

## Policy Analysis

# A social cost perspective in the wake of the Portuguese strategy for the fight against drugs<sup>☆</sup>



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## ABSTRACT

The Portuguese National Strategy for the Fight Against Drugs (NSFAD), approved in 1999, was explicitly grounded on the values of humanism and pragmatism and paved the way for the decriminalization of illicit drug use in Portugal in 2000. This paper presents an analysis of the social costs of illicit drug use in the wake of the strategy's approval. Taking into consideration health and non-health related costs, we find that the social cost of drugs decreased by 12% in the five years following the NSFAD's approval and by a rather significant 18% in the eleven-year period following its approval. Whilst the reduction of legal system costs (possibly associated with the decriminalization of drug consumption) is clearly one of the main explanatory factors, it is not the only one. In particular, the rather significant reduction of health-related costs has also played an important role.

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## Introduction

In November 2000, the Portuguese Government approved the decriminalization of illicit drug possession and consumption. This has stimulated an interest, among the international community, on the Portuguese policy of drug decriminalization (e.g., [Greenwald, 2009](#); [Hughes & Stevens, 2010, 2012](#); [Loo, Beusekom, & Kahan, 2002](#)). However, there is a tendency to focus on the decriminalization of illicit drug use per se (e.g., [Coelho, 2010](#); [Greenwald, 2009](#)),

overlooking that it was part of a wider institutional framework dealing with the drug problem: the National Strategy for the Fight Against Drugs (NSFAD), approved by the Government in 1999. This strategy, which was rooted in a health-oriented rationale, paved the way for a number of policy measures that included, but were not restricted to, the decriminalization of illicit drug possession and consumption. But, as it is evident in parliamentary debates, all these measures were highly controversial regarding their expected social and economic effects.

Therefore, this paper's main objective is to provide an assessment of the social cost of illicit drug use in Portugal since the NSFAD's approval in 1999. In doing so, we follow as closely as possible [Kopp and Fenoglio \(2001\)](#), who analyse the social costs of drugs – taking into account health and non-health related costs, both direct and indirect, associated with illicit drugs – using the cost-of-illness approach.

It is tempting to use this type of framework to, simultaneously, carry out an impact assessment of the NSFAD.<sup>1</sup> However, the crucial

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<sup>1</sup> A previous version of this paper, and the broader research report where this research originated, had that objective (to use the social cost analysis as the basis of an ex post impact assessment) in mind, in the spirit of [Nosyk's \(2012\)](#) suggestion that standard evaluation methods should be used whenever possible to assess drug policies' impacts – of which [Andresen and Boyd \(2010\)](#) is a good example.

element of impact assessments is the determination of causality: to identify and test causal relationships between a given policy and all of its possible and significant consequences. Although the social cost analysis we carry out in this paper does allow for the identification and measurement (in social cost terms) of the main changes which have occurred regarding illicit drug use in Portugal since the NSFAD's approval, it is difficult to establish clear and direct causal relationships. For example, the NSFAD contains multiple policy objectives as well as multiple mechanisms in order to achieve them. Moreover, some of those mechanisms – for instance, the deployment of a national network of centres for drug addiction treatment – were implemented partly before the approval of the NSFAD in 1999, while others – such as the decriminalization of drug use in 2000 – were implemented sometime after its approval. Therefore, the evolution of social costs of illicit drug use after 1999 reflects not only various policy measures, some of which are directly associated with the NSFAD while others are not, but also other factors – economic, sociologic, demographic, etc. – which make it difficult to establish such causal relationships.

Several other authors have estimated the social cost of drugs in a variety of countries. However, as [Vander Laenen, Vandam, and De Ruyver \(2008\)](#) note, these estimates are not directly comparable, because they typically have different objectives, follow different methodologies and use different definitions of social costs. For instance, looking at Canada, [Rehm et al. \(2007\)](#) quantify the social costs of drugs, as well as of alcohol and tobacco, while [Fenoglio, Parel, and Kopp \(2003\)](#), making use of a social cost definition very close to the one we have used, estimate the social cost of drugs in France in 1997. [Origer \(2002\)](#) has quantified the social cost of drugs for Luxemburg in 1999, but focuses mainly in direct costs.

Our findings are, in our opinion, interesting and somewhat surprising. First, we observe a reduction of approximately 12% (on average) in the social cost of drugs in the 5-year period that followed the NSFAD's approval, in 1999, and a rather significant 18% (average) reduction until 2010. Second, this social cost reduction is rooted only partly on the observed reduction of the (direct and indirect) legal system costs associated with (the fewer) individuals imprisoned for drug-law offences, especially after the decriminalization of drug use. Third, another main explanatory factor for the reduction in social costs was the rather significant reduction in indirect health costs, namely the reduction of drug-related deaths. Although there has been an increase in (direct) health-related costs for drug addiction, this increase was small compared to the rather significant reduction in the remaining health-related cost categories we look at.

Following this introduction, section 'Overview of the Portuguese drug policy' briefly describes the NSFAD. Section 'Methodology' summarizes the methodology. Section 'Research findings' presents the main research findings, and section 'Conclusion' concludes. An [Appendix](#) describes in greater detail the data and the methodological assumptions underlying our results.

### Overview of the Portuguese drug policy

The Portuguese drug policy is shaped by the ideas of pragmatism and humanism, and it has evolved towards the decriminalization of drug consumption ([Agra, 2009; Dias, 2007; Poiares, 1995](#)). But it took a long way to develop into its current state: according to [Agra \(2009\)](#), the trajectory of regulation on the drug problem has been marked by three stages:

- 'attentiveness and resistance' (ranging from 1909 to 1970): the Portuguese drug policy resisted the prohibitionist movement led by the US and China during the Shanghai conference of 1909, for cultural and financial reasons. In mainland Portugal, at the time,

drug consumption was restricted to an economic and social elite that did not commit crime as a means to finance addiction, but in overseas territories, namely in Timor and Macau, drug consumption was widespread. Therefore, the drug laws approved in 1924 and in 1927 were only concerned with drug transaction and intended to regulate drug trading so as to prevent taxation frauds ([Agra, 2009; Marques, 2008; Poiares, 1995](#));

- 'excessive adhesion' (1970–1983): in 1970, Decree-Law no. 420/70 criminalized illicit drug use for the first time in Portugal and was implemented in a turbulent historical period (the authoritarian political regime led by Marcello Caetano was challenged by the opponents of the regime and faced the economic and social consequences of the colonial wars that endured since the early 1960s), at a time of international pressure to take measures on drug trafficking and consumption. Nonetheless, as it is emphasized by [Agra \(2009\)](#), what is most remarkable about this law is that it was excessively alarmist, at least up to the 1980s, given the reduced dimension of illicit drug consumption in Portugal;
- 'contraction of criminal perspective and damage reduction policy' (1983–2000): between 1975 and 1982 drug consumption as a crime was increasingly re-conceptualized as a disease. During the 1980s and 1990s, the perspective that dominated legislative discourse was indeed that of drug consumption as a health-related problem, and, correspondingly, that of the drug addict as someone in need of treatment and social reintegration. The new legal regime of 1983 (Decree-Law no. 430/83) had a salient characteristic that was kept in the later Decree-Law no. 15/93: it instituted the distinction between drug trafficking and drug consumption, as it strongly sanctioned the former, but established only 'symbolic' sanctions for the latter, which involved the possibilities of dismissal and discharge ([Agra, 2009](#)).

In 1995, a Committee for the Assessment of Drug Addiction, Consumption and Traffic was created within the Portuguese Parliament. Moreover, a multidisciplinary experts' group was created by governmental initiative in 1998, and given the task of drafting guidelines for future drug policy. The subsequent report, as well as the public debate surrounding these initiatives, laid the foundation of the NSFAD.

The NSFAD, which very closely follows the expert group's report, was published as a Resolution of the Council of Ministers (no. 46/99) in 1999. It sets the guidelines for the Portuguese public policy on drugs, namely regarding international cooperation, prevention, treatment, harm reduction, social reintegration, supply control and demand reduction. The document is organized in eight general principles, six objectives and the following thirteen strategic options (as translated by [Moreira, Trigueiros, & Antunes, 2007](#), pp. 15–16):

- “(i) To reinforce international cooperation [ . . . ];
- (ii) To decriminalize the use of drugs, prohibiting them as a breach of administrative regulations;
- (iii) to redirect the focus to primary prevention [ . . . ];
- (iv) to extend and improve the quality and response capacity of the health care network for drug addicts [ . . . ];
- (v) to extend harm reduction policies, namely through syringe and needle exchange programmes and the low-threshold administration of substitution drugs [ . . . ];
- (vi) to promote and encourage the implementation of initiatives to support social and professional reintegration of drug addicts [ . . . ];
- (vii) to provide treatment for imprisoned drug addicts and to extend harm reduction policies to prison establishments [ . . . ];
- (viii) to provide voluntary treatment as an alternative to prison sentences for drug addicts;

(ix) to increase scientific research and the training of human resources in the field of drugs and drug addiction [ . . . ];  
 (x) to establish methodologies and procedures for evaluation of public and private initiatives in the field of drugs and drug addiction;  
 (xi) to adopt a simplified model of interdepartmental political coordination for the development of the national drug strategy [ . . . ];  
 (xii) to reinforce the combat against drug trafficking and money laundering and to improve the cooperation between different national and international authorities;  
 (xiii) to double public investment to PTE (Portuguese escudo) 32 billion (€ 159,615,327.06) (at a rate of 10% a year) over the next five years [ . . . ]”

The decriminalization of illicit drug acquisition and possession for personal use (understood as that which does not exceed the quantity needed for an average individual consumption for a period of 10 days) was approved in November 2000 (via Law no. 30/2000) and entered into force on the 1st July 2001. Drug acquisition and possession are considered as administrative offences, which are to be sanctioned by the new Commissions for the Dissuasion of Drug Addiction (CDTs). As described by [Hughes and Stevens \(2010, p. 1002\)](#), the CDTs work as follows:

“The CDTs are regional panels made up of three people, including lawyers, social workers and medical professionals. Alleged offenders are referred by the police to the CDTs, who then discuss with the offender the motivations for and circumstances surrounding their offence and are able to provide a range of sanctions, including community service, fines, suspensions on professional licenses and bans on attending designated places. However, their primary aim is to dissuade drug use and to encourage dependent drug users into treatment. Towards this end, they determine whether individuals are dependent or not. For dependent users, they can recommend that a person enters a treatment or education programme instead of receiving a sanction. For non-dependent users, they can order a provisional suspension of proceedings, attendance at a police station, psychological or educational service, or impose a fine.”

Drug decriminalization is an important policy measure of the NSFAD. But it is only one of the measures adopted to deal with the drug problem. Indeed, it coexists with other measures and resources such as the extension of the healthcare services network and the syringe exchange programme, the increase in scientific research and specialist training and the significant financial budget rise. For instance, the NSFAD has increased the importance of the Inter-Ministerial Council for the Fight Against Drugs and Drug Addiction and led to the setting up of the Portuguese Institute for Drugs and Drug Addiction (IDT).

## Methodology

### Overview

Our primary objective is to quantify the social costs of illicit drug use since the approval of the NSFAD, in 1999. We largely follow [Kopp and Fenoglio \(2001\)](#) both in the definition of social costs of illicit drug use, as well as in the calculation methodology. The latter is based on the cost-of-illness approach, that is, “the social cost of illness is equivalent to the cumulative costs generated by the illness without taking account of the fact that some activities to which the illness gives rise may actually create wealth” ([Kopp & Fenoglio, 2001, p. 14](#)). In other words, drug use is viewed as a disease, with a wide range of consequences both for the individual as

well as for society, which generates costs and, therefore, consumes resources which would otherwise have alternative uses. In practice, social costs of drug use in any given year are viewed as a sum of public expenditure on drugs, private costs (incurred by individual drug users) and costs incurred by society (indirect costs, such as lost productivity). As [Kopp and Fenoglio \(2001\)](#) and [Fenoglio et al. \(2003\)](#) argue, this cost-of-illness approach has been widely used to analyse the social costs of mental illness, alcoholism, car accidents, or smoking and is very helpful in the formulation of policy decisions (see [Segel, 2006](#), for a more thorough review of the methodology and many of its policy-related uses).

Regarding the definition of social costs of drug use, different researchers have adopted different definitions. We also follow [Kopp and Fenoglio \(2001\)](#) in their categorization of social costs (which, in any case, is very similar to [Garoupa & Soares, 2007](#)): social costs are divided according to their main driver (health-related vs. non-health related costs) and according to their relationship to drug use (direct or indirect). However, we focus on a subset of the long list of drug-related effects presented by [Kopp and Fenoglio \(2001, Table 1, p. 15\)](#) because of data availability problems. For instance, some of the costs outlined by [Kopp and Fenoglio \(2001, Table 1, p. 15\)](#) which we have not included are the costs of pharmaceuticals (direct, health-related), drug-related crime-victim costs, drug-related crime other than drug-law offences, drug-related property destruction (direct, non-health related) or drug-related crime-victims' lost productivity (indirect, non-health related). Therefore, our calculations are likely to underestimate the true social cost of drug use. [Table 1](#) summarizes the social costs considered in this paper.

### Data

Despite the benefits of qualitative research methods such as ethnography or actor network theory (for a recent overview, see [Vitellone, 2013](#)), the approach we have taken to carry out the analysis has been to rely essentially on publicly available data. While being advantageous from a transparency and availability viewpoint, this approach raised significant challenges especially when attempting to identify cost indicators for our analysis. Therefore, we had to formulate a number of assumptions in order to be able to obtain a cost figure for each and every type of cost identified in [Table 1](#) throughout the (relatively long) period we were looking at. These assumptions were chosen to be as conservative as possible (so as not to ‘inflate’ the social cost calculations) and were applied in a consistent and coherent manner (so as not to introduce biases in the cost calculations). We describe all the assumptions in greater detail in the [Appendix](#). All of our data sources are listed in the bibliography (and clearly identified in each calculation) but most of the ‘output’ data (main indicators of the drug situation in Portugal, e.g., number of drug users infected with HIV or hepatitis B/C, number of syringes exchanged, number of drug law offences, etc.) comes from the IDT annual reports and from the annual EMCDDA reports on Portugal. Finally, all cost figures are presented at constant 1999 prices.

As a short overview of the data we have used, we can clearly say that in the period under analysis (1999–2010), much has changed in the drug situation in Portugal. Between 2001 and 2007, there was an increase in the percentage of the population which has used drugs at least once in the previous year (meaning the year preceding the year of reference of the questionnaire), but this was mainly driven by older (over 24 years old) people (indeed, the ‘use’ rate for 15–24 years old decreased). Also, a lower percentage of school-age individuals (15 or 16 years old) consumed drugs at least once in the last year, particularly from 2003 onwards. Therefore, despite fears that the decriminalization of drug use would contribute to higher levels of drug consumption, these appear not to have materialized.

**Table 1**  
Drug-related social costs considered.

Type of cost	Direct cost	Indirect cost
Health-related	Treatment, prevention and risk and harm reduction of drugs Health costs associated with the consequences of drug use (hepatitis, HIV/AIDS)	Lost income and production due to drug addiction treatment Lost income and production due to drug-related death
Non-health related	Social rehabilitation Legal system costs associated with drugs	Lost income and production of individuals arrested because of drug-related crimes

With respect to the outpatient treatment of drug addiction, the number of new patients has decreased from 1999 onwards, although the overall number of patients under treatment has increased steadily. This suggests that drug users undergo longer spells of outpatient treatment. Inpatient care has also increased slightly from 1999 onwards. However, patients undergoing (outpatient or inpatient) treatment report significantly lower HIV or hepatitis B/C infection rates. Also, the number of deaths with positive toxicology reports for the use of illicit drugs has decreased from 1999 until 2004 and increased from then onwards (although, in 2010, the number of such drug-related deaths was lower than in 1999).

Until 2000, there was a steady increase in the number of drug-law offences, which has decreased significantly between 2000 and 2001. Note that the decriminalization of drug use was implemented in Portugal in 2001, which despite considering drug use to be a (punishable) offence, no longer considers it a crime. The main drug associated with these drug-law offences changed: from 2000 onwards it was no longer heroin, but cannabis. The number of individuals imprisoned for drug-law offences has also been decreasing (especially from 2002 onwards), as well as their proportion in the overall prison population.

## Research findings

### Health-related costs

As outlined in Table 1, we have looked at direct and indirect health-related costs. The majority of labelled direct costs associated with treatment, prevention and risk and harm reduction of drugs were supported, from 2003 onwards, by a single public institute – IDT – created by Decree-Law no. 269-A/2002. Therefore, we have used IDT's annual budget (from 2003 onwards) as a proxy for these direct costs. For the years 1999–2002, we have used a pseudo-IDT annual budget, collecting cost data from the various entities which executed IDT's tasks and responsibilities prior to 2003 (see Appendix for more details). The top left graphic in Fig. 1 displays these costs.

In addition to these (direct) costs, we have also looked at health expenditure associated with treatment for drug addiction-related problems in the Portuguese National Health Service's hospitals. It is rather complex (perhaps impossible) to determine with precision all hospital costs associated with the treatment of drug-related health problems. Therefore, we have focused on the main pathologies which may lead a drug user to resort to hospital services, namely those that are included in the Major Diagnostic Categories (MDC) number seven ('Hepatobiliary System And Pancreas', which includes hepatitis) and twenty-five ('HIV infection'). With these pathologies in mind, we have proceeded to the estimation of drug-related (direct) hospital costs (see Appendix for a detailed overview of the estimation methodology), which we present as the top right graphic of Fig. 1.

The third (and final) direct health-related cost element is the syringe exchange programme, implemented in Portugal since 1993 and financed by the National Commission for the Fight Against HIV/AIDS (CNLCS). The cost of this programme is, therefore, not

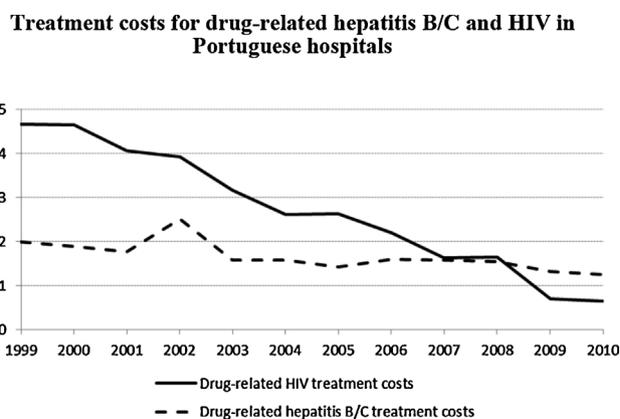
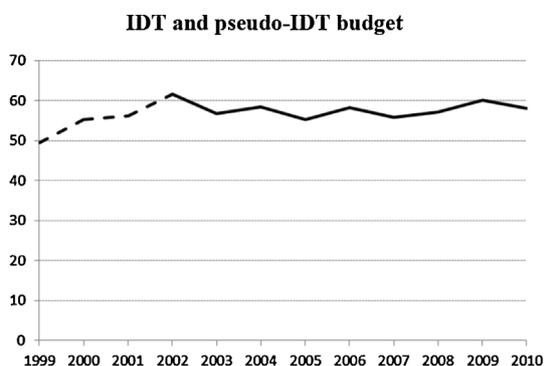
included in the IDT budget. According to Exigo Consultores (2002), the cost per syringe in 1999 was €0.32. Therefore, we used this cost and the (annual) data (from IDT and EMCDDA) on the number of distributed syringes to calculate the total cost of this programme (not displayed in Fig. 1, but included in the social cost calculations).

As outlined in Table 1, on top of these direct (health-related) costs for the prevention, treatment and risk and harm reduction of drugs, there are also indirect costs, namely those associated with the lost income and lost production attributable to the (negative) health effects of drug use. In particular, following Kopp and Fenoglio (2001), we considered the fact that while being treated for drug addiction, individuals may not earn an income and cannot contribute to the production of the firm where they are employed, and individuals whose death is related to drugs can no longer earn any income or contribute to production. As we mention in section 'Data', we had to formulate reasonable assumptions whenever we could not identify the respective costs, and we describe these assumptions in detail in the Appendix.

Starting with drug users undergoing outpatient treatment, we assume that each appointment (including travel time) implies an absence from the workplace which is justified under the labour law and, therefore, has no impact on the individual's income. However, this implies that the individual, during that period, does not contribute to his employer's production and, therefore, we assume this to be an indirect cost of undergoing outpatient treatment. In particular, lost production is considered to be equivalent to the gross value added (GVA) net of salaries. As Kopp and Fenoglio (2001) note, gross value added is a measure of firms' wealth creation in an economy and is generally shared between employees (through salaries), firms (through capital remunerations) and the State (through taxes). By removing salaries and employment-related taxation (e.g., income taxes and social security contributions) from the gross value added, we are left with a measure of lost production which includes lost taxes unrelated to employment (i.e., which includes taxation on firms' profits, on firms' sales, such as the value added tax, as well as other indirect taxes but excludes income taxes and social security contributions). Lost production associated with outpatient treatment (identified with the superscript 'O') is then calculated in the following way (see Appendix for more details):

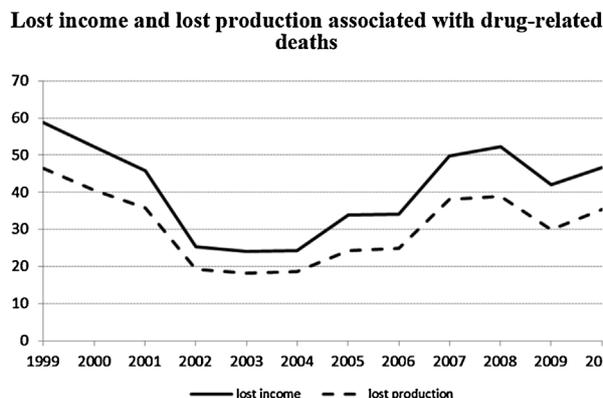
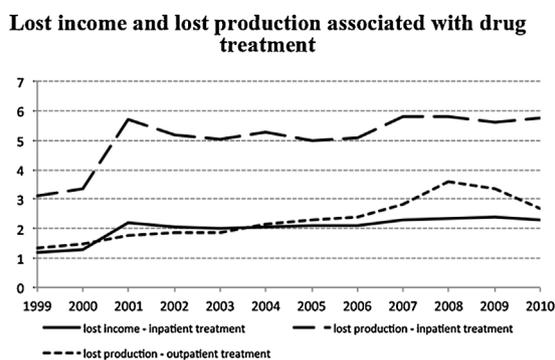
$$\begin{aligned} \text{Lost production}_t^O &= N_t^O \\ &\times ER_t^O \times \left( \frac{d_t^O \times \text{no. appointments/patient}_t}{\text{no. work hours/year}} \right) \\ &\times \frac{(\text{GVA net of salaries})_t}{\text{no. workers employed}_t} \end{aligned}$$

where  $N_t^O$  is the total number of drug users undergoing outpatient treatment,  $ER_t^O$  is their employment rate,  $d_t^O$  is the average treatment duration (in hours) and  $t$  is the year under consideration. In essence, the first two terms provide, for each year, the total number of patients undergoing treatment who are employed, the third term indicates the (yearly) percentage of their work time needed for treatment and the last term is an indicator of per worker production.



Unit: Millions of euros at 1999 constant prices  
Notes: For 1999–2001, the values correspond to the sum of costs associated with IPDT, SPTT and Youth Secretary of State.

Unit: Millions of euros, at 1999 constant prices



Unit: Millions of euros at 1999 constant prices

Unit: Millions of euros at 1999 constant prices

**Fig. 1.** Health-related costs: 1999–2010.

Sources: EMCDDA and IDT; calculations based on assumptions and data from IDT, IGIF, ACSS and INE; own calculations based on data from IDT, EMCDDA and INE; and Own calculations based on data from IDT and INE.

For inpatients – that is, patients undergoing treatment requiring hospitalization – we followed a similar type of reasoning in order to calculate lost production. There are two types of units providing inpatient care: detoxification units (IDU), for relatively short stays; and therapeutic communities (ITC) for longer stays. Lost production is thus calculated in the following way ( $i = \text{'IDU', 'ITC'}$ ):

$$\text{Lost production}_t^i = N_t^i \times ER_t^i \times \left( \frac{d_t^i}{365 \text{ days}} \right) \times \frac{(\text{GVA net of salaries})_t}{\text{no. workers employed}_t}$$

where  $N_t^i$  is the number of inpatients in the inpatient care unit,  $ER_t^i$  is the respective employment rate and  $d_t^i$  is the average inpatient treatment duration (in days).

Finally, we assumed that inpatient treatment affects patients' income. Although social security mechanisms exist (e.g., statutory sick pay), these are typically not full protection mechanisms. In the Portuguese case, this subsidy corresponds to 70% of the income value for a 90–354 days sick leave. Therefore, we assumed that each employed inpatient loses 30% of his income while the treatment is

undergoing. Also, we did not know the average income of these individuals and chose to use the average economy-wide salary per worker for each year under analysis, which includes both income taxes as well as social security contributions. Lost income is thus calculated in the following way ( $i = \text{'IDU', 'ITC'}$ ):

$$\text{Lost income}_t^i = N_t^i \times ER_t^{\text{IDU}} \times \left( \frac{d_t^i}{365 \text{ days}} \right) \times \frac{(\text{workers salaries})_t}{\text{no. workers employed}_t}$$

Based on the underlying data and assumptions, we present in the bottom left graphic of Fig. 1 the lost income and lost production associated with drug treatment (outpatient and inpatient care). Note that the main (upward) trend is largely driven by the (increasing) number of drug users undergoing treatment in the period under analysis.

Finally, we also looked at the lost income and lost production associated with drug-related deaths, which, as Kopp and Fenoglio (2001) note, is a social (indirect) cost of drug use. The lost income is

calculated in the following way ('DRD' stands for drug-related death):

$$\text{lost income}_t^{\text{DRD}} = M_t^{\text{DRD}} \cdot \left[ \frac{R_t \cdot (1 - (1 + r)^{-m_t})}{r} \right] + F_t^{\text{DRD}} \cdot \left[ \frac{R_t \cdot (1 - (1 + r)^{-f_t})}{r} \right]$$

where  $M_t^{\text{DRD}}$  ( $F_t^{\text{DRD}}$ ) is the number of male (female) drug-related deaths,  $m_t$  ( $f_t$ ) is the difference (in years) between the retirement age (which we assume to be 65-years old) and the average male (female) age at the time of their death,  $R_t$  is the average annual salary (assumed to be equal across gender) and  $r$  is the discount rate, which embodies the idea that this income could generate a return if invested in an alternative way with the same risk – as in Kopp and Fenoglio (2001), we assumed a discount rate of 6%, but we note that the higher is the discount rate, the lower is the net present value of the lost income. In practice, the above equation calculates, for men's and women's deaths, the net present value of the future income which they can no longer benefit from, assuming that in each year between the time of their death and their retirement age they would receive an income equivalent to the average economy-wide (gross) salary.

As a proxy for the number of male and female drug-related deaths, we use the number of deaths with positive toxicology report for illicit drugs. It is certainly debatable whether this is the most appropriate indicator. Greenwald (2009), for instance, discusses that this indicator is sensitive to the number of toxicology exams. In the case of Portugal, where an increased number of exams has been performed, this could lead to a higher number of positive results. If we were to follow Kopp and Fenoglio (2001), we would need to look at the underlying cause of death and use probabilities to establish a link between the likelihood that that cause of death is drug-related, but this detailed information is not available. Hughes and Stevens (2012), discussing the case of Portugal, note that data on the number of deaths directly attributable to drugs (overdose) was only made available in 2010; moreover, INE (the National Statistics Institute) has backdated to 2001 the number of deaths due to drugs as determined by doctors according to International Classification of Diseases (ICD) protocols. Data on this indicator for the full time period (1999–2010) under analysis is not available and we chose, instead, to use the number of deaths with positive toxicology report for illicit drugs as a proxy for the number of drug-related deaths (for which data was available throughout the period under analysis), while acknowledging, as Hughes and Stevens (2012) note, that this indicator overestimates the number of drug-related deaths.<sup>2</sup>

<sup>2</sup> A careful analysis of the two indicators – the number of deaths with positive toxicology reports, which we use, and the number of deaths due to drugs as determined by doctors according to ICD protocols – for the 2002–2010 period where both are now available (see Fig. 4 in Hughes & Stevens, 2012) shows that adopting the latter would have two effects on our calculations of the costs of drug-related deaths: first, it would affect the level of costs, because, as Hughes and Stevens (2012) note, the number of deaths with positive toxicology reports is (five to twenty-four times, with this difference being more pronounced for the more recent years) higher than the number of drug-related according to ICD protocols; second, it would affect the evolution over time of costs (Hughes & Stevens, 2012, Fig. 4, show that the former indicator is U-shaped, whilst the latter is resembles a 'left leaning L-shape'). Assuming the 2002 ratio of ICD protocol to positive toxicological report deaths to calculate ICD protocol deaths for 1999–2001, and assuming the same age and gender distribution for such deaths, we find that lost income and production are indeed over-estimated by a factor of 11 (on average). This does not, however, affect our main results: whilst using the ICD protocol death indicator would reduce the level of social costs, it would not significantly change its evolution over time.

In a similar way, we calculated the lost production associated with drug-related death in the following way:

$$\text{lost production}_t^{\text{DRD}} = M_t^{\text{DRD}} \cdot \left[ \frac{P_t \cdot (1 - (1 + r)^{-m_t})}{r} \right] + F_t^{\text{DRD}} \cdot \left[ \frac{P_t \cdot (1 - (1 + r)^{-f_t})}{r} \right]$$

where  $P_t$  is the annual lost production per individual. In practice, this equation calculates the net present value of the lost production of an individual between the time of his death and the retirement age and we have used the same discount rate as for lost income (6%).

The bottom right graphic in Fig. 1 presents the results of these calculations for the period 1999–2010. Inevitably, both the lost income and the lost production follow closely the evolution of the number of drug-related deaths.

#### Non-health related costs

With respect to non-health related costs, as outlined in Table 1, we looked mainly at social rehabilitation and legal system costs (both of which are direct costs), as well as at the lost income and lost production of individuals arrested because of drug-law offences (indirect costs).

Starting with social rehabilitation costs, a specific programme ('Vida-Emprego') was created to help in the social rehabilitation of drug users, considered by the NSFAD to be an integral part of the treatment for drug addiction. This programme is financed in an autonomous manner by the Employment and Professional Formation Institute and its budget execution (i.e., its effective spending) was used in the social cost calculation (we have chosen not to present this graphically).

We followed Kopp and Fenoglio (2001) to include as legal system (direct) costs the police costs for detection of drug-law offences, the court costs associated with the legal process of drug-law offences and prison costs of imprisoned individuals for drug-law offences. Starting with the latter, following Kopp and Fenoglio (2001), we calculated drug-related prison expenditure as ('CDI' stands for cost of drug-related imprisonment):

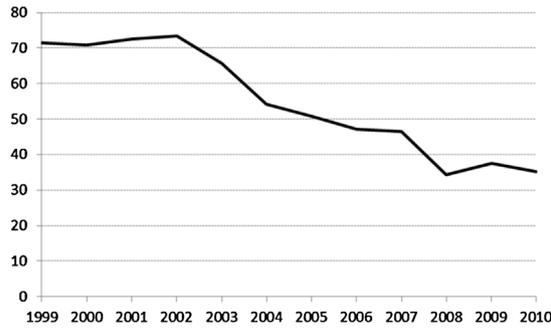
$$\text{CDI}_t = \frac{N_t^{\text{DI}}}{N_t^{\text{I}}} \times \text{total prison expenditure}_t$$

where  $N_t^{\text{DI}}$  is the number of individuals imprisoned for drug-law offences and  $N_t^{\text{I}}$  is the total number of imprisoned individuals. In practice, this equation calculates the total cost of drug-related imprisonments as a fraction of total prison expenditure and this fraction is determined by the percentage of drug-related imprisonments in the total number of imprisoned individuals. The top left graphic in Fig. 2 shows that the cost of drug-related imprisonments has been decreasing steadily, particularly from 2002 onwards. As outlined above, this is mainly explained by the reduction both in the number of individuals imprisoned for drug-law offences as well as by the reduction of their proportion in the overall prison population.

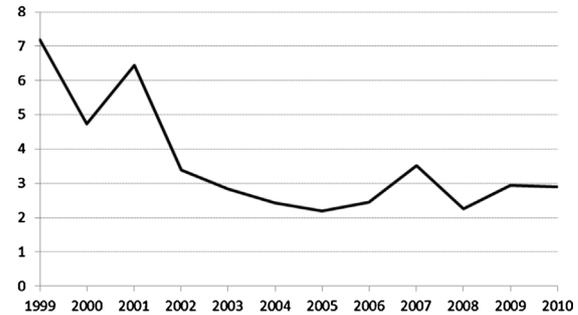
As for court costs associated with drug-law related criminal proceedings, we followed Kopp and Fenoglio (2001) and used the following equation ('CDP' stands for costs of drug-law related criminal proceedings):

$$\text{CDP}_t = \frac{N_t^{\text{DP}}}{N_t^{\text{P}}} \times \text{total criminal court expenditure}_t$$

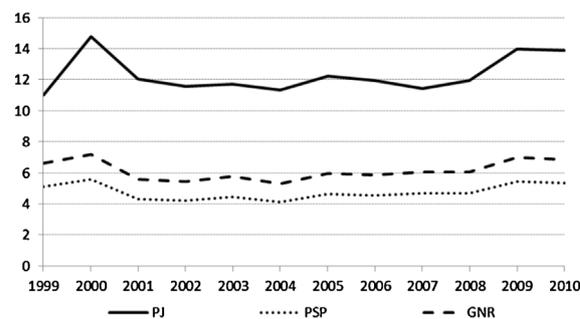
where  $N_t^{\text{DP}}$  is the total number of drug-law related criminal proceedings and  $N_t^{\text{P}}$  is the total number of criminal proceedings. We present the result of this calculation as the top right graphic

**Prison expenditure associated with individuals imprisoned for drug-law offences**

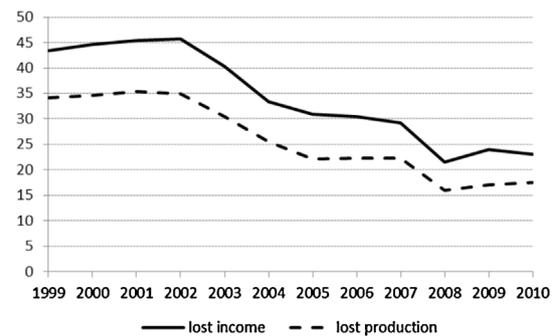
Unit: Millions of euros at 1999 constant prices

**Total court expenditure associated with drug-law related criminal proceedings**

Unit: Millions of euros at 1999 constant prices

**Total police force costs associated with drug-related occurrences**

Unit: Millions of euros at 1999 constant prices

**Lost income and lost production associated with drug-related imprisonments**

Unit: Millions of euros at 1999 constant prices

**Fig. 2.** Non-health related costs: 1999–2010.

Sources: Own calculations based on data from IDT, INE and Direcção Geral dos Serviços Prisionais (Directorate General of Prison Services). Own calculations based on data from Direcção-Geral da Administração da Justiça, Direcção-Geral da Política de Justiça and INE. Calculations based on own assumptions and data from Ministério da Administração Interna, Ministério da Justiça, Gabinete Coordenador de Segurança, Gabinete do Secretário-Geral do Sistema de Segurança and INE. Own calculations based on data from IDT and INE.

of Fig. 2, where a clear decrease in costs is observed from 2001 onwards. We once again note that the decriminalization of drug use in 2000 necessarily implies that it ceases to be a criminal offence and, as such, those cases no longer initiate criminal proceedings. Drug use cases fall under the jurisdiction of the Drug Addiction Dissuasion Commissions (which organize the respective civil proceedings), whose expenditure is supported by IDT and is already included in its budget (see Fig. 1).

Legal system (direct) costs also include police costs for detection of drug-law offences. In Portugal, three different police forces exist: Polícia Judiciária (PJ), a specialized police force mainly responsible for major drug-law offences, such as drug trafficking or money laundering; Guarda Nacional Republicana (GNR), a standard police force which covers mainly the small and medium-sized municipalities; and Polícia de Segurança Pública (PSP), a standard police force which covers mainly the large municipalities in the country. Data on police costs (and especially on drug-related police costs) is virtually non-existent, which necessarily implies that we had to make a significant number of assumptions to estimate them (see Appendix for more details).

The bottom right graphic of Fig. 2 presents the results of our calculations and suggests that PJ's cost has increased (compared to 1999) while GNR's and PSP's cost has generally decreased. The former was expected: indeed, one of the NSFAD's objectives was the enhancement of the fight against drug trafficking and money

laundering, both of which fall mainly under the jurisdiction of PJ. This is consistent with the observed trends for drug-law offences according to their type: consumption, consumption-trafficking and trafficking. Indeed, in absolute terms, the number of trafficking offences increased by 47%, while the number of consumption-trafficking offences increased by 15% between 1999 and 2010; by comparison, the number of consumption offences decreased by 9% in the same time period.

Finally, we focused on the lost income and lost production of individuals imprisoned because of drug-law offences (an indirect social cost, as outlined in Table 1). Following Kopp and Fenoglio (2001), we calculate these as ('DI' stands for drug-related imprisonment):

$$\text{lost income}_t^{\text{DI}} = N_t^{\text{DI}} \times \frac{\text{worker salaries}_t}{\text{active population}_t}$$

$$\text{lost production}_t^{\text{DI}} = N_t^{\text{DI}} \times \frac{(\text{GVA net of salaries})_t}{\text{active population}_t}$$

where  $N_t^{\text{DI}}$  is the number of drug-law offence related imprisonments in year  $t$ . The bottom right graphic of Fig. 2 presents the results of these calculations where, as we would expect, lost income and lost production follow closely the downward trend (mentioned earlier) in the number of drug-related imprisonments.

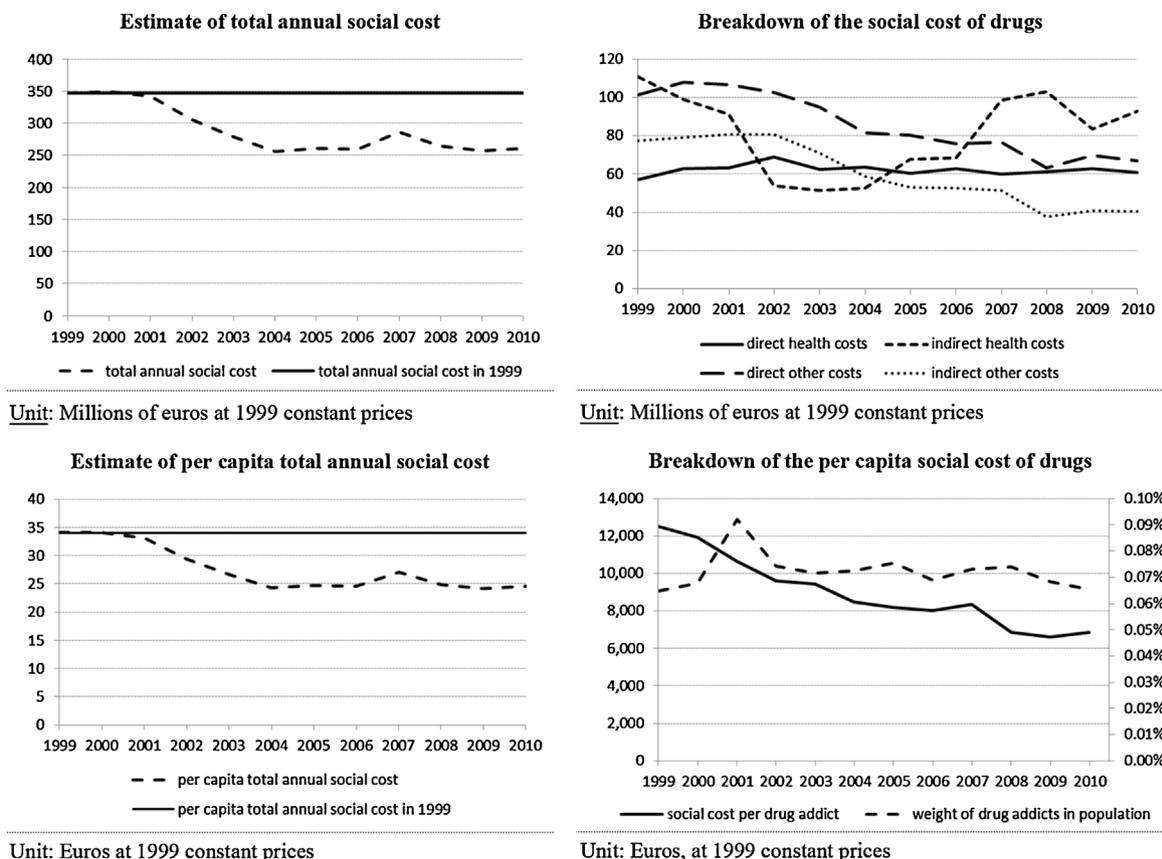


Fig. 3. Social cost of drugs: 1999–2010.

Source: Own calculations.

Total social costs

Based on the results outlined in section ‘Health-related costs’ (health-related direct and indirect costs) and section ‘Non-health related costs’ (non-health related direct and indirect costs), we present as the top left graphic of Fig. 3 the evolution the social cost of drugs in the period 1999–2010. Notice that in the year 2000 – the year which followed the approval of the NSFAD – there was an increase in the social cost of drugs but from 2001 onwards this social cost was always below the 1999 level. In the top right graphic of Fig. 3 we present a breakdown of the social cost of drugs following the cost categories described in Table 1. Two trends are clearly noticed: a slight increase in direct health costs following the implementation of the NSFAD; and a significant decrease in non-health related direct and indirect costs.

In relative terms, we obtain a per capita social cost of drugs of €24.53 in 2010 in comparison with a per capita social cost of €34.02 in 1999 (at 1999 constant prices), as we can see in the bottom left graphic of Fig. 3.

We can break down the per capita social cost in the following way:

$$\text{per capita social cost} = \frac{\text{social cost}}{\text{no. drug addicts}} \times \frac{\text{no. drug addicts}}{\text{population}}$$

If we use as a proxy for the number of drug addicts the total number of drug users undergoing inpatient treatment (detoxification units and therapeutic communities), we can see in the bottom right graphic of Fig. 3 that the gradual decrease in the social cost of drugs is mainly caused by the decrease in the social cost per drug addict.

Based on these estimates, we look closely at the evolution of social costs in two time periods: first, the time period 2000–2004, which corresponds to the first 5 years following the NSFAD’s approval; second, a longer time period (2000–2010) of 11 years following the NSFAD’s approval. In both situations we compared the (annual) social cost in 1999 with the average annual social cost in each of these time periods. The results are presented in Fig. 4.

Starting with the first time period (1999 vs. 2000–2004), note that total social costs are 12% lower. This is mainly driven by the significant reduction in indirect health costs (37%) and indirect non-health related costs (5%), which are sufficiently pronounced to overshadow the (12%) increase in direct health costs. This is not surprising, in the light of the results presented in sections ‘Health-related

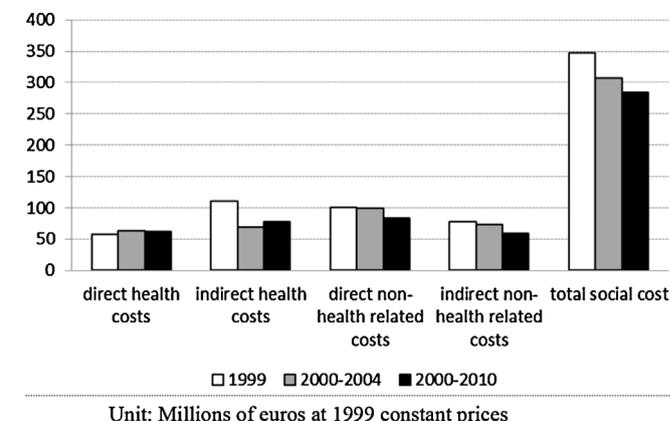


Fig. 4. Breakdown of social cost by type of cost and time period. Source: Own calculations.

costs' and 'Non-health related costs'. Indeed, not only was a significant decrease in the number of drug-related deaths observed (thus reducing indirect health costs), but there was also a very significant reduction in the number of individuals imprisoned for drug-law offences (thus reducing non-health related indirect costs). The latter can certainly not be dissociated from the decriminalization of drug use implemented in 2001, although clear and direct causal relationships are difficult to establish with this framework.

Looking at the second time period (1999 vs. 2000–2010), the change in the social cost of drugs is more significant, as there was a 18% decrease. As discussed above, this is mainly driven by the (29%) reduction in indirect health costs, the (24%) reduction in non-health related indirect costs and the (17%) reduction in non-health related direct costs (by contrast, direct health costs increased 9%). The latter two reductions (in non-health related direct and indirect costs) may, in our opinion, be associated with the decriminalization of drug use, through a lower number of use-related criminal proceedings (and, thus, lower criminal court expenditure) and, more importantly, through a reduction in the number of drug-related imprisonments.

## Conclusion

In this paper, we have carried out an analysis of the social costs of illicit drug use in Portugal after the approval of the NSFAD in 1999, following the cost-of-illness methodology described by Kopp and Fenoglio (2001) and using, as much as possible, relevant publicly available data – even though, in several occasions, assumptions had to be made in order to obtain estimates for each and every year in the 1999–2010 period under analysis.

Our results point towards a significant (average) reduction (12%) in the social cost of drugs in the 5 years following the NSFAD's approval (2000–2004), particularly driven by the reduction in indirect health costs caused by the reduction in the number of drug-related deaths. In a longer timeframe (2000–2010), the social cost (average) reduction is more significant (18%), as not only indirect health costs decreased, but also a significant reduction was observed in non-health related direct and indirect costs, namely legal system (direct) costs associated with criminal proceedings for drug-law offences and, particularly, (indirect) costs associated with lost income and lost production of individuals imprisoned for drug-law offences. The latter may be associated with the decriminalization of drug use, which was implemented in 2001, while the former may bear some relationship with the NSFAD's health-oriented rationale. However, as we have outlined earlier, it is extremely difficult to establish clear causal relationships between the NSFAD's implementation and this observed evolution of social costs and, therefore, we refrain from drawing conclusions in that regard.

Overall, our paper is (to the best of our knowledge) the first attempt to quantify the social costs of drugs in Portugal. Despite its main shortcomings, namely the necessity of formulating assumptions in order to circumvent the inexistence of publicly available data for the whole period under analysis (1999–2010), our results are grounded on a sound calculation methodology (suggested by Kopp & Fenoglio, 2001). Additionally, they probably underestimate the true social cost of drugs in Portugal, because only a subset of possible social costs was considered (due to data availability problems); had the data been available for more cost categories, we would probably have arrived at a higher social cost for every year in the period 1999–2010.

From a policy viewpoint, the usefulness of this framework to carry out an impact assessment of the NSFAD should be carefully analysed. Indeed, regulatory impact assessments are and will continue to be extremely useful tools to evaluate, both *ex ante* and *ex post*, public policies and, in doing so, contribute to a better use

of (limited) public funds. However, particular care should be taken, especially with a multi-objective and multi-instrument policy such as the NSFAD, to establish (and test) causal relationships. While this causality is certainly a more complex issue, it certainly warrants further research.

## Appendix

### Health-related costs

From 2003 onwards, with IDT's creation, the majority of direct costs associated with treatment, prevention and risk and harm reduction of drugs were supported by its budget, which we have used as a proxy (IDT, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011). However, prior to 2003, IDT's functions were scattered across several other entities, such as IDT's immediate predecessor (IPDT), which had fewer responsibilities than IDT, as well as SPTT (public institute mainly responsible for treatment) and the Youth Secretary of State. Therefore, for the years 1999–2001 we have used EMCDDA data on the annual budget of IPDT, SPTT and the Youth Secretary of State, and for 2002 we have used EMCDDA (2000, 2001, 2002) data on the Ministry of Health's budget allocated to drug addiction and treatment. The objective of using this data was to create a pseudo-IDT annual budget (which is necessarily an approximation of what would indeed be the annual budget of all the entities executing the tasks and responsibilities that IDT took on from 2003 onwards) for the years 1999–2002, prior to its existence.

For the calculation of drug-related (direct) hospital costs, we have focused on the main pathologies which may lead a drug user to resort to hospital services, namely those that are included in the Major Diagnostic Categories (MDC) number seven ('Hepatobiliary System And Pancreas', which includes hepatitis) and twenty-five ('HIV infection').

With respect to hospital treatment for hepatitis B and C, we have used data on the number of hospital episodes for Diagnosis-Related Groups (DRG) 205 and 206 (Disorders of Hepatobiliary System except Malignancy, Cirrhosis and Alcoholic Hepatitis), which are included in MDC seven, for the year 2006 (ACSS, 2006). We have also used the per episode payment that hospitals (through a financing contract established with the Ministry of Health) received in that same year as a proxy for each episode's treatment costs. However, we did not have any further information for previous or subsequent years, nor did we know the percentage of those episodes that are related to drug use. Therefore, we made the following assumptions: firstly, we assumed that the evolution of the number of episodes in each year follows the evolution of the total number of hepatitis B and C infection. The Portuguese Association for the Study of Liver mentions a 1–1.5% hepatitis B and C infection rate, with 70% of cases unaware of this. Therefore, we assumed the lower bound of the interval (1%) as the overall population infection rate and also assumed that only 30% of cases would be correctly diagnosed and, thus, treated for hepatitis B or C in hospitals. Secondly, we used the hepatitis B and C infection rates for drug users to calculate the total number of hepatitis B or C infected drug users in each year (EMCDDA, 2001, 2002; IDT, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011) and used this to calculate the weight of drug-related hepatitis cases in the overall population. Finally, we used these weights to infer how many of DRG 205 and 206 episodes would be drug-related and, multiplying it by the per episode cost (which we assume to be constant throughout the period under analysis), obtained an estimate of total hospital costs for the treatment of drug-related hepatitis B and C episodes.

In what concerns HIV treatment, we used data on the number of episodes reported for this MDC in the period 2004–2006 (ACSS,

2006; IGIF, 2004, 2005), as well as the per episode payment foreseen in the financing contract that some hospitals have established with the Ministry of Health (for 2006), which we again assumed to be equivalent to its cost. However, no further data existed for previous or subsequent years. We, therefore, made the following assumptions: firstly, we assumed that the evolution in the number of annual episodes for this MDC follows the evolution of the total number of HIV notifications (EMCDDA, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009; IDT, 2009, 2010). Secondly, we used the percentage of HIV notifications associated with drug use as a proxy for the number of episodes associated with drug use (IDT, 2009, 2010). Finally, we took the per episode cost in 2006, assumed it to be constant throughout the period under analysis and multiplied it by the number of drug-related episodes to obtain the total hospital costs associated with the treatment of drug-related HIV infections.

Focusing now on indirect health-related costs, IDT data suggests that between 2004 and 2010, 40–48% of drug users undergoing outpatient treatment were employed (IDT, 2005, 2006, 2007, 2008, 2009, 2010, 2011). Therefore, for the remaining years under analysis (1999–2003) – for which we have no data – we assumed an ‘employment rate’ of 46% (the average employment rate between 2004 and 2010). In doing so, we are mainly considering an impact on income on individuals who are employed while being treated (because the time needed to undertake treatment may be work time during which individuals neither receive income nor contribute to their employer’s production). IDT (2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011) and EMCDDA (2000) allows us to calculate the average number of treatment or doctor appointments of each patient, but does not indicate the average duration of each appointment. On top of the appointment’s duration, the patient must spend some time travelling to and from the nearest treatment centre. Our working assumption is that each appointment (including travel time) lasts between 1 and 3 h and we therefore chose the middle point in this interval (2 h) as the average appointment duration.

For inpatients care in detoxification units, IDT (2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011) published the employment rate of inpatients for the period 2003–2010 (22–32%). In the absence of comparable data for 1999–2002, we assumed an employment rate equivalent to the average in 2003–2010 (28%). However, we did not know the average duration of stays in these units and assumed it to be 7-days long. For inpatient care in therapeutic communities we only had the employment rate for 2009–2010 (average 25%) (IDT, 2010, 2011). Therefore, this is the assumption we made for the employment rate for the rest of the period under analysis (1999–2008). We did not know the average treatment duration in this type of unit but assume an average of 6 months.

#### Non-health related costs

In order to calculate prison costs of imprisoned individuals for drug-law offences, we had data on the total number of imprisoned individuals as well as the fraction of these who are imprisoned for drug-law offences (IDT, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011). We also had data on the total expenditure on prisons (Direcção Geral dos Serviços Prisionais, 2006, 2007, 2008, 2009, 2010), albeit only for the period 2005–2010. Therefore, we calculated the average expenditure for each imprisoned individual in the period 2005–2010 and assumed it to be equal to the average individual expenditure in the period 1999–2004; by multiplying this (unit) cost by the total number of imprisoned individuals, we were able to calculate/estimate total prison expenditure for the whole period under analysis (1999–2010).

As for court costs, we had data from the Directorate-General for Justice Policy on the total number of criminal proceedings in each year and, particularly, the number of such proceedings that

**Table 2**

Assumed breakdown of drug-law offences (by type) across police forces.

	PJ (%)	GNR (%)	PSP (%)	Total (%)
Use	0	36	64	100
Trafficking	11	32	57	100
Use-trafficking	11	32	57	100

Source: Own assumptions based on data from Gabinete Coordenador de Segurança (2008) and Gabinete do Secretário-Geral do Sistema de Segurança Interna (2009).

are associated with drug-law offences. However, we only had data on total (criminal) court expenditure for the years 2007 and 2008 (Direcção-Geral da Administração da Justiça, 2008, 2009). Therefore, we calculated the average cost per proceeding in the years 2007–2008 and assumed it to be equal in the periods 1999–2006 and 2009–2010.

In order to calculate the police costs for detection of drug-law offences, we first tried to estimate a breakdown of drug-law offences according to the ‘originating’ police force. We used data on drug-trafficking occurrences from 2007 to 2008 (Gabinete Coordenador de Segurança, 2008; Gabinete do Secretário-Geral do Sistema de Segurança Interna, 2009) to determine the percentage of occurrences originating in each police force and assumed this percentage to be constant throughout the period under analysis (1999–2010). We had data (EMCDDA, 2000, 2010; IDT, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011) for every year on the number of drug-law offences by type (trafficking, use-trafficking and use), so we made the assumption that use-related occurrences are associated with GNR and PSP only, with a weight proportional to their relative weights in drug-trafficking. By contrast, the weights for trafficking and use-trafficking are those mentioned above (the percentage of drug-trafficking occurrences in 2007–2008 originating in each police force). Table 2 summarizes the assumed breakdown of drug-law offences (by type) across police forces.

We then tried to gather data on the annual budgets of each police force, which was not possible for all the years under analysis. For PJ, the annual budget was close to 104 million euros in 2008 (Secretaria-Geral do Ministério da Justiça, 2010) and approximately 30% of occurrences in that year were drug-related (by comparison, in 2004 25% of occurrences were drug-related (Ministério da Administração Interna, 2005)). Therefore, we made the conservative assumption (given the weights above) that 15% of PJ’s budget is associated with the fight against drugs. Based on this assumption, we calculated the cost per occurrence in 2008 (for which we had a total budget figure available) and assumed it to be equal for every year under analysis (1999–2010). By multiplying this unit cost by the (estimated) number of occurrences associated with PJ (see assumptions in Table 2), we were able to estimate the total cost of PJ in the fight against drugs throughout the period (see Fig. 2).

GNR’s annual budget was approximately 790 million euros in 2008 (Gabinete do Secretário-Geral do Sistema de Segurança Interna, 2009) and drug-related occurrences were approximately 2.2% of the total number of occurrences (Guarda Nacional Republicana, 2009). We made the (conservative) assumption that 1% of GNR’s annual budget is spent in the fight against drugs. Following the same type of calculation method as for PJ, we calculated unit cost of each occurrence for 2008 (for which we have a total budget figure available) and assumed it to be constant throughout 1999–2010. By multiplying this unit cost and the (estimated) number of occurrences associated with GNR (see assumptions in Table 2) we obtained an estimate of GNR’s annual spending in the fight against drugs in the period 1999–2010 (see Fig. 2).

Finally, we followed a similar type of reasoning for PSP: we assumed that 1% of its 611 million euros budget in 2008 (Direcção Nacional da PSP, 2009) is used in the fight against drugs. Assuming the unit cost of each occurrence in 2008 to be equal in every year

under analysis (1999–2010) and multiplying it by the (estimated) number of occurrences in each year (see assumptions in Table 2), we obtained an estimate of PSP's costs in the fight against drugs (see Fig. 2).

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