

The legalization of cannabis derivatives in Spain: Hypothesis on a potential emerging market

La legalización de los derivados del cannabis en España: Hipótesis sobre un potencial mercado emergente

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Abstract

First, this paper estimates the dimensions of the market for cannabis in Spain using data on the extent of consumption and the main patterns of use of consumers. Then the paper reviews the hypothetical production and distribution costs of these drugs in different production regimes under different legal conditions. The review shows that current prices of cannabis in the illegal market could be notably reduced if production and distribution of cannabis were decriminalized and even more if they were performed by legal enterprises. Thirdly, we examine the relationship between prices and consumption levels by analysing the price elasticity of demand. A fall in the prices of cannabis products will likely result in an increase in the number of users and in the total amount consumed. Lastly we consider several alternatives for the taxation of cannabis derivatives to counteract the likely fall in prices, and their pros and cons.

Keywords: drug policy; illicit drug markets; marijuana; cannabis legalization; prices; Spain.

Resumen

En este artículo se analiza en primer lugar la dimensión que tiene el mercado de cannabis en España en base a los datos disponibles sobre la extensión del consumo y las pautas de uso de los consumidores. A continuación se repasan y comparan los costes de producción y distribución del cannabis en distintos regímenes de producción y diversas condiciones jurídicas. Se observa cómo los precios del cannabis al detalle en el mercado ilegal son bastante altos y podrían reducirse considerablemente si se legalizasen la producción y la comercialización. En tercer lugar, se examina la relación que hay entre los precios y el consumo a través del análisis de la elasticidad del precio de la demanda. Se pone de manifiesto cómo una caída de los precios probablemente resulte en un aumento tanto en el número de usuarios como en la cantidad total consumida por estos. Por último, se consideran distintas alternativas de fiscalización destinadas a contrarrestar la caída de precios de los derivados del cannabis, mostrando sus fortalezas y debilidades.

Palabras clave: políticas sobre drogas; mercados de drogas ilícitas, marihuana, precios, legalización del cannabis, España.

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Cannabis derivatives are the most frequently used illicit drugs in the world. While consumption of these products is not at the same level as that of legal drugs such as tobacco, alcohol or caffeine, it is at least six times higher than that of any other illicit drug (Gowing et al., 2015; UNODC, 2015). Although cannabis derivatives are substances with a great variety of uses and therapeutic, religious and recreational significance, we are here concerned with them as commodities that are manufactured and distributed for monetary gain. They have their origin in an agricultural cheap product which can be grown in many regions of the world. However, in a situation of illegality, the costs of manufacture and distribution increase disproportionately, as is also the case with coca leaves or the poppy plant. Cost rise because manufacturers and distributors have to face risks at each stage of the manufacturing and sales process. Indeed, it can be said that the illicit drugs business has more of a services than manufacturing profile. Illegality also prevents economies of scale from operating which would bring down the costs of manufacturing, distribution and sales considerably (Hawken, 2013).

The first question that any government attempting to legalise cannabis derivatives should consider is to what extent it is willing to liberalize its production and marketing. In addition, there are various alternatives which could be applied in different ways and with greater or lesser restriction. Among the main policy options we would highlight the following: 1) *de facto* legalisation of retail sales in establishments similar to the Dutch *coffee shops*; 2) legalisation of small scale cultivation for personal use; 3) approval of shared cultivation in user clubs or associations; 4) establishment of a state monopoly on production and sale, administered via a licensing system similar to those that have existed for governing tobacco, alcohol and opium; and 5) allowing the free production and sale as consumer goods while prohibiting the sale to minors, as is the case today with alcohol and tobacco (Apfel, 2014; Brook & Wakabayashi, 2000; Gammella & Martín, 1992; Kilmer, Kruihof, Pardal, Caulkins & Rubin, 2013; MacCoun, 2014).

Such changes would have repercussions both within the country in question and on its international relations, particularly with those countries with which it maintains the closest trade, migratory and political links since it would affect the international treaties signed on the matter. The Dutch experience with *de facto* legalisation appears to indicate that the changes in the legal status of a substance affect neighbouring countries and their consumers, and that such changes are often of an international and transnational character (Decorte, 2007; Korf, 2002, 2011; MacCoun & Reuter, 1997, 2001; MacCoun, 2011; Monshouwer, van Laar & Vollebergh, 2011; van Ooyen-Houben & Keemans, 2015; van Ooyen-Houben, Bieleman & Korf, 2016).

It is also important to consider whether legalising the production and sale of cannabis would lead to a notable reduc-

tion of retail prices and an increase in availability. In addition, it is likely that products would become more standardised, adulteration would be diminished and both average levels of quality and potency would increase. The amount of information available to consumers about the products could also increase, while it is likely that different forms of commercialisation and advertising used by manufacturers and distributors would also multiply. All these factors could trigger increased consumption, especially in the mid-term (Caulkins, Kilmer & Kleiman, 2016; Caulkins, 2016a).

The marijuana and hashish trade is a business that currently generates large profits. Most of these products are consumed by intensive users, who are mostly found among the young adult population, aged between 18 and 25 (Caulkins et al., 2015; Caulkins et al, 2016; van Laar, Frijns, Trautmann & Lombi, 2013). From a commercial point of view, a business dedicated to the manufacture and distribution of cannabis would attempt to increase brand loyalty and expand its customer base among such intensive users, while at the same time aiming to attract new customers willing to try its products. To achieve this, such companies would likely develop and stimulate commodification and marketing processes for these products. Meanwhile, public administrations would take on new responsibilities, which would require appropriate regulation and budget provisions in order to address them. Such a situation would lead to new areas of conflict, legal action and complaints. Even if direct advertising of these products were banned, as is increasingly the case with tobacco, it is likely that indirect advertising and promotion of legal cannabis products would increase, potentially opening up new perspectives for these drugs or re-evaluating some which are already known.

We do not know what kind of social representations would occupy the collective imagination in a new societal context where these drugs were freely traded and legally available items of mass consumption. Nor do we know how these representations would influence the curiosity to try them, consume them on a regular basis or avoid them. But we should not rule out a scenario similar to that involving legally available psychoactive drugs in their various legal and commercial statuses, especially alcohol, something with which some North American states are currently experimenting.

If legalisation were to bring with it an increased number of users, especially those who took them with greater frequency or intensity, there would be a concomitant rise in the incidence and prevalence of problems associated with their use - including the risk of addiction - and therefore also in the costs to the individual, families and society attributed directly or indirectly to their consumption. This rise, both in the number of users and in problematic or harmful consumption patterns, is one of the central issues to be borne in mind in the discussion regarding legalisation and its consequences. (Caulkins, 2016a, 2016b; Hall & Lynskey, 2016; Hasin et al, 2015; WHO, 2016).

On the other hand, converting cannabis derivatives into products which can be bought and consumed legally could also have benefits for the consumer such as greater quality and standardisation of the product, improved health and safety control and more information regarding their contents. At the same time, however, we should not forget that there are legal products of mass consumption such as cigarettes or many popular drinks whose contents are a trade secret and not accessible to the consumer.

Legalisation could also lead to a decrease in police enforcement and criminal prosecution of dealers and traffickers, thus reducing the costs involved in these tasks. In addition, it is highly likely that trials connected with this trade and the number of people tried and imprisoned would also diminish. This could help to improve the Spanish legal and prison system, which is currently overloaded and hardly sustainable.

Despite this, neither the illegal market nor unlawful behaviour would disappear with legalisation. For example, the use of marijuana would continue to be prohibited for minors and so they would continue to obtain it illegally. The state would have to decide on the punishments to be imposed on people facilitating access or selling marijuana to minors. The trafficking and selling of drugs would continue to be investigated by the police and the penal system. Nevertheless, the policing, penal and prison system costs of such behaviour would certainly be much lower than those generated by with the current prohibitionist system. The savings involved could be partially dedicated to increasing and improving the treatment of problems linked to consumption, as well as improving the education of children and adolescents regarding the use of cannabis and other drugs, reducing the demand and consumption of these substances and limiting their excessive or problematic use as far as possible.

Furthermore, legalisation of cannabis would make it easier for public administrations to improve control of production and sales of the products. The state's main instrument for regulating prices and keeping them at a level which would prevent increased consumption is taxation. Revenues raised by taxation could also be dedicated to prevention and treatment, as well as to the implementation of other social policies. Conversely, taxes could handicap the fight against the illegal market if they keep prices for the legal products too high. There is currently no taxation model which has been successfully applied to the cannabis market. As will be seen, the choice of both tax base and rates to be applied to the production and consumption of cannabis are still decisions of an experimental nature with results which have not been entirely satisfactory.

Establishing the economic impact that government policies have or may have on the regulation, sale or use of cannabis is a complex undertaking. Beside the fact that it requires data that is often not available or does not exist, the model should cover variables such as production meth-

ods, prices, consumption patterns, the harm or loss it can cause, taxes and potential benefits. Working on the assumption that marijuana use involves risks and potential harm, and that both are proportional to the extent and forms of use, the number of intensive users and the levels of tetrahydrocannabinol (THC), the best public policy would be one that contributes to limiting and improving consumption, thus reducing the negative consequences, while at the same time making responsible and controlled consumption more possible. However, the recent legalisation of marijuana for recreational use in Uruguay and several North American states is highlighting the difficulties involved in implementing a taxation policy in this market, its limited effectiveness in combating the black market, as well as the moderate economic and social benefits of some of the tax revenue systems being tried out. Although it is still too early to evaluate the success of these experiments, the fact that some of them were substantially modified shortly after implementation suggests that economic considerations, alongside social criteria, must be kept foremost in mind when designing public policy on drugs (Kleiman & Ziskind, 2014).

This article analyses firstly the size of the cannabis market in Spain, on the basis of data available on the extent of use and consumption patterns of the different types of users. This will be followed by reviewing and comparing the costs of cannabis production and distribution in different production regimes and varying conditions of legality. The available data seems to show that retail prices of cannabis in the illegal market are quite high and could be considerably reduced were production and sales to be legalised. Thirdly, we will examine the relationship between price and consumption by analysing the price elasticity of demand, which indicates that a drop in prices would increase demand and aggregate consumption, and possibly also the number of users. Finally, the strengths and weaknesses of different taxation alternatives for marijuana are considered. For this purpose, we review the experiments that have been tried or are proposed in those North American states which have recently legalised cannabis for recreational use: Colorado, Washington, Oregon, Alaska and the District of Columbia.

The size of the cannabis market in Spain

Estimating the size of an illegal market is a complicated challenge. All estimates are rather problematic, so the data offered below should be considered as no more than hypothesis to be tested.

What is known is that recent studies in the USA and the European Union have shown cannabis to be mostly consumed among regular and experienced users who claim, in population-based surveys, to have used cannabis daily or almost daily in the past month. In addition, it has been shown that the quantity consumed rises with frequency of use, i.e. the greater the number of days on which this type of substance is

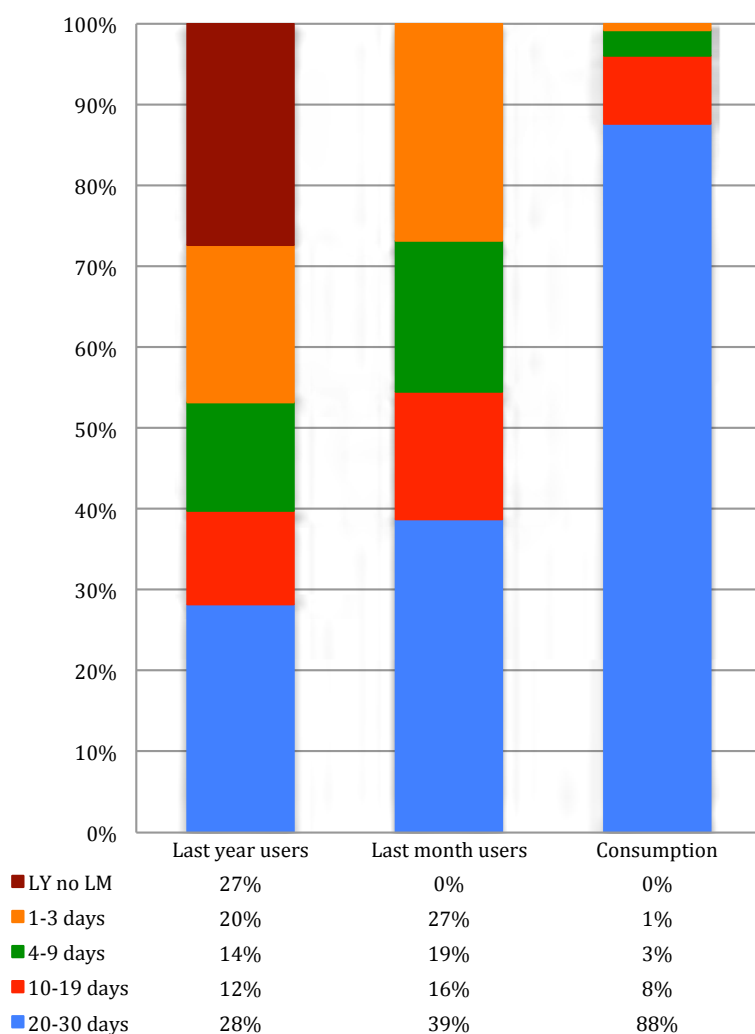
consumed, the greater the mean amount consumed in each episode of cannabis use. Those who use cannabis on a daily basis consume a much greater average daily quantity than those who do so less frequently. Therefore, when estimating consumption in any way, it is necessary to bear in mind the user profile in terms of the frequency with which they consume the substance, the normal dosage consumed, the routes of administration, etc. (Caulkins & Kilmer, 2013; Caulkins et al, 2015; Caulkins, Hawken, Kilmer & Kleiman, 2012; Kilmer, Caulkins, Midgette, et al., 2013; van Laar et al, 2013).

In our estimation we have applied the same procedure used by Caulkins and Kilmer (2013) to calculate the size of the cannabis market in the European Union. We have taken the data on the prevalence of cannabis use in the past month and frequency of use (measured in days of consumption) from the 2013 EDADES survey (Figure 1). The mean

quantities consumed daily by each type of user was taken from a study in which an online questionnaire designed to gather this data was administered to 2,530 cannabis users in seven European Union countries (van Laar et al., 2013).

The amount of cannabis consumed in Spain in 2013 was around 388 tonnes¹, slightly lower than the 394 tonnes that Caulkins and Kilmer estimated for 2009. The greater part of this, which we estimate to account for 87% of the demand for these products, was consumed by those who use them on a daily or almost daily basis. Similar results are found in all EU countries where this has been studied (Caulkins & Kilmer, 2013).

According to the results of the study by Caulkins and Kilmer, Spain was the European Union country in which most cannabis was consumed in 2009. In that year, over a quarter of all cannabis derivatives used in the EU were con-



Note. PY: prevalence of use in the past year. PM: prevalence of use in the past month. 1-30: number of days used in the past month. Source: Prepared by the authors based on data from EDADES 2013.

Figure 1. Relative size of different segments of the cannabis market in Spain, 2013

¹ Since experts consider that surveys on drugs only reflect between 25% and 50% of real consumption, this amount would need to be multiplied by a correction factor of between 0.25 and 0.5 to obtain a quantity more in line with real use (Caulkins & Kilmer, 2013: 295-6). In this case, the amount consumed would be estimated at between 485 and 582 tonnes. In this article, the figures we offer do not take account of this difference between consumption declared by consumers and real consumption because it would vary according to the substance in question and would probably not be the same across all countries.

sumed there. Six countries accounted for 87% of total consumption: Spain, France, Italy, United Kingdom, Germany and the Netherlands. Nevertheless, significant differences could be observed between these countries, based on the relative importance of the most intensive users in each country. Three of the them (Spain, France and the Netherlands) have more than double the rate of intensive users (those who used the substance on more than 19 days in the past month) than the other three (Germany, UK and Italy), in which more than half the users only took the drug between once and three times a month. This could indicate the existence of two distinct cannabis consumption patterns in Europe: one where low intensity consumption is dominant, the other with a greater prevalence of users taking the drug on a daily or almost daily basis. Portugal would clearly be included in the group of Spain, France and the Netherlands, while two other countries, Belgium and Austria, would also be very close to this group.

The value of the cannabis market in Spain

What is the value and the dimension of the cannabis market in Spain? How much is spent in total purchasing this product? How much do all cannabis users spend together?

In their study of the European cannabis market, Caulkins and Kilmer (2013) calculated the approximate spending on cannabis in 22 EU countries in two different ways. Firstly, they multiplied the estimated quantity consumed by the average market retail price per gram of marijuana. The result of this calculation was a total spend of €1,931 million

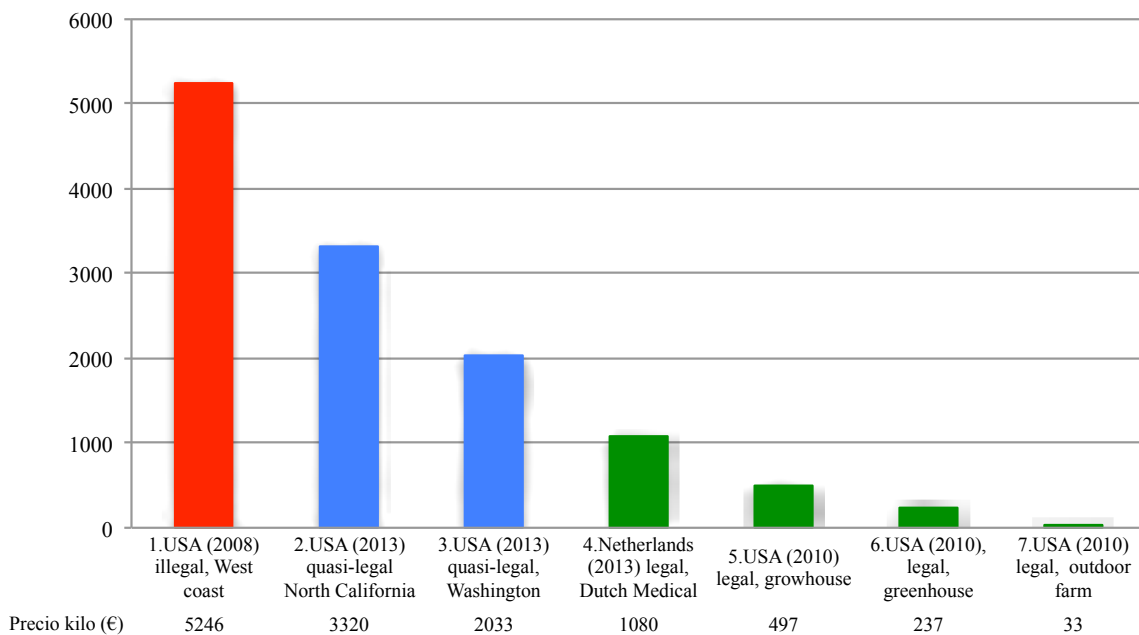
in Spain in 2009. The second calculation was made using the weighted average price data of monthly spending declared by the different types of users in the online survey of seven countries. This generated a total retail expenditure of €1,575 million, which would be equivalent to each user spending €55 per month and €659 per year.

Caulkins and Kilmer point out that the difference between the two figures may be due, among other reasons, to the fact that regular and intensive users usually buy large quantities, thus obtaining better prices and discounts. From this perspective, the divergence between the two estimates offers an approximate measure of the average size of discounts, which in Spain would be around 20%. This figure is in line with our own figures, which were obtained in our 2015 field study and in interviews with this type of user.

Cannabis prices in relation to their legal status

How far would cannabis prices drop if it were legalised? In an attempt to answer this question, we will review the analysis carried out by Caulkins (2014: 21-22) of several scenarios which we will attempt to sketch out with the available data. Figure 2 shows the results of comparing production costs and prices of a kilogram of *sinsemilla* marijuana under different production regimes and different legality status.

The first column in Figure 2, in red, represents the wholesale price per kilo of marijuana in the west of the USA in 2008, when the sale and use of cannabis was still illegal. Since then, prices have dropped considerably (Caulkins, 2014).



Note. Sources: 1. Caulkins, 2014; 2. Caulkins and Bond, 2012; 3. Caulkins, Andrzejewski and Dahlkemper, 2013; 4. Kilmer and Burgdorf, 2013; 5. Kilmer, Caulkins, Pacula, MacCoun, and Reuter, 2010; 6. Caulkins, 2010; 7. Caulkins, Hawken, Kilmer and Kleiman, 2012. Average annual exchange rates for the year in question were used to convert dollars to euros.

Figure 2. Wholesale price per kilogram of sinsemilla marijuana under different production regimes

The next two columns, in blue, show the drop in prices triggered by the partial lifting of prohibition for medicinal purposes, despite continued illegality at federal level. The green columns reflect production costs in different scenarios within legal production and trade regimes. The first of these shows the production costs of a Dutch pharmaceutical company which grows high quality cannabis for medicinal purposes on a small scale. The last three columns show estimated production costs of different cultivation alternatives within a regulated legal regime. Production costs could even be cheaper if we took the current hemp costs for a variety of industrial uses. In Canada, this type of hemp currently costs around €964 per hectare. Given these conditions, a kilogram of marijuana with a THC concentration similar to that of the *sinsemilla* variety could be produced for under €2 before taxes (Caulkins et al, 2012: 161). The production costs of a kilogram of tobacco are of a similar order and would be very similar for marijuana. In order to produce marijuana with high THC content it would not even be necessary to cultivate the *sinsemilla* variety since the industrial process could include enriching the marijuana with THC from other parts of the plant or from other plants – something which has not yet been tried in any of the states in which cannabis has been legalized for medicinal or recreational purposes.

How price changes affect consumption: the elasticity of demand

How would demand be affected by a fall in the prices of legal cannabis?

The effect of prices on consumption is termed “price elasticity of demand” in economics. This concept measures the change which takes place in the consumption of a good or service when the price is raised by one per cent and is calculated by observing the subsequent shifts in the product’s demand curve.

The economists who have studied the elasticity of demand of cannabis have attempted to reveal how consumption changes in response to changes in both price and legislation. It should be noted that legalisation would also affect other determining factors of consumption that economic analyses do not take into consideration, such as the changes in cultural norms, informal sanctions (imposed for example by parents or other authority figures) or peer group pressure.

Research into the demand elasticity of cannabis has been carried out in countries like USA and Australia, but not in Spain. Pacula (2010) systematically reviewed all the literature on the subject, with a special focus on how changes in prices and legislation can affect the prevalence and frequency of use among the different types of user groups. As has been pointed out previously, consumption is largely concentrated among regular and intensive users (Gamella & Jiménez Rodrigo, 2003), so that any variation in the number of these would affect global consumption.

In all studies at international level, current users are concentrated in certain age groups. Spain is no exception and in the 2013 EDADES survey, 15.9% of those between 18 and 25 years of age claimed to have used cannabis in the past month, as against 7.7% of minors under 18 (15-17 years of age), and 5% of those above 25 (26-64 years of age).

Pacula points out that there is sufficient evidence in the literature that reductions in both prices and administrative or penal sanctions for marijuana use lead to (1) more people starting to use it, especially adolescents and young adults, (2) more regular users, and (3) their consumption being extended for longer periods. According to Pacula, any model that tries to project the impact that the legalisation of marijuana may have on the market also needs to take into account the changes in social norms and in the perception of harm, as well as the changes in monetary price and legal risks. Otherwise, the forecast effect of legalisation on consumption could be underestimated (Pacula & Lundberg, 2014; Pacula, 2010).

There are many factors which make it difficult to calculate approximately by how much cannabis consumption could increase in Spain if its sale was legalised. First of all we do not know by how much prices would really fall. Secondly, the estimations of total demand elasticity carried out range from -0.4 to -1.5 and were calculated on modest price variations in a prohibition regime (Kilmer, Caulkins, Pacula, MacCoun & Reuter, 2010: 23; Pacula & Lundberg, 2014: 7). It is quite likely that the link between prices and consumption is rather different in a legal regime. In addition, there will certainly be other factors beyond price which would change in a legalised and normalised commercial environment. Many users would, for example, lose their fear of legal sanctions and their social and political implications (Kilmer et al., 2010: 23-24; MacCoun, 2010). It could also happen that perceptions of these drugs and their attractions would change, or that some of their risks or advantages would become more visible and undeniable if more verified data about their use were made available, as is currently the case with tobacco, sugar or alcohol.

Taxation of cannabis products

We stated previously that legalisation could contribute to a marked reduction in prices through the reduction of risks run by producers and distributors. Increases in productivity and a reduction in the average costs generated by the economies of scale can clearly be added to this, while a rise in the number of users and total consumption can also be expected. The fall in prices could be offset by the application of special taxes, thus providing revenues for the state which could in turn be given over to prevention and treatment as well as the implementation of other social policies. Taxes on marijuana should be of a sufficiently high rate to prevent an increase in consumption or a switch to other countries with

higher taxes, but they should be below the threshold which allows the legal trade to compete with the black market; these are difficult aims to achieve. In Washington, for example, the prices per gram of marijuana when it became available in legal establishments in 2014 ranged from \$25 to \$30. A considerable proportion of this price was determined by the excise taxes applied during this first stage: manufacturers, processors and retailers were taxed at 25% of the retail price. In July 2015, the taxation system was changed and a single 37% tax was applied on retail sales. At the same time, the number of licences for establishments selling the drug and the competition between them increased. As a result, marijuana prices fell to little more than \$9 per gram in March 2016, very close to the prices in the illicit trade (Jensen & Roussell, 2016; The Daily News in Longview, 2-01-2016). In less than two years, the wholesale price of recreational marijuana fell by two thirds in Washington (Humphreys, 2016).

Two questions currently stand out in the debate on legalisation and taxation: at which rate should legal marijuana be taxed, and what exactly should be taxed? There are a variety of studies with interesting analyses and ideas on these topics (Caulkins et al, 2015; Kilmer et al, 2010; Kilmer, Caulkins, Midgette, et al, 2013), but the best information can be found in the reports and media articles about what is happening in those North American states which have so far legalised recreational use: Colorado, Washington, Alaska, Oregon and the District of Columbia. This last one has only legalised cultivation of up to six plants (three in the flowering stage) for residents because Congress has prevented the city of Washington from implementing a taxation system for regulating a legal market for marijuana. The experiences of the other states present interesting similarities and differences. In all these pioneering states the first act was to legalise the sale of marijuana for medicinal purposes, which was taxed at low rates. Its sale for recreational use was legalised in the next step, and this was taxed at higher rates. This gave rise to three competing markets: the illegal market, the legal market and the market for medicinal marijuana, some of which ended up being used fraudulently for recreational purposes. There were differences in the rates of taxation and the tax base applied in each state.

In November 2012 Colorado and Washington approved the legal sale of recreational marijuana. Products went on sale in early 2014 in Colorado and mid-2014 in Washington. Both states opted for an *ad valorem* tax on marijuana, i.e. a percentage of the final retail price of the product.

The main advantage of this system is that it is easy to apply and its implementation involves little cost. It does, however, suffer from certain disadvantages, chief among them its shortcomings in undermining the black market. Generally, when an industry begins operating, prices rise if demand outstrips supply. This occurred in both Washington and Colorado when marijuana was first sold legally for recreational purposes. Applying relatively high levels of special

taxes on the products contributed to price increases, to the point where these could hardly compete with the market in illicit marijuana, which was thus able to sustain its sales. As a result, the sale of illicit marijuana managed to keep an important share of the market.

Furthermore, if producers manage to develop economies of scale, prices will fall and with them taxation revenues. An additional problem is that lower prices could lead to a rise in consumption among young people and that some of the lower priced marijuana might be diverted to illegal markets in other states at higher prices (Caulkins et al, 2015). This could be corrected by raising taxes, although this would have a negative effect on the emerging legal production sector. It appears that in the USA, pressure from the legal marijuana industry has resulted in changes in legislation and taxation in its favour, reducing taxes on its products (Jensen & Roussell, 2016; Subritzky, Pettigrew & Lenton, 2015) the cultivation, sale and use of recreational cannabis has been prohibited by law in most countries. The illegal sale in other states of marijuana purchased legally in Colorado has also been observed (Gurman, 2016; Hughes, 2016).

In November 2014, Oregon and Alaska passed legislation approving the production and sale of recreational cannabis. In October 2015 this type of marijuana became legally available in Oregon in dispensaries which had already been set up to sell it for medicinal use. It is hoped that in 2016 the first licences will be issued to open establishments which can sell marijuana exclusively for recreational use. These products have yet to go on sale in Alaska because its marijuana legislation is still under development. In contrast to Colorado and Washington, Oregon and Alaska have decided to apply weight-based rather than price-based excised taxes. In January 2016, Oregon began to apply a 25% tax on all transactions involving recreational marijuana taking place temporarily in the medicinal marijuana dispensaries. Once sales can be moved to the new establishments licensed for this purpose, a tax of between 17% and 20% is envisaged on these commercial operations.

Applying taxes by weight rather than price has the advantage of more stable revenues. In addition, it may hinder the development of mass production in the industry, thereby favouring the creation of more artisan products and of higher quality. On the other hand, this could entail the risk of a type of cannabis with a highly concentrated active ingredient being sold, something that has been observed in recent years in the illegal markets both in the USA and in the EU. For these reasons, some experts have proposed other systems which would tax the THC content or the proportion of the active ingredients THC and CBD (cannabidiol). Taxing the content of marijuana could favour the development of "softer" products with a lower psychoactive potential and which are less intoxicating. It is worth noting in this regard that various studies have highlighted the correlation between a greater risk of addiction and the potency

of the cannabis consumed (Freeman & Winstock, 2015). In the Netherlands, for example, a rise in THC concentrations of marijuana and hashish sold in the *coffee shops* coincided with an increased demand for treatment, although in recent years the demand for treatment has begun to go down (Hall, 2015; Liebrechts, et al. 2013; MacCoun, 2011; Niesink, Rigter, Koeter & Brunt, 2015; Pijlman, Rigter, Hoek, Goldschmidt & Niesink, 2005). Other research has shown that the presence of CBD offsets some of the adverse effects of THC such as anxiety, panic attacks and some psychotic symptoms (Bhattacharyya et al., 2010; Englund et al., 2012; Leweke et al., 2012; Niesink & van Laar, 2013). However, a tax on active ingredients would most probably pose technical difficulties and involved higher costs since it would be necessary to create a system of random checks on the contents of the products offered for sale. This type of control has yet to be implemented anywhere.

Conclusions

The legal and political status of cannabis has changed in an unprecedented manner. In some western nations its production, distribution and sales are reaching a level of legalisation that will allow cannabis to be recognised as a psychoactive substance consumed on a large scale and tolerated in the same way as alcohol and tobacco, as well as to be included in the general pharmacopoeia. This transformation is generating a multitude of questions and uncertainties regarding the costs and benefits associated with cannabis becoming a legal, commercial and regulated product subject to taxation.

The legalisation of hemp derivatives provokes frequently conflicting reactions from polarised camps. Some see legalisation as an issue of social justice and a sort of panacea to treat a variety of illnesses or resolve problems of substance dependence. Others, meanwhile, can only see this age-old plant as a threat to the health of consumers and a source of social problems of all kinds. Nevertheless, defending the right to grow plants for personal consumption or the use of hemp derivatives among adults should not be incompatible with the promotion of responsible and moderate use of such products, or even the prevention of its consumption or the struggle to reduce its use among the most vulnerable members of society. These efforts could be sustained or even improved in a situation of legal normality and commercial legality of the products involved. Those promoting cannabis legalisation should also be more involved in working to prevent or reduce consumption, especially when immoderate, as well in reducing the harm it can cause - as do those in favour of tobacco control.

For some years, Spain has maintained a cannabis trading regime characterised by easy access, relatively low prices and rich and intense indirect advertising, with production and sales however remaining illegal. As a result, a market

has consolidated around illicit hemp derivatives offering a wide range of Moroccan hashish and locally grown marijuana to a large number of consumers (Alvarez, Gamella & Parra, 2016; Gamella & Jiménez Rodrigo, 2004, 2005). Cannabis has become an attractive and desirable product for a notable sector of the Spanish population, mostly young people, who often underestimate the risks and dangers especially those involved in the most intensive and prolonged use.

In Spain cannabis consumption has remained decriminalised since the mid-1970. However, in 1982 a system of controls and punishments for possession and use of the drug in public places was introduced, based on administrative sanctions and fines (Mayán Santos, 2007). This system of penalties most likely contributed to the development of a disregard for the law and for the efforts at treatment and prevention of drugs which were realised in Spain among both cannabis users and public opinion in general.

This study has presented a series of politico-economic arguments relating to price, taxation and methods of regulation of the production and sale of cannabis. These aspects of the cannabis market should be taken into consideration in any reform of its legal status, as should the fact that cannabis prices in Spain are the lowest in the European Union, which goes some way towards explaining why Spain is one of the countries with the greatest number of both average and most experienced users. But there is still room for price reductions if production and distribution are decriminalised. Since lower cannabis prices could lead to a rise both in the number of consumers and the total quantity consumed, the discussion around the legalisation of cannabis production and trade needs to consider concrete measures to prevent sharp price cuts which could have serious effects on the demand for the products involved.

One of the crucial aspects regarding the legalisation of the hemp derivatives market will therefore be its taxation. Taxes can serve to control prices and prevent a growth in demand as a consequence of possible price falls. The experiences of the pioneering states in marijuana legalisation for recreational use show that the taxation of cannabis is a complex issue for which generally accepted solutions have yet to be found. Finding a balance between satisfactory revenue and a tax level which will allow the legal market to progressively displace the illegal one requires more knowledge and a greater consensus among the different groups involved than is currently the case. The results of the first attempts to tax legal marijuana have not been as encouraging as was hoped. As might be expected after almost a century of the prohibition of these sought-after substances, the institutions created informally in response to illegality are more complex and flexible than imagined, and the new legal institutions have been extremely rigid and slow in their responses. Simply not enough is known about the consequences of legalising marijuana and all the good intentions and more or

less informed opinions do not suffice to develop either an efficient market or a satisfactory taxation system. Low rates of taxation are necessary so that an emerging market be capable of progressively replacing the illegal one. In consequence, it can be expected that, in its initial stages, the taxation of cannabis would not generate large revenues. It is furthermore quite likely that the greater part of this income would need to be invested in the regulation process itself, for example prevention and treatment programmes, management and control of production and sales, etc. At the same time, a significant decrease in the Spanish prison population and the concomitant reduction in public spending should not be expected. Indeed, the disappearance of administrative penalties for possession and use in public places would deprive the state of many million Euros of income from this dubious source. The repression of the illegal cannabis market and the persecution of traffickers would continue while a large illegal production industry exists in Spain and other countries which use Spain as a transit route for these products. At least in the short term, legalisation is thus highly unlikely to eradicate illegal cannabis growing in Spain or the illegal importing of cannabis derivatives from other countries such as Morocco.

It also remains to be seen how the legal and social experiments being carried out in various North American states, which will most likely also be tried in Europe, will affect the policies and positions of increasingly influential countries in other parts of the globalised world. It is impossible not to think of China, the Arab world, India or Russia in this respect. In several of these regions, cannabis use has ancient traditions which have continued to exist independently of the emergence of western counterculture in the 1960s and 70s which, however, also affects the younger generation of these countries in many ways.

The regulation or legalisation of cannabis derivatives is a complex issue which should be dealt with primarily from a public health perspective. This article has discussed several hypotheses informed with the currently available data which show the potential importance of socio-economic aspects in the planning, regulation and taxation of future cannabis control policies.

Conflict of interests

None of the authors of this study declare a conflict of interests.

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