” (I18), they have also pointed to customers’ unreliability, nuisance and the fear of being caught because of the contact with customers. This element of nuisance was particularly pertinent in dealers’ rapport with heroin users, who were seen as more problematic than cocaine users.

In several cases, investments made by dealers with the drug dealing profits did not seem to be strategic. Indeed, our respondents talked about spending their profits in immediate consumer goods, or in what they called the ‘lifestyle’. In doing so, dealers did not seem to follow one of the risk mitigation tactics they had suggested, i.e., while keeping a low profile was seen as a very important factor to reduce the risk of being caught, some dealers might not have been able to behave and invest accordingly. Additionally, dealers indicated investing their profits in the purchase of residential property, and/or other licit activities, for example.

When discussing other profitable businesses, other than drug dealing, the biggest group of dealers in the Italian sample considered trafficking and sale of firearms as a profitable business. Elsewhere, German dealers commented on the opportunities for making a profit in trafficking and sale of medical drugs (including subutex, for example). Dealers’ perception of profitable products or businesses tended to focus on illicit activities.

For cocaine dealing in Italy, there were sufficient data to do a more detailed analysis of role-separation by market level, distinguishing between those who bought more than a kilogram at a time from retailers who sold to users and the wholesalers – including higher- and lower-level wholesalers who connected the multi-kilo traffickers to the retailers. Particular attention was paid to transaction “cycles” meaning the sequence of steps whereby a dealer obtains drugs from a high-market level, breaks that package down into smaller unit sizes, and sells them on after marking the price up.

Overall the market structure described by Italian cocaine dealers is a familiar hierarchy with dealers at one level selling to multiple dealers at lower levels. However, compared to distribution networks in the UK and US, the Italian cocaine distribution networks seemed to have larger branching factors and even sometimes level-skipping, with a dealer selling down two market levels rather than just one. The net result is that there may sometimes be one fewer transaction separating the importer from the user in Italian cocaine distribution networks than in UK and US drug distribution networks. This could be a cause of, or a response to, what appear to be possibly smaller quantity discounts (and, hence, smaller price mark-ups) in this market.

Comparing across market levels within this market, retailers realized the highest mark-ups, in percentage terms, and executed the most transaction cycles per unit time. However, higher-level dealers still enjoyed far higher net revenues per month than did retailers due to higher overall volume of their business. Nonetheless, because the drug distribution network forks or branches as it moves from one level to the next lower, there are very many more dealers at lower than higher market levels. Indeed, there are so many more retailers than wholesalers or multi-kilo traffickers, that it is dealers at the retail market level who collectively retain the largest share of what users spend on drugs.



As this study's focus laid on providing rich, descriptive information about dealers' operations and business practices, and taking into account the study sample design as well as other data limitations, we refrain from drawing policy conclusions or recommendations. With regard to future research, it would be useful to expand the drug transaction cycles analysis to the Italian heroin transaction cycles and/or further explore the Slovenian cycles data. On reflection, a shorter and more flexible interview protocol, allowing interviewers more scope to follow-up respondents' comments with additional questions could have provided more detailed information on some of the issues at hand. In the main, we encourage further research in this area, to replicate this study in prisons in other countries in order to examine high-level dealers' practices and activities in the market, which remains an underresearched subset of the drug dealer population.



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Appendix A: Research ethics and informed consent

Ethics considerations

The research team is committed to strong ethical values, ensuring professional and institutional integrity and ethically responsible relationships with research participants, research partners and clients. Throughout the project we paid close attention to ethical issues in order to ensure that our research met the highest ethical standards. As set out in Table A.1 ethical considerations arising from our study fall into two main categories: general research ethics and ethical issues stemming from the specific subject of the research. The most pressing ethical concerns in this context relate to the anonymity and safety of the prisoners who agree to be interviewed. These concerns have been addressed by the strict protection of data and through our research design.

Table A.1: Table of relevant ethical issues.

Issue	Relevant to this study YES/NO
Informed Consent	
• Does the proposal involve children?	No
• Does the proposal involve patients or persons not able to give consent?	No
• Does the proposal involve adult healthy volunteers?	Yes
• Does the proposal involve Human Genetic Material?	No
• Does the proposal involve Human biological samples?	No
• Does the proposal involve Human data collection?	Yes
Research on Human embryo/foetus	
• Does the proposal involve Human Embryos?	No
• Does the proposal involve Human Foetal Tissue / Cells?	No
• Does the proposal involve Human Embryonic Stem Cells?	No
Privacy	
• Does the proposal involve the processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?	Yes
• Does the proposal involve tracking the location or observation of people?	No
Research on Animals	
• Does the proposal involve research on animals?	No
• Are those animals transgenic small laboratory animals?	
• Are those animals transgenic farm animals?	
• Are those animals cloning farm animals?	
• Are those animals non-human primates?	

Research ethics

As part of good research practice and in light of the high sensitivity of data recording criminal activities, we adopted strict measures to protect the data collected through our research. All research partners adhered to high security standards throughout the lifecycle of the project, including the collection, processing, storage and destruction of data, and observe the Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data. In addition to general procedures regarding office security and data protection from unauthorised persons, sensitive data has not been transmitted over the open internet. Instead, data discs⁸² or hard copies have been delivered either by hand (courier) or registered post. RAND Europe assisted research partners in ensuring these procedures.

Subject matter ethics

Our study crucially relies on interviews with prisoners in order to gain insights into the profit strategies and incentive structures of EU drugs markets. There is no alternative method for collecting this ‘on the ground’ information. The research team appreciate that research involving prisoners

⁸² Preferably data disks would be encrypted and password protected.



(who may be part of a vulnerable population) poses specific ethical concerns. In order to address these concerns our study has been guided by two ethical principles. The first is the principle of beneficence: our research aims to maximise possible benefits and to minimise possible harms. The second concerns respect for the autonomy and dignity of persons. The following explanations summarise how these principles affect our research approach to, in particular in relation to: the choice of collected data; confidentiality; informed consent; psychological support to interviewers and interviewees; and the dissemination of results.

Choice and analysis of data

The most pressing ethical concern raised by our study is the risk that prisoners could face physical or psychological harms as a result of participating in our research. There are a number of groups that may seek retribution against an offender for speaking with someone from outside the prison, whether or not the interviewee discloses harmful information about an organisation or individual. This may include, but is not limited to: other prisoners, prison employees or staff, other public officials or members of the public. Anonymity and confidentiality are, therefore, of the utmost importance.

In order to achieve anonymity, we sought to minimise the amount of personal data collected. This included the following:

- We did not record participating prisoners' names. When asking prison authorities to help us select prisoners for the interviews, we explicitly asked prison officers and later the prisoners themselves not to disclose any names. The implications of this measure for informed consent will be discussed below.
- We did not record birthdates, but instead worked with relatively wide age brackets.
- We recorded prisoners' ethnicities and countries of birth.

Where we are collecting demographic information from interviewees, this is because we have concluded that these demographic indicators are indispensable for the insights that this study seeks to gain and for the detection of potential biases within the sample. To elaborate, mechanisms affecting prices, costs and market-related experiences are likely to vary between different groups of drug dealers and traffickers and possibly even within groups. Accordingly, information on age groups is required to cover multiple demographic groups and thus provide a more reliable range of prices, costs and activities. Furthermore, this helped us to verify whether prisoners have been in the drug business for the length of time that they claim. Information on ethnicity and country of birth, in turn, is necessary to monitor whether our study reaches different groups of drug dealers and traffickers who are likely to operate within different cost and incentive structures. More precisely, drug dealers and traffickers probably sell in particular territories, are connected to different networks, and generally buy from selected people (e.g. people from the same ethnic group or social network). These factors are likely to be reflected in different buy and sell prices and market-related experiences. Interviewing dealers from only one country or ethnicity could thus lead to significant bias.

In addition to the data protection measures mentioned above, we sought to ensure that it was not possible to identify participating prisoners indirectly by adopting the following approach to personal data:

- Only information aggregated to the country level is part of our report. Names and locations of the participating prisons are not published. No names of participating prisoners have been collected. No research partner will be allowed to publish individual data.
- Included quotes have been anonymised. In addition, we only chose quotes that contain general statements and do not give any indication about specific persons or contexts that would allow indirect identifications.



Confidentiality

Anonymity also requires that any information provided during interviews is handled confidentially. In order to ensure confidentiality, we adopted the following measures:

- Interviews have been conducted in rooms where prisoners cannot be overheard or seen by other prisoners. Prison officers have not been present during interviews.
- We asked prison authorities to arrange interviews in a way which is the least attention-raising and disruptive for general prison life.
- We transcribed interviews, but no names have been included in transcripts.
- Interviews with offenders hold the risk of prisoners' disclosing information about their own or others' previous or planned offences or about potential harm relating to themselves or others. Such disclosures may create conflicts for researchers between confidentiality, the law and moral values. If such cases were to arise, we would stop the interview, discuss matters of confidentiality with the prisoner and allow the prisoner to reflect whether or not he wishes to continue his explanations, bearing in mind that certain information may have to be passed on to authorities.

Informed consent

In addition to approval sought by the respective prison authorities, respect for the autonomy and dignity of prisoners demands that they give their free, competent and informed consent to participate in our study. Given the specific nature of the prison environment which is characterised by unequal relationships, there is the danger that prisoners feel, or indeed are, coerced into taking part in research. Moreover, there is the possibility that prisoners experience problems such as mental illness, have learning difficulties or are themselves drug users, adding to their vulnerability. Accordingly, we worked closely with prison authorities in order to ensure that prisoners take part voluntarily and were fit to participate.

To ensure that consent was informed, interviewers were asked to communicate the below key points to prisoners before the interview. It was left to the discretion of the interviewing teams in the three countries whether this information was given in writing, orally or both in writing and orally, so long as they were assured that interviewees had understood these points. A template information sheet, explaining the study, was produced for use by interviewers if they so choose to use it and translate it into their languages. This is provided below.

Textbox A.1: Key information to be communicated to interviewees to ensure voluntary participation and informed consent.

- Purpose of the study: *The objective of ALICE RAP is to increase our understanding of profit strategies and incentive structures within European drug markets*
- Why we wanted to conduct interviews: *In order to gain in-depth knowledge about how drug dealers are currently operating, we are conducting interviews with individuals presently serving sentences for previous drug dealing or trafficking offences*
- What the interview is about: *In this interview, we will ask you to respond to questions about your experiences with regard to profit strategies and incentives structures within drug markets*
- Anonymity: *In order to increase confidentiality and ensure your anonymity, we would like to ask you not to disclose your own name. Moreover, since we are interested in the general structure of drug markets and not in the individuals selling drugs, we would like to ask you not to give specific details about other drug dealers or offences.*
- What will happen to the interview information: *The information you provide will be analysed by RAND Europe (Cambridge, UK) and used for reports to the European Commission, scientific articles and articles in professional journals.*
- Participation is voluntary: *If you choose to take part in our study, your participation is*



entirely voluntary.

- Participation will not have effects on sentence: *If you decide not to participate, you will not be penalised or encounter any negative consequences. However, please note also that if you decide to take part, this will not affect the terms of your sentence or impact on prison conditions.*
- Right not to answer questions and to discontinue participation: *If you choose to participate but do not wish to answer specific questions, or if you wish to discontinue participation at any time during the interview or study, you will be entirely free to do so without facing any negative consequences.*
- Confidentiality: *Any answers you give will remain totally anonymous and be treated with the strictest confidentiality.*

In order to prevent prisoners from revealing their names (to protect their anonymity), we did not ask the prisoners to sign the informed consent form but instead let the interviewer record the response. Although we appreciate that this may be somewhat unorthodox, not asking for prisoners' signatures allowed us to provide further protection for the prisoner and help ensure that anonymity is maintained.

Safety and psychological support

Conducting interviews with offenders raises concerns about the safety of interviewers. Consequently, we closely collaborated with prison authorities to ensure that the safety of interviewers is guaranteed. Moreover, interviews within prison environments can lead to psychological and emotional stress for both the researcher and the prisoner. Accordingly, at the end of the interview we made prisoners aware of the possibility of counselling and worked closely together with prison authorities in order to make sure that prisoners have access to counselling services. Similarly, we actively encouraged interviewers to seek support in case they experienced distress.

Dissemination of results

Our research outputs and reports underwent internal ethical reviews in order to ensure that no unwitting profiling or stereotyping of individual prisoners, prisoner groups or drug dealers has taken place. In addition, this review was also concerned with making sure that no indirect identifications of participating prisoners was possible.

To promote an equitable distribution of benefits and results of our study, we will disseminate our findings through public reports and academic articles. This will also include explicit offers to participating prisoners to have access to our reports.

RAND Europe together with [INSERT NAME OF PARTNER ORGANISATION] are conducting a study commissioned by the European Union to explore sellers' accounts of the heroin or cocaine business. As part of this study, participants are being recruited who can provide insights about the ways in which dealers and traffickers earn money within the drug market. Accordingly, we are writing today to invite you to take part in our research by interviewing with a researcher.

Before you decide whether or not you wish to participate, it is important that you understand why the research is being conducted and what your participation would involve. Please take the time to read the following information with care and, if you wish, feel free to discuss it with someone who is required to keep your conversations confidential, such as [INSERT AS RELEVANT TO PARTICULAR PRISON, FOR EXAMPLE, RELIGIOUS ADVISOR OR COUNSELLOR].

If there is anything that seems unclear or that you would like to know more about, please contact one of the people listed in this letter.

What is the purpose of this study?

This study aims to develop a better understanding of how the cocaine or heroin market works in your country and the role that dealers and traffickers play within it to earn money.

What will happen if I agree to take part?

First, a researcher will meet with you to discuss the study in more detail and ask for your consent that information provided by you can be used in our study. Then, if you agree to take part, you will be interviewed for approximately 60 minutes. The researcher will ask a series of questions about your experience in the drug business, providing brief explanations of why he or she is asking certain questions. If you do not wish to answer specific questions, or discontinue participation at any time during the interview or study, you will be entirely free to do so without being penalised. If the researcher does not finish all the questions, the researcher will ask you if he or she can come back one more time.

To guarantee confidentiality, the interviews will be conducted in rooms where you cannot be overheard or seen by other prisoners. A prison officer will not [PARTNERS TO CHECK AND CONFIRM] be in the room. Since your anonymity is

of the utmost importance to us, we will not ask about your name and would appreciate it if you were careful not to reveal your name during your interactions with us. Moreover, we are not interested in obtaining information that could lead to the identification of other individuals engaged in drug sales or trafficking and would like to ask you, therefore, not to provide any information that may lead to their direct or indirect identification. Our study will use the information provided by you in a way that makes sure you remain completely anonymous.

What are the possible benefits of taking part?

By participating in this study, you have the opportunity to talk about your personal experiences of working in the drug business. Telling your own story may prove to be very valuable to you. Moreover, you will help to advance knowledge of the way in which dealers and traffickers are treated and the pressures and difficulties they face in the drug business. It will also help service providers to understand the environment of drug addicted patients and potentially find better ways to contribute to their recovery.

What are the possible risks/What if something goes wrong?

The possibility that someone finds out that you participated in our study cannot be entirely eliminated. However, in co-operation with the prison authority, we have adopted several measures to minimise this risk and guarantee your anonymity. As stated above, we will not know your name and your responses will be totally anonymised.

If you wish to complain about any aspect of the way you have been approached or treated during the course of this study, the normal complaints mechanisms of the prison are available to you [PARTNERS TO CONFIRM WITH PRISON AND AMEND AS APPROPRIATE]

Should I take part?

It is your choice to decide whether or not you wish to take part. If you decide to participate, this will not affect the terms of your sentence or impact on prison conditions. If you choose not to participate or to discontinue your participation at any time during the interview or study, you will be entirely free to do so without facing any negative consequences.



We would be delighted if you agreed to contribute to our research by answering our questions about the drug market. If you wish to participate, please contact [PARTNER TO INSERT DESCRIPTION OF THE



PROCEDURE IN RELEVANT PRISON]. Thank you very much indeed for considering your participation in our study.



Appendix B: Interview protocol

Personal background (*Interviewer: Only ask these if not provided by the prison already*)

We need to ask a couple of questions about you that will help with our analysis.

1. In which age bracket are you? I will read out the options. Please choose one option that best describes your age. (*circle one*)

- a. Less than 25
- b. 25-45
- c. 46-62
- d. 62+
- e. No response

2. What is your ethnic group? I will read out the options. Please choose one option that best describes your ethnic group or background (*circle one*)

- a. White
- b. Mixed / Multiple ethnic groups
- c. Asian / Asian (*German, Slovenian, Italian*)
- d. Black / African / Caribbean / Black (*German, Slovenian, Italian*)
- e. Chinese
- f. Arab
- g. Other ethnic group? _____
- h. No response



3. In which country were you born? (*circle one or type*)

- a. Home country (*Italy, Slovenia, Germany*)
- b. _____
- c. No response

Background of dealing/trafficking

In this first set of questions, we would like to understand which drugs you have been involved in selling/trafficking. This is to make sure you and I are clear about which drugs you have in mind when answering these questions. We also want to understand how and when you started selling/trafficking.

4. Which drugs were involved with this sentence? (circle and name all that apply)

- a. Heroin
- b. Cocaine (rock OR powder)
- c. Other _____

[*For those trafficking/selling more than one drug*]:

a. Would you consider one of these as your main drug? If yes, which one:

- a. Heroin
- b. Cocaine (rock OR powder)

[Our studies are on cocaine and heroin specifically, and other drugs as part of the drug business generally. If replies something else is a main drug, ask them whether they have dealt/trafficked heroin or cocaine more and would be willing to answer questions of that as the main drug.]



5. What was the first drug you ever trafficked/sold? (*circle and name **all** that apply*)

- a. Heroin
- b. Cocaine
- c. Cannabis
- d. Ecstasy
- e. Methamphetamines
- f. Other _____

6. How old were you when you first started trafficking/ selling? [*A rough estimate is ok*]

_____ years old

7. How did you start trafficking/ selling?

For example: a friend asked to help, a family member sold, met someone in prison



8. How typical was the way you got into dealing or trafficking your main drug [heroin/cocaine] compared to people you know? (*circle one & provide explanation if possible*)

	Typical	Not typical
Explanation:		
<i>For example:</i> most people you know used & then got into selling that way; most people you know had a family member or friend ask to help sell		

9. Would it be the same to enter the dealing or trafficking your main drug [heroin/cocaine] today? (*circle one & provide explanation if possible*)

	Yes	No
Explanation:		

10. Have you ever stopped trafficking/selling before?

	Yes	No
Explanation:		
<i>For example:</i> couldn't sell in prison; had to take care of someone		



Cycle

We would like to ask you about the amount of time from getting a new supply to selling all of it for your main drug [*heroin/cocaine*]. This set of questions helps us better understand the typical amount of time it takes to buy and sell some product.

11. Did you have more than one supplier? (*circle one*)

Yes	No
-----	----

Let's think about one of your main suppliers:

12. Typically, how often did you receive a new supply of your main drug [*heroin / cocaine*] from your main supplier?

_____ every _____
OR: _____
<i>For example: once every 3 weeks; 10 times in the summer/ 5 times in winter</i>

13. How does the re-supply work from your main supplier?

<i>For example: your supplier would call you & give you a date to take the new supply; you would call up your supplier when you were almost out of product</i>
--

14. Have you ever had it where you sold everything you had of your main drug [*heroin / cocaine*] and had to wait for the re-supply from your main supplier? (*circle one*)

Yes	No
-----	----



15. What did you typically do in the meantime while you had none of your main drug to sell? [*if having trouble, ask: think about the last time you didn't have any drugs but people came asking for some, what did you do?*]

For example: nothing, just wait for another supply; try to sell another drug; call supplier to try and get more; try to get a new supplier

16. How long could it typically last that you didn't have anything to sell?

17. Did it make it hard to get customers after that? (*circle one & provide explanation if possible*)

Yes

No

Explain:

For example: no problem because only one around town selling



18. What about a situation where you had too much to sell. Did you ever have a situation when you got new supply of your main drug [*heroin / cocaine*], but still had some product left? (*circle one & provide explanation if possible*)

Yes

No

If yes, what did you typically do?

For example: try to sell more to usual customers; store it for later in case don't have enough later

Costs

Now we would like to ask you about how much it costs to do business in the main drug you trafficked/sold [*heroin / cocaine*]. We first would like to know how much it costs to buy from your main supplier and whether you have multiple suppliers.

If you have more than one supplier for this drug, let's think about one main supplier.

19. How much would you typically buy from this supplier at one time (or per purchase)?

_____ (*include type of unit*)

For example: ___10 kilograms_____



20. In what currency and what was the price you typically paid for that amount of drugs?

_____ (include currency)

For example: ____ € 350,000 _____

So just to make sure I understand you would typically paid _____ for _____ of
[heroin /cocaine]?

21. Can you think of the minimum and the maximum you have paid to this supplier?

Minimum (include currency & units) _____

Maximum (include currency & units) _____

For example: ____ colombian peso 920,000,000 for 10 kilograms _____

[Consider asking them about the situation in which they paid these prices]



Yes	No
-----	----

Can we now talk about some of the other costs of being in the business of dealing or trafficking, not just those for buying a supply? Specifically, we would like to know about the other monetary costs involved in selling your main drug [*heroin / cocaine*].

Yes	No
-----	----

_____ hours
_____ days

[If they separate by days during the week and weekend, use below]:

_____ hours (Mon-Thur)
_____ hours (Fri – Sun)



25. How much do you pay yourself per hour for trafficking/selling your main drug [*heroin / cocaine*]?

€ _____ per hour worked on trafficking/selling
_____ number of hours it takes to arrange delivery of one package or
_____ sell one package

[Please try to get them to work this out. They may start by thinking another way but want per unit rather than totals, for example]:

_____ % per kilogram sold
_____ € per package supplied

[If still struggling to answer the question of how much paid per hour worked, consider:

Compared to a public sector employee who earns about €x per hour, how much do you think you earned compared to them per hour?

26. In a typical week, working in jobs other than trafficking/selling your main drug, how much did you earn per hour and how many hours did you work?

€ _____ per hour
_____ hours per week

_____ (if use another type of unit)



Cost type	Cost
Fuel	€ _____ per _____ delivered OR: _____
Packaging material	€ _____ per _____ delivered OR: _____
Transporters/couriers (people who carry drugs)	€ _____ per hour per person OR: _____

[We need per 'unit', not totals for the month or aggregate numbers.]

[illegible]



29. Could you tell me how much these costs were and how many times you would have to pay them?

Payment type	Amount of payment	Number of times

Make sure we know whether the payments are a set number of times per year or if related to amount of drug moved/number of shipments.

For example: one time per year; a couple times a month; for each package

I have a couple of extra questions about transporting drugs that are not about the monetary costs, but about the risks.

30. Have you ever heard of your main drug [*heroin / cocaine*] being transported across countries in Europe? (*circle one*)

Yes	No
-----	----



31. What kinds of things have you heard people doing to get the main drug you sold [heroin / cocaine] across countries in Europe?

For example: hiding in lorries; swallowing drugs & taking a flight from Colombia to Rome

32. Does it seem risky to you to transport drugs across the countries, compared to dealing or trafficking? *(circle one below)*

Yes

No

33. Why or why not?



Revenue

We have just discussed the costs of dealing/trafficking. Now these next set of question will refer to how much money a person can earn trafficking/selling the main drug [*heroin / cocaine*]. We will ask some questions about sale prices.

34. When selling, what was the typical weight of what you would sell to one buyer? And what was the price of that weight?

	<i>(include type of unit weight)</i>
	<i>(include currency)</i>
<i>For example:</i> ____1 kilogram____	<i>For example:</i> ____€ 350,000____
So just to make sure I understand you would typically sold _____ for _____ of [<i>heroin /cocaine</i>]? 	

Other revenue streams

Now I'm going to ask you some questions about your view on earning money from selling other drugs and other things in general. This will help us understand what the value of some of those other markets might be.

35. You said earlier your main drug involved in the sentence was [*heroin/cocaine*], were you ever involved in other drugs? (*circle one below*)

Yes	No
-----	----



36. What kinds of drugs?

- a. Heroin
- b. Cocaine (rock OR powder)
- c. Cannabis
- d. Ecstasy
- e. Methamphetamines
- f. Other _____

If you have been involved in more than three types of drugs, pick the top three in terms of volume trafficked or sold for the following set of questions.

37. How did you start dealing/trafficking each of these?

Drug type	Got into it by:



38. What happened in terms of sales- were you able to get supply and sell straight away?

Drug type	Supply quickly	Sell quickly
	Yes _____ No _____	Yes _____ No _____
	Yes _____ No _____	Yes _____ No _____
	Yes _____ No _____	Yes _____ No _____

39. Did competitors do anything to try and stop you from selling your main drug [heroin/cocaine] and these other drugs?

Drug type	Yes	No	If yes, what?
Main drug			



40. Thinking about these other drugs than your main drug, how much would it cost to **buy** drugs for dealing/trafficking and of what weight?

Drug type	Price	Weight

Remember to write the currency and unit type. Don't assume Euros or kilograms.

41. Again thinking about these drugs that were not your main drug, what was the typical weight of drugs you would **sell** and at what price?

Drug type	Price	Weight

Remember to write the currency and unit type. Don't assume Euros or kilograms.

42. Do you think there was more money to be made in these drug businesses than you earned? (*circle one below*)

Yes	No
-----	----



43. What advice would you give to an aspiring young guy who wants to sell illegal things?

44. What products, other than drugs, would you recommend to an ambitious young guy who is interested? How much profit can be made and why would you recommend these?

Product	How much profit can be earned per unit sold?	Why?

For example: selling women, firearms

For example: €10,000 per woman per year

For example: good money, low risk of police

Make sure to clarify this is not what someone pays themselves but the revenue for selling.



Adaptability and barriers

I now have some questions to ask you about people working their way up in this business of trafficking/selling your main drug [*heroin / cocaine*]. This is to help us better understand how the market works in terms of how easy it is to get into and get out of trafficking/selling.

45. You said you've been doing this since you were about x years old, have you seen people move up, like from selling on the streets to selling bigger packages to other dealers? (*circle one*)

Yes	No
-----	----

46. Do you sell more or less the same as you did when you first started? (*circle one*)

Less	Same	More
------	------	------

47. About how old were you when you moved into selling at the highest level you reached? [*roughly*]

_____ years old

48. What made you want to move up each time?

<i>For example:</i> more money; less risk; both

49. How did you go about doing it?

<i>For example:</i> became friends with higher level dealer; made a lot of deals & worked way up
--



50. Have you noticed any important changes in the market since you started?

For example: use of internet; less border checks & easier to move drugs around Europe

51. Did the way you operate change in important ways since you've started?

For example: how you sold to people changed & you went from selling on streets to selling to people at their houses; they way people pay has changed

52. What advice would you give to an aspiring young guy who would like to get into selling this drug?



53. What would they need to think about to get started in this market?

54. What should they know about how their competitors may react?



Marketing

I now have a few questions to ask you about getting new clients or keeping old ones in this business of trafficking/selling your main drug [*heroin / cocaine*]. This is to help us better understand how the customers react in this drug market.

55. How do you let people know about good or new [*heroin / cocaine*]?

56. How do you find new customers for [*heroin / cocaine*]?

For example: offer discounts to get new people into it

57. Would you use freebies or discounts or anything to get new clients? (*circle one*)

Yes	No
-----	----

58. How much might you discount for your main drug of [*heroin / cocaine*]?

_____ % to _____ (types of people)



59. For those involved in street dealing, would you give discounts to addicts or sell them better quality (less cut) drugs? (*circle one & provide explanation if possible*)

Yes	No
Why or why not?	

60. Again about hooked people, are they good customers for street dealers to have or actually quite difficult?

--

61. What would you do if product wasn't as good as usual?

<i>For example: sell to people you don't usually sell to? Nothing different?</i>

Risks

I now have some questions about how risky is the trafficking/selling of your main drug [*heroin / cocaine*]. In particular, we would like to know about the types of risks you faced, such as those from police and from other competitors, but also how seriously you took these risks.



62. Do you worry about the police? (*circle one*)

Yes	No	Sometimes
Explain:		

63. Thinking about the last time you had to worry about the police, why were you worried and did it make you change anything about how you operated to deal or traffick?

For example: someone got caught undercover; someone had their house and car taken by police

64. What, if anything, is most worrying about the police?

For example: arrest, search, fines, confiscating your stuff, recruiting informants



65. What can people do to reduce the risk of police arresting them or finding their money and taking it?

66. Did you ever hear about dealers having problems with other dealers? (*circle one*)

Yes	No
-----	----

67. What kind of problems can dealers face from other dealers?

Prompts: thinking about the last incident of two dealers, what happened?

68. Did you ever carry a gun while picking up or delivering drugs? (*circle one*)

Yes	No
-----	----

69. Did you usually carry a gun? (*circle one*)

Yes	No
-----	----



70. What other business problems have we not talked about?

Management

I now have a few questions to ask you about the chain of command in trafficking/selling of your main drug [*heroin / cocaine*]. Just like every job, people need to discuss things with others such as report to someone or talk to others in the same business.

71. Would you ever work together with other dealers or traffickers?

For example: to try to keep prices up

72. Did you get to make decisions about what areas to work? (*circle one & provide explanation if possible*)

Yes	No
Explain:	



73. Who makes decisions about prices and quantities to sell? (*circle one & provide explanation if possible*)

Yes	No
Explain:	
<i>For example: you do; your boss does; you check how much others are selling for & just set the same prices & sell for the same quantity as others</i>	

Public sector

This is the last set of questions. I would like to get your point of view about working with people in official posts. These set of questions are to better understand how much you would have to interact with people working

74. Did you ever hear about other traffickers/dealers who were moving the same drugs to the similar locations as you bribing officials? (*circle one & provide explanation if possible*)

Yes	No
Explain:	



75. What kinds of officials were they bribing and in order to do what?

For example: customs officials to traffic across borders; judges to get light sentences; police to not pay attention to selling on streets

76. How did it help their business?

For example: made more money because kept competitors out & large shipments could come in

Thank you...



Addiction and Lifestyles in Contemporary Europe: Reframing Addictions Project (ALICE RAP)

Report 3: Lottery Gambling, Problem Gambling, and Addiction

Deliverable 10.1 Addiction Revenues, Work Package 10

Walker, I.*

* Lancaster University and Princeton University



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Acknowledgments

The research leading to these results or outcomes has received funding from the European Union's Seventh Framework Programme (FP7/2007-2013), under Grant Agreement n° 266813 - Addictions and Lifestyle in Contemporary Europe – Reframing Addictions Project (ALICE RAP – www.alicerap.eu).

The author is grateful to the UK Data Service for providing much of the data used in this analysis and to Jillian Reynolds for helping to improve the exposition. The data used here can be made available to other researchers subject to approval by the Data Service and the Office of National Statistics.

Participant organisations in ALICE RAP can be seen at <http://www.alicerap.eu/about-alice-rap/partner-institutions.html>.

The author has no connection to the gambling industry and has received no funding from it. The author has received funding in the past from the Economic and Social Research Council to support blue skies research on the operation of lottery markets. He recently worked with Frontier Economics on a project, funded by Her Majesty's Customs and Excise, concerned with modelling aggregate demand elasticities for all gambling products in the UK. He currently holds an ESRC award for a PhD student as part of a new collaboration with the UK regulator, the Gambling Commission.

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Abstract

This report focuses on examining the extent of addiction and on estimating the seriousness of problem gambling, using available UK data as an illustrative case. A particular interest is the extent to which gambling may be subject to “rational” addiction – whereby individuals, in the light of their perception of all of the costs and benefits, willingly adopt behaviour that they nonetheless fully expect will end up becoming an addiction. We exploit a peculiar feature of lotto, the most common form of lottery game, to estimate a model of demand that allows for the possibility that this product is addictive AND that it may be “rationally” addictive. We find that the parameter estimates do satisfy the restrictions implied by the theory of rational addiction. On the other hand, the existing work also suggests large welfare gains from being able to play lotto.

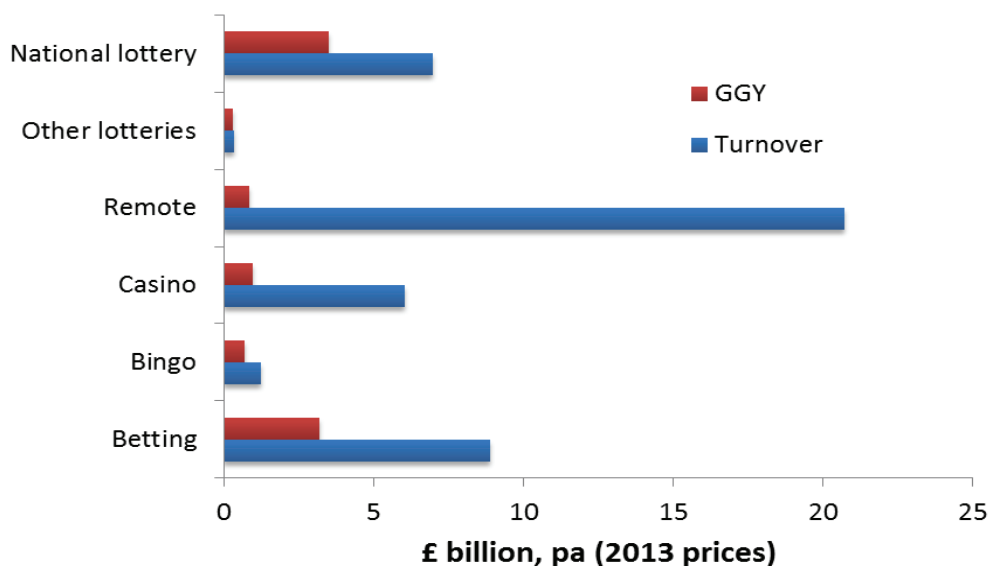
Problem gambling is typically defined in the literature with reference to behaviours that are only indirectly related to expenditure on gambling. We use a large recent survey to show the extent of problem gambling in the UK and show that while a small proportion of the population exhibit problem gambling, our estimate of the reduction in well-being associated with being a problem gambler is large. While one might be tempted to conclude that problem gambling represents an important policy problem our finding that lotto exhibits rational addiction would suggest otherwise.



1. Introduction

The UK has, by international standards, quite high levels of gambling participation and expenditure. Burhringer *et al* (2013) reports statistics for EU27 that suggest annual adult Gross Gambling Yield (GGY defined as stakes minus winnings) of around €400 per capita and the UK figure is approximately €300, including the estimates of remote gambling (forms of gambling that are usually mediated via an organisation based outside the jurisdiction and often conducted over the internet). Estimates of gambling expenditure from survey data are surrounded by considerable uncertainty (see, for example, Blaszczynski *et al*, 2006), while estimates derived from the supply side of the industry are typically rather incomplete, particularly with respect to remote gambling. This is particularly worrying because estimates of remote gambling suggests that this is the largest source of turnover expenditure. However, estimates of the remote gambling takeout rate (the proportion of the stakes that are NOT returned to players in the form of prizes) are small and suggest that this form of gambling is a less important source of Gross Gambling Yield than other forms. In contrast, lotteries seem to figure largest in terms of GGY because of their high takeout rate. Figure 1 shows the estimates from the Gambling Commission (the UK regulator) for 2012/13.

Figure 1 . UK Gambling Stakes (Turnover) and Yield (GGY) 2012/13.



Many products generate externalities – side-effects that might be socially undesirable which give rise to a need for the products to be regulated and/or taxed to mitigate such side-effects. Clearly, there is a trade-off involved: on the one hand the ability to gamble allows people to develop an addiction that harms themselves and/or their loved ones; on the other hand, the ability to play generates enjoyment that benefits those that play. This paper tries to evaluate these costs and benefits.

Becker and Murphy (1988) provides the foundation for much of the modern economics approach to addiction. Prior to this seminal research, economists modelled the process of addiction simply as habit formation and persistence. In such a *myopic* addiction framework current consumption behaviour depends on the current price



and on the previous level of consumption (and hence on the previous price). In contrast, the *rational* addiction framework emphasises the role of expected *future* prices. A rational addict *chooses* to become addicted because the present enjoyment of consumption outweighs the future “price” of becoming addicted (where price is broadly defined in both non-pecuniary as well as pecuniary costs). So lower expected future prices will induce higher levels of addiction. This idea of rational addiction has dramatic implications for policy: since addiction is freely chosen in this framework there is no case for intervention. There are no externalities, only internalities. While the idea that individuals are forward looking in their behaviour is compelling, existing research that tests for rational addiction has relied on demand responses to pre-announced price changes (including announcements of potential health risks) rather than actual consumer expectations of future prices.

We present a time series analysis of UK lotto sales below. We focus on lotto because, uniquely among gambling products, it has a peculiar feature that allows players to form expectations of future prices in a way that varies from draw to draw. Thus, this research does not rely on the credibility of announcements of future prices or the novelty of health risk announcements¹. Our estimates suggest strong evidence of habituation in that sales are positively correlated over time. We use our estimates to evaluate the enjoyment, or *consumer surplus*, generated by being able to play lotto. We also show some support for the idea that people are forward looking – we show that lotto sales also depend on the expected future price. While our results support the essence of rational addiction we also acknowledge the widespread conviction that addiction is a cause for policy concern – there is substantial evidence that many addicts want and need help. This is manifest by the popularity of self-control devices that help addicts to commit to a course of action that will reduce their dependency. We also use a large cross-section survey to show that there is some evidence that “problem” gambling exists. Here, we consider the extent of problem gambling and show that although it affects only a small proportion of the population, there is some indication that the effect on afflicted individuals is large and we evaluate how large this might be.

Recent investigations into addiction by economists have typically used a specification of an empirical behavioural model that incorporates the idea that individuals make rational choices. An example of the genre is Gruber and Koszegi (2001) who find, based on aggregate data for cigarette smoking, that smoking behaviour is indeed sensitive to pre-announced tax-induced price changes that have not yet been implemented. Their identification strategy depends on the credibility of the price announcements and assumptions about incidence which are untested in this and other similar work – if individuals think that the announced price change lacks credibility then this would undermine the validity of the test for rational addiction. Here we use a unique feature of lotto games that does not depend on the credibility of pre-announced price changes.

¹ Several papers exploit the 1964 Surgeon General’s report on smoking and lung cancer. However, work by Doll and Hill (1950, 1954) had demonstrated the link convincingly many years before the report so the timing is unclear.



There is little existing research on the potential for gambling to be addictive and there appear to have been no attempts to test for rational addiction. There are several papers (see, for example, Paton *et al*, 2004) on horse racing and some very simple time series work (see Frontier Economics 2014) that is concerned with casino gambling, online betting, and betting on fixed odds betting machines. These latter forms of gambling are widely regarded as being the most addictive although there is no evidence, to our knowledge, that these forms of gambling have a *causal* effect on problem gambling. The focus of this literature has been to estimate the responsiveness of demand to *price* and to use these estimated price elasticities to show how demand could be moderated by imposing higher taxation. Walker and Young (2000) is one of a number of papers that estimate the demand for lotto and, in particular, the price elasticity of demand. The paper distinguishes between short and long run effects by allowing for habituation and finds evidence of strong habituation effects. In that paper, the authors exploit a peculiar feature of lotto games – that in draws where the winning numbers were not purchased, the jackpot is *rolled-over* to the following draw. Such *rollovers* are conditionally (on previous sales) random and give rise to a boost in sales in the following draw - Walker and Young find that this positive shock to sales is persistent. A further paper that is also explicit about testing for habituation is Guryan and Kearney (2010). This investigates the effects of a local boost to sales on subsequent sales in the Texan lotto game. In Texas consumers know the whereabouts of the vendor(s) of the winning ticket(s) in each draw and the authors refer to these vendors as “lucky stores”. Those vendors find that they sell more tickets in *subsequent* draws presumably because consumers (wrongly) assume that they are more likely to win if they buy tickets at such a store. Since the winning numbers are drawn randomly it seems very likely that the location of winning vendors is also random so the positive shock to sales is quasi-experimental. The authors estimate the effect of being a winning store on sales at those stores in each subsequent draw and find that the shock to sales is positive and fades relatively slowly over time.

However, none of the existing work on the demand for lotto considers the possible role of future prices. The first contribution that we make here is to show that the expected future price matters for the current level of sales. Indeed, remarkably, we find that the restriction on the parameter estimates that are implied by the model of rational addiction are satisfied in our analysis. Our second contribution is that we use the estimated price elasticity to evaluate how much enjoyment (or *consumer surplus*) is generated by lotto.²

Our second contribution relates to the welfare costs of gambling. Our inspection of a cross section survey of gambling prevalence suggests, like much of the existing literature, that a rather small proportion of individuals are afflicted by problem gambling, as it is usually defined. Strangely, problem gambling is typically defined with only indirect reference to the extent of gambling. Here, we show that problem gambling is indeed associated with the extent of gambling – even with gambling

² Consumer surplus is (approximately) the inverse of the demand elasticity times half of GGY (see Forrest (2013)).



expenditure on lotto, which is usually regarded as a relatively benign form of gambling. A reservation about existing research is that it fails to provide a cardinal and comparable metric to allow policymakers to understand the seriousness of the problems that individuals afflicted by problem gamblers experience. Here we exploit a unique feature of our gambling prevalence dataset – it also contains information on individual well-being. This enables us to place an average financial value on the welfare costs of being a problem gambler. In particular, we compare our estimate of the effect of (a rather weak definition of) problem gambling on well-being, which we find to be large in comparison with other life events, with our estimate of the effect of (log) income on well-being in our data, which we find to be small but nonetheless highly statistically significant. The implication of these two correlations is that: being a problem gambler is associated with a reduction in well-being that would be commensurate with a non problem gambler experiencing a very large income loss. Of course, we cannot attribute problem gambling to lotto exclusively – or even mainly. Thus, the piece of the puzzle that remains missing in the literature is to establish the *causal* effect of being able to play lotto on problem gambling. While it has only been possible to play lotto in the UK for the last 20 years a simple before-and-after comparison would confound other changes that have occurred over time. We leave resolving this for future research.

2. Lotto demand

The UK lottery market is heavily dominated by the National Lottery (NL) which is currently operated by the private sector licensee, Camelot, under a long term revenue sharing agreement with the UK government. The NL is effectively a monopolist, although a very limited degree of new entry has occurred in recent years and its monopoly power is limited through competitive tendering for the license. The NL currently runs two “lotto” pari-mutuel games each week (Lotto and Euromillions) and each of these games feature two draws per week. Lotto games are referred to as pari-mutuel (literally, mutual stake) games because they provide winners with a **share** of a prize pool rather than a fixed set of guaranteed prizes. In the simplest form of such games (Lotto in the UK is such a simple case) players buy a ticket which records the player’s chosen n numbers from a panel of N numbers without replacement. The n winning numbers are chosen in each draw - usually by some mechanical device involving the N numbered rotating balls. Players who own tickets that match all of the n balls drawn share the n -ball prize, known as the jackpot. Players whose tickets match $n-1$ balls win a share of the $n-1$ ball pool, etc. For example, the UK has a very popular Lotto design with $n=6$ and $N=49$. Thus, the probability of one’s ticket being a jackpot winning ticket is $\pi = n!/N!(N-n)!$, which is almost 1 in 14 million in this 6/49 design. If the numbers that players choose are selected randomly then the probability that there would be NO winning tickets sold in a given draw with sales of S tickets is $\rho = (1-\pi)^S$.

The ability to choose one’s own numbers, rather than have a random number issued by the ticket vendor, is thought to be an important attraction of such games. On the one hand, being able to choose one’s own numbers rather than having them selected randomly is thought to increase the attractiveness of the game; on the other hand, the way players choose their numbers affects the probability of the n -ball jackpot prize



being won because there will be fewer unique tickets (i.e. tickets with specific combinations of numbers) sold than the actual number of tickets sold³.

The crucial feature of lotto is that in the event of there being no jackpot winners then the jackpot pool is transferred to the jackpot pool of the NEXT draw of the same game. This is known as a “rollover”. The simplest case is where the only prize pool is the jackpot one from matching all 6 balls drawn (nothing of substance is raised by the more general, and realistic, case where there are also prize pools for matching less than 6 balls). In this simplified case, if half of the sales revenue is returned as prizes (which is approximately true) then the jackpot for the t^{th} draw is $J_t = R_t + S_t / 2$, where $R = S_{t-1} / 2$ in the event of a rollover and 0 otherwise. Rollovers enhance the jackpot prize pool and make tickets better value and so increase sales. The expected value of the jackpot is given by $V_t = (1 - \rho_t) J_t / S_t$. The relationship between sales and expected value in a regular draw, not enhanced by a rollover, is monotonically increasing, but convex, because higher sales lower the rollover probability.

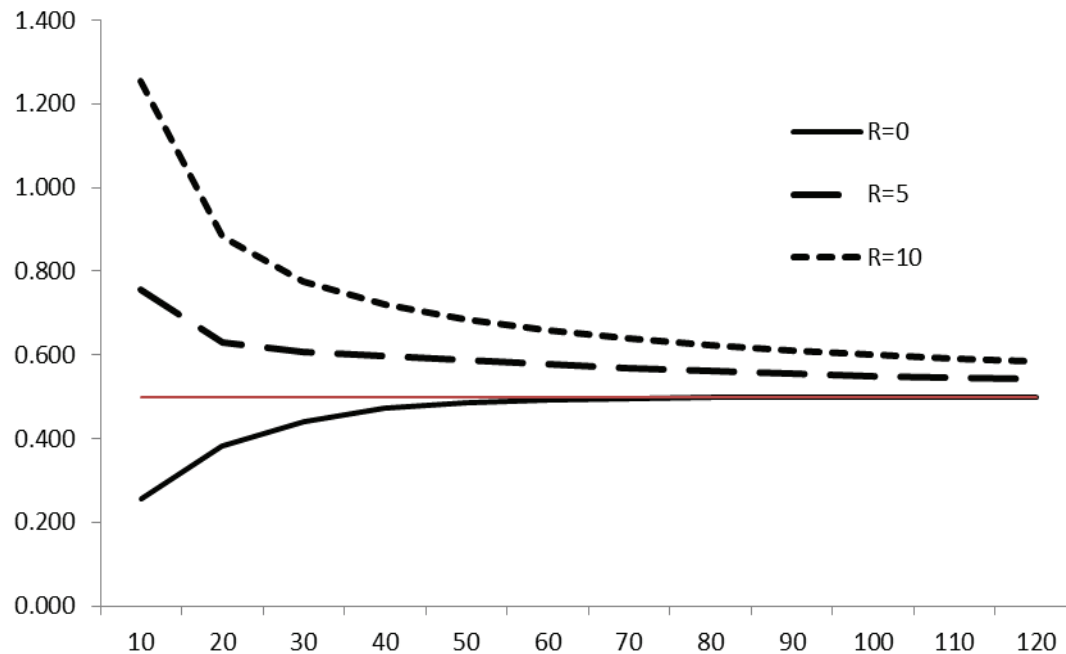
However, in a draw that has been enhanced by a rollover, while higher sales would reduce the rollover probability and raise the expected value of tickets as before, higher sales increase the chance that there will be more winners sharing the enhanced jackpot and this decreases the expected value of tickets. The relationship between aggregate sales and the expected value of tickets is given by the solid line in Figure 2 for the no rollover case and by the dashed lines for two illustrative levels of rollover. Note that as sales get larger the expected value asymptotes to $\frac{1}{2}$ (since the price of a ticket is £1 and the takeout rate in the UK lotto game is 50% because only half of sales revenue is returned as prizes). The expected value asymptotes to $\frac{1}{2}$ from below in the case of a regular draw, and from above in the case of a rollover-enhanced draw. In the latter case, the relationship between aggregate sales and expected value is non-monotonic but in the 6/49 case, even for a relatively small rollover, the expected value falls over the empirically relevant range and asymptotes towards $\frac{1}{2}$ from above.

NL offers two draws each week for their 6/49 design game in the UK: one at the weekend and the other midweek. The latter has considerably lower sales than the former. This implies that the midweek draw has a higher rollover probability than does the weekend draw and this lowers the expected value of a midweek ticket relative to a weekend ticket.

³ Thus, we might expect $(1 - \pi)^{\phi^S}$ with $0 < \phi < 1$ to provide a better estimate of the rollover probability where ϕ is the proportion of tickets sold that are unique (i.e. only ticket with a particular combination of numbers is sold) can be estimated as the ratio of the theoretical rollover probability to the observed proportion of draws that are rollovers. In our data we find that the proportion of rollover draws is 0.30 for midweek draws and 0.15 for weekend draws, while the theoretical expectations based on sales of 22 and 44 million respectively are 0.21 and 0.05.



Figure 2. Expected Value (£) and Sales (£m) in 6/49 Lotto: Rollover Effects.



However, when there is no jackpot winner this raises the *expected value* of a ticket in the *subsequent* draw. That is, the jackpot pool of a weekend draw will roll over to enhance the jackpot pool, and the expected value of a ticket, for the following midweek draw, and vice versa. Suppose weekend sales are approximately 40m, then the rollover probability is 12% (if players choose their numbers randomly), and the size of a rollover would be approximately £6m. If there were no rollover the expected value is approximately 0.5, but if there is a rollover then £6m of the £20m of prize money is transferred to the following draw. In which case, the expected value, *ex post*, is just 0.38. Thus, the expectation of the value of a ticket is the weighted average of these two values, which is approximately £0.48. Similarly, if the weekday sales are 20m then the rollover probability is approximately 25% and the jackpot pool is approximately, and on average, £3m. If a rollover occurs the value of a ticket in this draw is £0.36, while if it does not then the value is 0.5. Thus, the expectation of the value of a ticket in a typical weekday draw is the weighted average - approximately 0.47. The value of tickets in draws where the jackpot has been enhanced by a rollover from the previous draw depends on what the rollover does to sales: i.e. on the aggregate demand response. Assuming that the effect on demand is small enough to ignore, then a £6m rollover on a weekend draw would enhance the value of a ticket in a typical weekday draw by 0.3 to become 0.75, while a £3m rollover in a typical weekday draw would enhance the expected value on the subsequent weekend draw by 0.10 to become 0.59. Thus, the expectation of the expected value in the next draw depends on whether the current draw is a rollover or not and whether it is midweek or weekend. The importance of this variation in expected value, and hence in the effective price of a ticket, is that price in the current draw can be estimated with reasonable precision and depends on whether there was a rollover in the previous draw, **and** the expectation of the price in the next draw can also be estimated and depends on whether the *current* draw contains a rollover, or not. Since rollovers are random this feature of the game

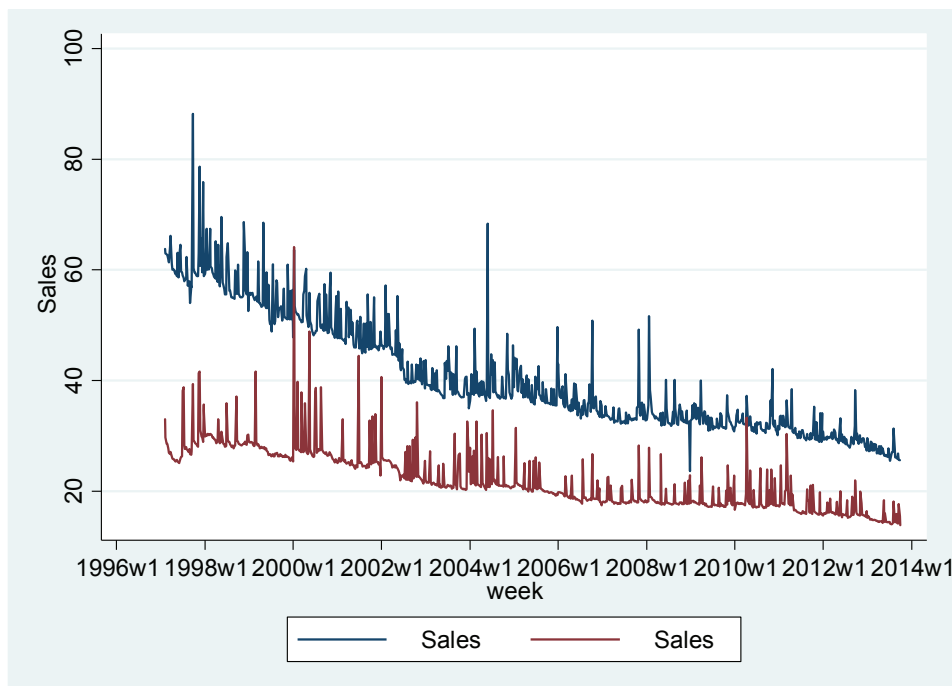


gives rise to exogenous variation in price and allows us to estimate the elasticity of demand. Moreover, since the expected price in the NEXT draw depends on whether the existing draw is a rollover and on whether its midweek or weekend we can also exploit variation in the expected future price.

The data comes from www.merseyworld.com/lottery and corresponds to the period between the addition of the midweek draw to the weekend draw in early 1996 to the point when the game design was changed in early 2014. This provides 1735 observations over a 17 year period. The dependent variable is log sales while the explanatory variables include a midweek dummy, a time trend (i.e the draw number), and the log price. The log specification is a useful one because it allows us to interpret the price coefficient as a price elasticity of demand.

The time series behaviour of sales can be clearly seen from Figure 3. There is a large decline in sales, even in nominal terms, for both weekend (blue) and weekday (red) draws. Sales end up in 2014 being around half their nominal levels in 1996. There are clear discrete jumps in sales in draws where the expected value has been enhanced by a rollover in the previous draw. Large spikes correspond to double or even treble (and one quadruple) rollovers and it is these jumps that allow us to recover a price elasticity. Less clearly visible are the above trend levels of sales in the draw or two after a rollover. This serial (and cross game serial) correlation in sales across successive draws is clear from our estimates and is well known in the industry where it is referred to as a “halo” effect. The halo effect is instrumental in countering the decline in sales that tends to occur during a rollover famine in lotto games.

Figure 3. Time Series of Lotto Sales (£m per draw): 1997 to 2014.



Red = weekday draws, Blue = midweek draws



Prior to the period shown in Figure 3 there had only been one draw per week and sales had been rising strongly – the distinctive change occurred when the midweek draw was introduced (also a 6/49 design) *and* the two games were linked together via their rollovers. Prior to this, weekend rollovers were quite frequent and were large. After the launch of the new draw, sales for the midweek draw were around half the weekend average. Rollovers were more frequent in the midweek draw but correspondingly smaller and so had a smaller effect on weekend sales than previous rollovers had. And these smaller changes in sales had a subsequent smaller halo effect. The combined effect is a long run fall in sales.

Table 1 presents estimates of the simplest possible specification where the dependent variable is log sales per draw and the explanatory variables include: log price (= log of £1 minus the expected value based on the expected prize pools, which will vary depending on whether the draw is a rollover or not), a draw trend to capture the long run decline over time, and a dummy variable to capture the lower demand for the midweek draw. The log price coefficient yields the demand elasticity and the coefficients on midweek and the trend can be interpreted as proportional effects on sales. We refer to this as our myopic specification. It is common to capture the dynamic effects on sales by including the lagged dependent variable as a regressor so, in addition to log price and the other two control variables, in column 2 of Table 1, we consider the effect of lagged log sales in the same game in the previous week (i.e. two draws ago) and the lagged level of sales in the previous draw of the other game. The coefficients on these lagged dependent variable capture the halo or habit effects arising from rollover-driven above trend sales in the previous draw in this game and in the previous week for the other game. We refer to this as the habit persistence specification. Finally, in column 3 of Table 1, we provide estimates of the Rational Addiction specification where sales depend on the current (log) “price”, the sales in the previous draw of that game (i.e. the lag of sales) and the sales in the *next* draw of that game (i.e. the *lead* of sales). The idea here is that, because people are forward looking and will buy more (less) now if they expect the future price to be low (high) and if the future price is high then future sales will be low. Indeed, full rationality implies that the positive effect on current sales of the lead of sales is equal in size to the positive effect of the lag of sales.

Table 1 presents coefficient estimates using least squares and their standard errors. All estimates are very precisely estimates and are highly statistically significantly different from zero. The myopic specification suggests a price elasticity of -0.46, and that midweek sales are close to 60% lower than midweek, controlling for the price, and that sales are falling at 0.04% draw (or about 4% per annum). The habit persistence specification captures the short run effect of price variation – a low price (rollover) boosts sales in the current draw (with a short run elasticity of about -0.43) *and* this boosts sales in the next draw (and, the next...). The long run elasticity is obtained by dividing the short run by 1 minus the coefficient on lagged sales (0.2) to give approximately -0.55. The habit persistence specification strongly rejects the simple model because of the strong significance of the lagged sales variable.



Finally, the last column provides estimates of the Rational Addiction model which examines the effects of current price *and* future and lagged price via their effects on future and lagged sales. That is, it includes the lead of log sales into the habit persistence specification. The theory suggests that (apart from time preference – irrelevant here because of the short time periods between draws) the negative effect of the expected future price on future sales and thence on current sales should equal the positive effect of the lagged price. That is, the coefficients on the lagged sales and the lead of sales should be positive and the same. Even though the coefficients are very precisely estimated we are still able to accept the null hypothesis that the coefficients on the lead and lag are the same. The other coefficients are close to their estimated values in the simplest specification. The model strongly rejects the habit persistence model because of the strong significance of the lead of sales variable. The long run elasticity is found by dividing the short run (-0.43) by 1 minus the sum of the lag and lead sales coefficients (i.e. by 0.73) to give approximately -0.6. This elasticity of -0.6 from our preferred specification gives us an approximate idea of the welfare gain from being able to play lotto – under certain assumptions the consumer surplus is half of the GGY divided by the (absolute value of the) demand elasticity. GGY is approximately £2.5 billion per annum so the consumer surplus enjoyed by players is approximately £2 billion per annum.⁴ The present value of such an indefinite flow of surplus would, using a discount rate of 5%, be approximately £40 billion!

The important methodological weakness of this analysis is that the lead of sales is endogenous, as too is the log price. The log price depends on whether there is a rollover and this depends in part on the level of sales in the previous draw – which is already included in the habit persistence model. The lead of sales is endogenous because it depends on the lead of log price which depends on whether there is a rollover in the current draw. Existing work on modelling lotto time series data relies on rollovers as a source of exogenous variation. This is not entirely convincing because the size of a rollover, if it occurs, depends on sales in the previous draw; and the probability of a rollover occurring also depends on the level of sales in the previous draw.⁵

⁴ There is an argument for disregarding the spending of problem gamblers in this calculation – although the rational addiction model would deny this. It is not clear what level of spending problem gamblers engage in but the 2010 Gambling Prevalence Survey provides responses to questions about the amount of monthly spend on lotto (and other forms of gambling). Only 4.7% of observations record more than a DSM score of 0, and only, 1.5% record more than 2. The usual definition of problem gambling using the DSM scale is a score of 4 or more is attained by less than 0.6% of people. Fitting a negative binomial to this data and calculating the predicted level of spending for different levels of DSM score we calculate that approximately 15% of sales is accounted for by those with DSM>0. In the light of the weak theoretical case for disregarding the spending by rationally addicted people and the small proportion of sales accounted for even those with just a modest degree of problem gambling we leave the problem gamblers in our calculations.

⁵ In extended work we explore a more convincing identification strategy which relies on the effect of the random nature of the winning numbers and the fact that players choose their numbers in a non-random way. For example, players favour birthdays to inspire their choice of numbers and these lie below 32. So when, by chance, numbers above 31 are drawn there is a greater chance of a rollover (see, Farrell *et al* (2000) for estimates of the importance of this effect). In extended work our results that exploit this idea as a source of instrumental variables show, nonetheless, similar conclusions.



Table 1. Estimates of Simple Specifications.

	<i>Myopic</i>	<i>Habit persistent</i>	<i>Rational addiction</i>
Constant	17.613 (0.013)	13.989 (0.166)	13.646 (0.172)
Midweek draw	-0.613 (0.004)	-0.727 (0.006)	-0.738 (0.007)
Draw trend	-0.0004 (0.0000004)	-0.0003 (0.0000006)	-0.0003 (0.0000006)
Log Price	-0.458 (0.013)	-0.432 (0.012))	-0.429 (0.012)
Lag log Sales		0.208 (0.009)	0.125 (0.015)
Lead log Sales			0.102 (0.016)
R ²	0.955	0.964	0.965

Note: Standard errors in parentheses.

3. Problem gambling

Our analysis of problem gambling relies on data from two sources. The first is the 2010 UK Gambling Prevalence Survey (GPS), which is the third such survey in the UK but the first to contain detailed information about gambling expenditures (per month) as well detailed information about problem gambling, defined in several ways. The GPS is a survey of 7748 individuals aged 16+. The sampling was conducted in the first half of 2010. 73% said that they gambled in the previous year (up from 68% in the previous GPS 2007 survey) with still only a relatively small proportion gambling online. The vast majority of gamblers say they take part “because it’s fun” and “for the chance of winning big money”. The two GPS measures of problem gambling show an increase in the number of problem gamblers in Britain. The proportions increased from 0.5% of the adult population in 2007 to 0.7% in 2010 (which is not a statistically significant rise) on one measure and from 0.6% in 2007 to 0.9% in 2010 (which is at the margins of statistical significance) on the other measure used. These rates are similar to those in other European countries (Germany, Norway and Switzerland) where this has been measured and are lower than countries like the USA, Australia and South Africa. The majority of gamblers did so through participation in the NL: 60% of GPS respondents reply that they gambled in the previous month and two-thirds of these did so through the purchase of NL lottery tickets. 60% of lottery participants replied that they bought lottery tickets at least weekly. The DSM measure of problem gambling is a score from 0 to 10 based on 10 yes/no questions asked of gambling participants in the GPS (in extended work we also consider the PGSI data that is also recorded in GPS 2010 – the results are essentially the same as those reported here).

Figure 4 shows the highly skewed distribution of the DSM score obtained from summing the responses to the questions. It is clear from the distribution that, no matter how problem gambling is defined on the basis of such a methodology, it will be



both small and very imprecisely measured even in fairly large samples. If problem gambling is as small as is suggested in these measures then it will require very large samples to track any changes that might be occurring over time. Moreover, given the highly skewed nature of the distribution it will also require very large samples to provide the power to be able to uncover statistical significant factors associated with problem gambling. Random sampling is unlikely to be an economic way of understanding and tracking problem gambling. This is an important lesson for future research.

The data suggests that only 0.6% of gamblers have a DSM>3 – the usual definition. Indeed only 4.5% have a DSM>0. While this is a small percentage the base is a large number. The UK adult gambling population is approximately 10 million so 0.6% who satisfy the strict usual definition of problem gambling would approximate to 60 thousand individuals at any one time, while the more modest definition of problem gambling of DSM>0 would imply around 450 thousand individuals.

The existing literature has not been able to place a money metric on the loss in well-being that problem gamblers feel. Here, we attempt to do so by evaluating the variation in well-being associated with different levels of DSM and with different levels of income. We exploit the responses to the question “How, on a 1 to 10 scale, do you feel about life as a whole” in GPS 2010. Similar questions have been used elsewhere to evaluate the effects of life events such as divorce. Figure 5 shows the level of well-being associated with different levels of DSM. It is notable that having DSM>0 seems to matter much more than the level of DSM above zero. Indeed, the differences in wellbeing for DSM values over 0 are not significantly different from each other. This might suggest that policymakers should focus on a lower value of DSM rather than >3. The focus on DSM>3 clearly misses out the majority of the loss in well-being associated with gambling behaviour.

Figure 4. Distribution of Problem Gambling Score: DSM.

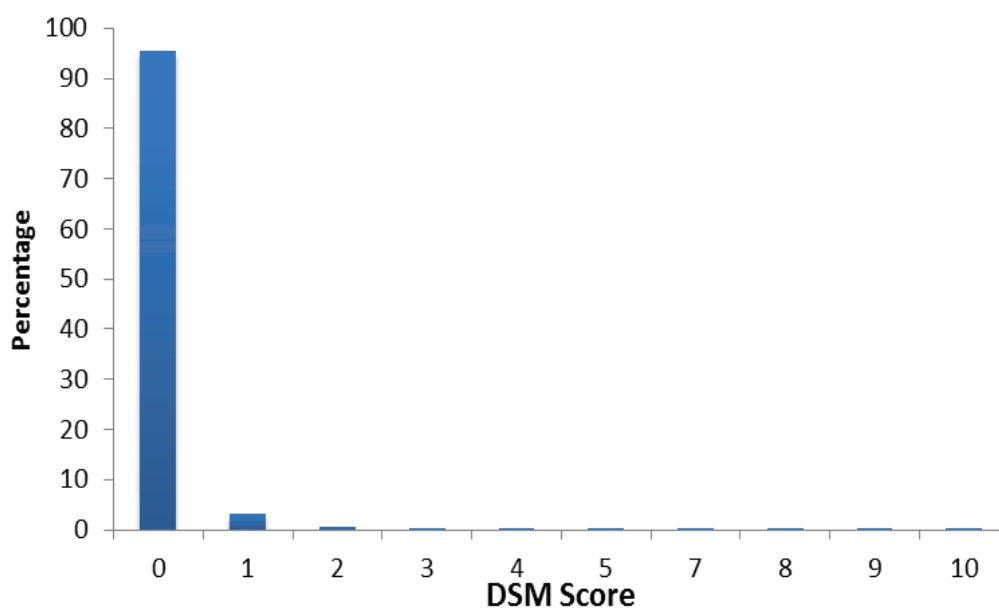
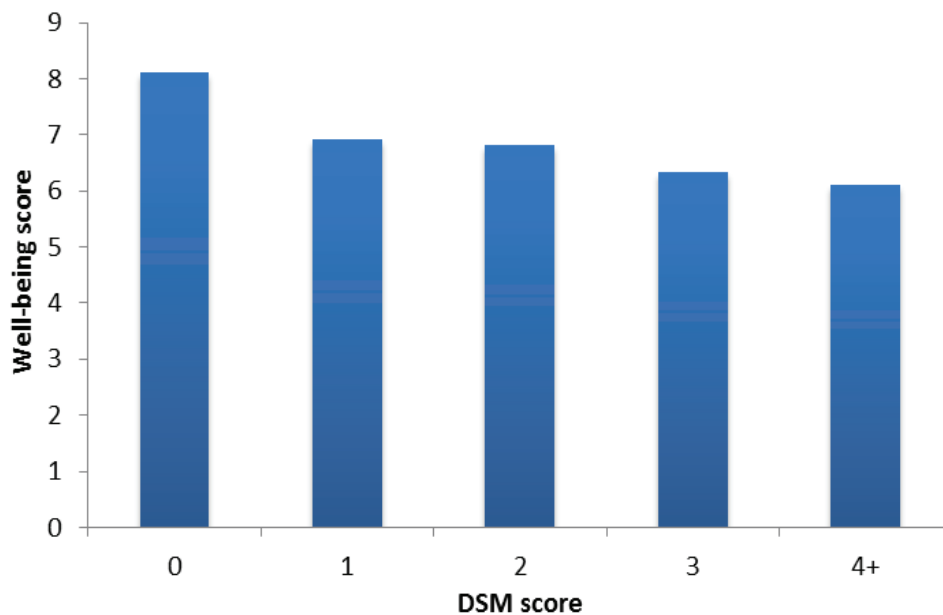




Figure 5. Well-being (1-10 scale) by DSM.



Nonetheless, there are predictable associations with exogenous variables in the GPS data that are familiar in this literature: the DSM score is higher for younger individuals, for men, and for whites. However the explanatory power of a fully saturated model of the DSM score that contains all three variables and their interactions is less than 0.05. Moreover, while the GPS data allows the correlations between problem gambling and various gambling expenditures to be estimated, the precision of such estimates will be small. The approach taken in previous studies of the determinants of individual self-reported well-being is to regress well-being against income and other factors – in our case the DSM score. The existing literature sometimes provides estimates of the “value” of some attribute, like being married, by dividing the coefficient on that attribute and the coefficient on (log) income. For example, Blanchflower and Oswald (2004) estimate that the value of being married (as opposed to single/separated/divorced/widowed) is equivalent to having an additional \$100,000 of annual income. However Deaton and Kahneman (2010) cast doubt on the reliability of simple measures of well-being.

Of course, just because small numbers of individuals seem to experience what are conventionally thought to be problem gambling does that mean that the problem is unimportant. If it were the case that the effects of being a problem gambler were very serious then it would still be a matter of concern for policymakers. In fact, the coefficient on an indicator that $DSM > 0$ in a well-being equation that controls for log annual income⁶ is a highly significant -0.765 (s.e. 0.055), while the log income coefficient is 0.072 (s.e. 0.022). Since the DSM coefficient on well-being is 10 times the size of the log income effect it follows that a unit rise in DSM is equivalent in its effects

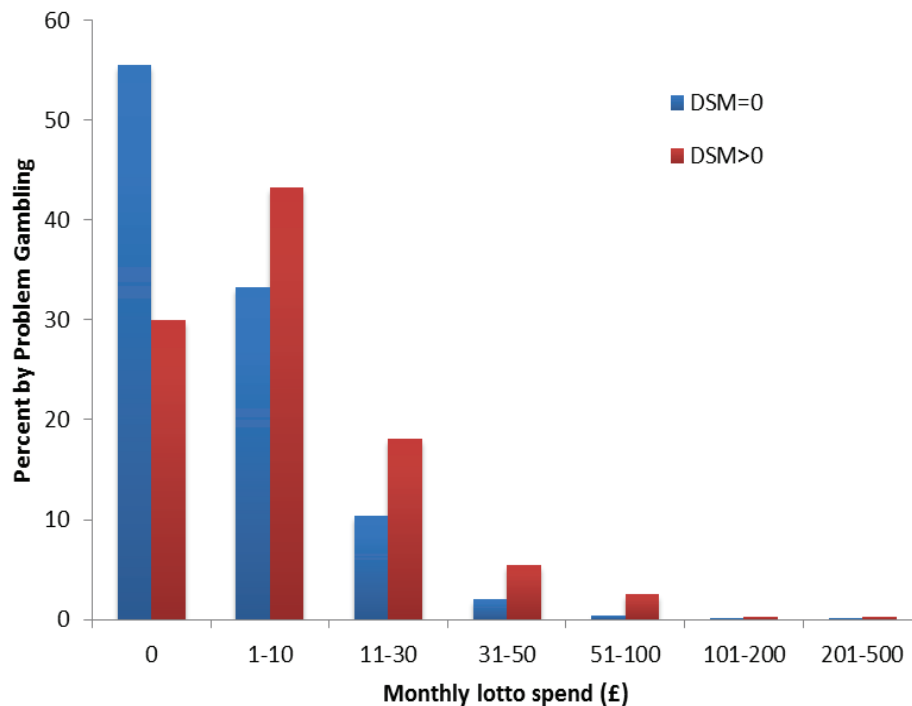
⁶ Income is reported in bins in the data. We fit a log-normal distribution to this histogram and take the conditional expectations of income within each cell as our explanatory variable.



on well-being of a fall in income of approximately 100%, when average annual income is approximately £26,000. If this were the average effect experienced by 450 thousand individuals with DSM>0 in the gambling population then this would imply a £12 billion loss in aggregate well-being. This is a large loss but less than one third of the aggregate £40 billion benefits associated with being able to play lotto ad infinitum.

However, it is very difficult to establish that the estimated effect of being a problem gambler on well-being is a *causal* effect. It seems likely that any *unobservable* determinant of well-being is very likely to be correlated with problem gambling. This would contaminate the inferences one can make from our simple estimates and it would be inappropriate to conclude that problem gambling causes unhappiness. For example, one important determinant of low well-being is being single – our estimate of the effect of being single (whether through separation, divorce or the death of a spouse – they have approximately the same effect on well-being) is approximately the same as the effect of DSM>0 on well-being. However, the effect of DSM>0 remains unchanged when being single is included in the model. This suggests that the extent of bias in our estimate of the causal effect might be quite limited and that the coefficient of -0.765 may be quite a tight upper bound to the true causal effect. On the other hand, the effect of income is likely to be a lower bound because, by its construction, it exhibits considerable measurement error that will attenuate the estimated coefficient towards zero. However, similar estimates of the effects of income on well-being abound in the literature even when income is more accurately recorded. Caution seems especially appropriate when our estimates of the determinants of lotto behaviour are consistent with rational addiction: taken at face value this suggests that.

Figure 6. Lotto spending distribution by DSM.





It also seems likely that lotto gambling expenditure and problem gambling are jointly determined – both are correlated with unobservable factors. Figure 6 shows the relationship between lottery spending and DSM in the cross-section. The proportion who spend between £30 and £50 a month is just 11%, but this proportion is 10% for DMS=0 and 18% for DSM>0. The gap is even larger at very high levels – over six times as many problem gamblers as non-problem gamblers spend more than £50 per month. However, this figure tells us nothing about causality.

Lotto is widely regarded as being a benign form of gambling, partly because the frequency of draws is low so the ability to play repeatedly is low. In contrast, scratchcards are just as easily available as lotto but it is possible to buy them repeatedly. The distinction between problem and non-problem gamblers is now sharper: the average monthly spend on scratchcards is almost eight times larger than for non-problem gamblers compared to just double in the case of lotto. Table 2 shows (marginal effect) estimates of the effect of lotto spending on DSM>0 relative to someone who spends nothing on lotto: adding additional variables makes little difference to the conclusion – problem gambling (i.e. DSM>) is positively associated with lotto spending with, for example, modest spending raising the probability of DSM>0 by approximately 50% relative to a non-spender. We find even larger effects for other forms of gambling.

Table 2. Probit Estimation with Dependent Variable DSM>0 using GPS 2010.

<i>Lotto spending</i>	<i>A</i>	<i>B</i>	<i>C</i>
£1-10	0.398 (0.057)	0.501 (0.061)	0.511 (0.062)
£11-30	0.552 (0.075)	0.706 (0.081)	0.712 (0.082)
£31-50	0.699 (0.132)	0.824 (0.138)	0.830 (0.139)
£51+	1.303 (0.196)	1.476 (0.201)	1.490 (0.203)

Note: Coefficients are marginal effects. Zero lottery spending is the excluded category. Column A includes only the lottery spending dummy variables; Column B also includes age, age squared, ethnic dummies, and sex; column C also includes marital status dummies and regional dummies.

Gambling expenditure, included as an explanatory variable in a model of problem gambling, will be endogenous and the estimated effect of expenditure on problem gambling will be a biased estimate of the causal effect because the coefficient will estimate both the effect of expenditure **and** the effect of unobservables to the extent that these are correlated with expenditure. Since it seems likely that the unobservable determinants of problem gambling are positively correlated with expenditures then the least squares estimate will be an upward biased estimate of the causal effect of expenditure alone. Resolving this difficulty is beyond the scope of this paper. Table 2 shows that there are strong effects and this seems stable even when additional covariates are included in an attempt to drive out the unobservables. This is not conclusive but points to some role for lottery spending in problem gambling.



4. Policy Implications and Concluding Remarks

We produce evidence of a large consumer surplus associated with being able to play lotto. On the other hand, if problem gambling were defined as a score on the DSM scale which is greater than 0 the problem amounts to around 4.5% of the adult gambling population, which approximates to 450 thousand individuals in the UK. Moreover, the empirical evidence presented here suggests that DSM is (negatively and significantly) correlated with well-being and the effect is large – DSM has an effect which is of the same order as being single rather than married (or cohabiting). However, this is likely to be an upper bound on the casual effect - but it is a large effect. It is not possible to identify the true causal effect but it is likely to be much lower than this because income and problem gambling may be positively correlated with each other for spurious reasons - for example riskier jobs pay better.

Our research turned to consideration of the economic factors underlying demand. Here we found strong evidence of habituation (from the lagged dependent variable) and some evidence of rational addiction (that we infer from the effect of future prices of current demand). The implication of the rational addiction finding is, taken at face value, dramatic – while we DO estimate that problem gamblers are dramatically worse off, in terms of their well-being, than individuals who are not problem gamblers we cannot conclude that, in a lifecycle sense, that this is a welfare loss imposed by gambling. Rather it is the welfare consequences of the *higher* levels of wellbeing experienced by these individuals while they have been acquiring this problem. This rational addiction finding, which has also been found for smoking in US data, comes from the forward looking behaviour in just one form of gambling. While it would be desirable to establish whether this was more generally true the prospects for doing so are poor. We are able to produce these estimates for lotto only because of the peculiar nature of the product. It is not possible to replicate this analysis for other forms of gambling.



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Conclusions

Deliverable D10.1 offers valuable insights into the costs, profits and retail expenditures of alcohol, tobacco, heroin, cocaine and gambling. In Report 1, Baumberg (UNIKENT) looked at the share of alcohol and tobacco consumption and expenditure that is accounted for by addicts. The study concluded that:

1. Addicts accounted for a substantial share of both tobacco and alcohol consumption across Europe.
2. Addicts seem to account for a greater share of total consumption for tobacco vs. alcohol. While this is perhaps to be expected given that tobacco use has sometimes been equated to tobacco dependence (see the discussion in Marmet et al, 2014) in ways that are not true for alcohol, it is perhaps surprising that the share of tobacco addicts is lower than we might expect (38-64% of cigarette consumption depending on the definition of dependence), and the share of alcohol addicts is perhaps higher than we might expect (15-20% of total consumption).
3. Tobacco addicts spend some €49-54bn (if dependence is assessed using DSM-IV) or €69-88bn (if using FTND) on cigarettes across the EU, while alcohol addicts spend €44-63bn on alcoholic drinks.

In using these figures we must be aware of various uncertainties that are not accounted for within these ranges, so the precise differences between e.g. addicts' spending on alcohol and tobacco across the EU should not be over-stated. Moreover, it should not be assumed that the share of addicts in consumption will be the same as the share of addicts in expenditure – there is evidence that e.g. alcohol addicts spend less per drink than non-addicts. Still, this analysis offers a first estimate of addicts' spending on alcohol and on tobacco in the EU, and it is hoped that the rough estimates provide a useful input into policymaking.

Report 2, by RAND Europe, UNICRI, UTRIP and TUD, presents findings from analysis of new data, collected especially for the ALICE project, through interviews with imprisoned drug dealers and traffickers. Report 2 explores a number of areas relating to how dealers entered the market and how they operated their dealing businesses. For example, we found that dealers in the Italian and Slovenian samples often offered discounts to customers. Another important set of findings relates to the costs of drug dealing and to how dealers spend their profits. While dealers in the samples were in general not able (or not willing) to discuss the costs of doing business in much detail, they discussed some of the broad types of costs, including direct sales-related costs such as the payment of packaging materials (foil, bags, etc.) or the rental of apartments for storage and mixing the drugs. Dealers also mentioned the payment of bribes and other costs which were not necessarily business-related (for instance, in relation to their 'lifestyle'). In terms of the investments made by dealers with the drug dealing profits, these ranged from the payment of more immediate consumer goods to investments in residential property and other illicit activities. Dealers' perception of profitable products or businesses tended also to focus on illicit activities. For example, when asked about the types of products, other than drugs, that dealers would recommend, how much profit could be made, and why they would recommend involvement with those products and businesses, trafficking and sale of firearms was mentioned by several dealers in the Italian sample.

Finally, report 3 on gambling, by Ian Walker, was able to achieve much more than what was originally anticipated. The work shows how much price changes drives gambling expenditure; and to what extent (even lotto) expenditure causes problem gambling; and, even though the extent of problem gambling is small, the study shows the large extent that problem gambling causes a reduction in individual well-being. Moreover, through the inclusion of new information on "well-being" the report is able to look, for the first time, at whether problem gamblers were really unhappy. Data suggests that problem gamblers (even using a very



conservative definition of problem) are much less happy than non-problem gamblers. However this does not imply that problem gambling cause low well-being – causality might be in the opposite direction: it may be the case that miserable people become problem gamblers.