Journal of Health Economics xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Journal of Health Economics

journal homepage: www.elsevier.com/locate/econbase

Unemployment, drugs and attitudes among European youth☆

Sara Ayllón*, Natalia N. Ferreira-Batista

Department of Economics & EQUALITAS, University of Girona, Spain

ARTICLE INFO

Article history:
Received 3 October 2016
Received in revised form 10 August 2017
Accepted 21 August 2017
Available online xxx

JEL classifications:
I12
K42
E32
D12

Keywords:
Unemployment
Drugs
Youth
Attitudes
Effective policies
Great recession
Europe

ABSTRACT

This paper studies changes in the patterns of drug consumption and attitudes towards drugs in relation to sky-high (youth) unemployment rates brought about by the Great Recession. Our analysis is based on data for 28 European countries that refer to young people. We find that the consumption of cannabis and 'new substances' is positively related to increasing unemployment rates. An increase of 1% in the regional unemployment rate is associated with an increase of 0.7 percentage points in the ratio of young people who state that they have consumed cannabis at some point in time. Our findings also indicate that higher unemployment may be associated with more young people perceiving that access to drugs has become more difficult, particularly access to ecstasy, cocaine and heroin. According to young Europeans, when the economy worsens, anti-drug policies should focus on the reduction of poverty and unemployment, and not on implementing tougher measures against users.

© 2017 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

If there is an age group that has been particularly hit by the Great Recession in Europe, it is certainly that of young people. Youth unemployment rates have reached unprecedented levels in many countries, labour market opportunities have clearly worsened, and the careers of many young people have been abruptly interrupted. The consequences of these deteriorating labour market conditions in several different spheres of life currently form the subject of analysis of much research – i.e. career prospects, the possibility for young people to leave the parental home and set up their own families, subjective well-being, etc. This paper adds to this literature by analysing the extent to which changes in the labour market have also translated into changes in the patterns of drug consumption and youth attitudes toward drugs.

Drug consumption among European youth is not a minor problem: 17.8 million young adults (15–34) used drugs in 2015 according to the European Drug Report 2016, published by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA, 2016). The same study estimates that cannabis was used in 2015 by 16.6 million young adults – that is, by 13.3% of the age group. In the case of cocaine, the figure was 2.4 million (1.9%), and for ecstasy (MDMA) and amphetamines, 2.1 million and 1.3 million (1.7% and 1.0%), respectively. Moreover, it is estimated that 8% of the youngest group (15–24) have used new psychoactive substances at some time. The same source estimates that EUR 24.3 billion were spent in 2013 on illicit drugs in Europe; that there were 1.6 million

☆ This paper has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement no. 649395, project title: NEGOTIATE – Overcoming early job-insecurity in Europe. Sara Ayllón also acknowledges support from the projects ECO2013-46516-C4-1-R, ECO2016-76506-C4-4-R and 2014-SGR-1279 and is very grateful for the warm hospitality received in the Department of Social Sciences at the University of Eastern Finland, where this paper was revised. Participants at the Negotiate meeting in Brighton (March 2016), at the Early Job Insecurity Workshop in Poznan (September 2016) and at the 41st Symposium of the Spanish Economic Association in Bilbao (December 2016) are thanked for their useful comments. We would also like to thank Richard Williams at the University of Notre Dame for answering our questions regarding the Stata command *gologit2*. Any errors or misinterpretations are our own.

* Corresponding author at: C/Universtat de Girona 10. 17003, Girona, Spain.
E-mail address: sara.ayllon@udg.edu (S. Ayllón).

http://dx.doi.org/10.1016/j.jhealeco.2017.08.005
0167-6296/© 2017 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

reported drug offences in 2014; and that at least 6800 overdose deaths occurred that same year (EMCDDA, 2016).[1]

But why should changes in the labour market be related to changes in drug consumption or attitudes toward drugs? The theoretical literature analysing the link between the business cycle and substance use highlights three causal pathways: an 'income effect', 'economic stress' and an 'opportunity cost' (also called 'substitution effect'). The 'income effect' asserts that if drugs are normal goods, then in a bad economy consumers should adapt their demand to a tighter budget, and therefore reduce their consumption. Evidence for this pro-cyclical result can be found in Neumayer (2004), Tapia Granados (2005), Gerdtham and Ruhm (2006), Charles and DeCicca (2008), Catalano et al. (2011), Freeman (1999), Ruhm and Black (2002), Ruhm (2005), Ásgeirsdóttir et al. (2012) and Xu (2013), and references within.[2]

The 'economic stress' mechanism links substance consumption to psychological reasons. In this case, to deal with uncertainty about future income, the increased probability of being unemployed or the lack of opportunities found in the labour market, young people may resort to self-medication, which causes an increase in substance use. Furthermore, economic recessions can change the 'opportunity cost' of substance consumption: given that fewer jobs are available and wages are lower, spending time using drugs has a smaller opportunity cost, which may enhance consumption.[3] Böckerman and Ilmakunnas (2009), Arkes (2011, 2012), Dee (2001), Bradford and Lastrapes (2014) and Currie and Tekin (2015) present evidence for such counter-cyclical results.[4] All in all, the relationship between substance use and the business cycle will be pro-cyclical if the income effect offsets the other two mechanisms, and counter-cyclical if it is the other way round.

This paper is the first to provide evidence of the relationship between sky-high (youth) unemployment rates brought about by the Great Recession and drug use among young people across Europe (28 countries). More importantly, our study goes beyond an analysis based solely on consumption to analyse certain attitudes towards drugs that have been identified in the literature as good predictors of future drug consumption. In particular, we analyse how changes in the local labour market may have had an effect on the availability of drugs and on young people's perceived access to them; on the perceived risk of drug consumption; and on youth opinion as to the most effective ways of combating the problems that drugs cause in society. The analysis of good predictors is important because, particularly when interviewed about drugs, individuals may be reluctant to admit actual consumption. Moreover, and as explained by Bachman et al. (1990), any complete explanation of drug use needs to account for drug-specific factors – for example, perceived risk and perceived availability. As those authors point out, only by accounting for drug-specific factors are we able to understand the different patterns of trends.[5] Indeed drug-specific factors are good predictors because they are more likely to change over time than are general factors related to the broad range of problem behaviour. In this respect, this paper adds to the literature a new analysis of how the economic environment may have shifted attitudes toward drugs.[6]

Our study focuses solely on young people (aged 15–24 years). This is important because, as the specialized literature shows, early consumption is one of the factors that can lead to progressive dependence (Swift et al., 2008; Coffey et al., 2003; von Sydow et al., 2001). In the case of cannabis, for example, several authors point to the possibility that early consumption can work as a gateway to harder drugs (Melberg et al., 2010; Beenstock and Rahav, 2002; Pudney, 2003; Van Ours, 2003; Fergusson et al., 2006; Bretteville-Jensen et al., 2008).

Our main findings indicate that rising levels of total and youth unemployment may be associated with increased consumption of cannabis and 'new substances' by European youth. According to our results for the period between 2011 and 2014, a 1% increase in the regional unemployment rate at the NUTS-1 level is associated with an increase of 0.7 percentage points in the probability that young people respond that they have consumed cannabis. In the case of new substances, the figure is 0.5 percentage points. Our results also indicate that a link can be established between changes in the local labour markets and perceived availability of drugs: as the unemployment rate rises, so access to drugs becomes more difficult, in the opinion of young Europeans (in particular, access to cocaine, heroin and ecstasy).[7] On the other hand, no link could be established between changes in the local labour markets and changes in young people's opinion of the health risk of using drugs. Finally, and when asked about effective policies to combat the problems that drugs cause in society, in contexts of rising unemployment young people say they are more in favour of measures that reduce poverty and unemployment than they are of tougher measures against users.

Our findings are important because they provide evidence of other effects of the Great Recession on young people that go beyond those more closely associated with the labour market. Moreover, our results should prove informative to policy makers: drug consumption is linked to the opportunities afforded to young people in the local labour markets, and so special attention needs to be focused where career prospects have worsened the most. Furthermore, our paper takes into account young people's own views on which policies are effective in combating the problems caused by drugs. Anti-drug policy should not ignore these views.

After this introduction, the paper continues as follows. The next section presents the dataset and some descriptive statistics. Section 3 introduces the methodology and the econometric techniques used. Section 4 shows our results on consumption, perceived availability, perceived risk of drug use and young people's opinions regarding effective anti-drug policies. Finally, the conclusions summarize our main results and discuss avenues for future research.

2. Data

The data used come from four Eurobarometer surveys on 'Young people and drugs', collected across Europe in four different years: 2004 (Flash Eurobarometer (EB) 158), 2008 (Flash EB 233), 2011 (Flash EB 330) and 2014 (Flash EB 401).[8] The pooled dataset suits

[1] The literature that links drug use and violence is large – see Boles and Miotto (2003) for a review.

[2] Results are called pro-cyclical because drug consumption changes have the same sign as economic growth rates: when an economy grows (GDP increases and unemployment falls), consumption is found to increase. Instead results are found to be counter-cyclical when in a growing economy (with lower unemployment rates), consumption diminishes.

[3] The planning horizon of young people during an economic crisis could be shorter than during better economic years, inducing short-term recreational consumption.

[4] The rise of unemployment during recessions increases people's free time to engage in other activities outside the labour market. On the other hand, it is also true that with more free time, adults can increase their control over activities undertaken by youth or teenagers (Arkes, 2007).

[5] As defined in Bachman et al. (1988: 95), drug-specific factors are 'those factors which relate primarily to the use of a particular drug rather than to drug use in general (or problem behaviour)'. Such factors include awareness of the drug, perception of the effects of using it, availability, perceptions by friends and others and perceptions that friends and relatives disapprove of using a certain drug.

[6] Attitudes, as personality traits, are not set in stone and change with the social and economic environment (Almlund et al., 2011).

[7] Our paper does not make any claims for causality: we simply wish to consider different predictors to try to understand possible future trends in consumption.

[8] The surveys used in this study have been explicitly designed to obtain information on drugs among young people between the ages of 15 and 24, and so our results

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

the purposes of our analysis, because it covers more than a decade and deals with the period prior to the Great Recession (2004), the time when countries were hardest hit (2008–2011) and the post-crisis period (2014) – though some countries are still having difficulty in escaping from the economic downturn. Data from the Eurobarometer surveys is free of charge and can be downloaded from the European Union Open Data Portal (http://opendata.europa.eu/data/dataset).

The pooled dataset contains detailed information relating to young people between the ages of 15 and 24 on drug consumption, access to drugs, youth opinion on the most effective ways to combat the problems caused by drugs, perceived risk of drug consumption, etc. The surveys are nationally representative of the specified age group, and respondents were selected randomly.[9] In total, 28 European countries are present in the pooled sample: 15 countries participated in 2004, 27 countries in 2008 and 2011, and 28 countries in 2014. Table A1 in the online Appendix contains detailed information on the countries and years covered. When working with data at the regional level, we use information at NUTS-1 (Nomenclature of Territorial Units for Statistics) and we count a total of 96 regions.[10] Our pooled sample contains 45,412 observations. One important issue of the data to hand is that the four Eurobarometer surveys do not contain exactly the same variables, and sometimes answer codes differ. Thus a long process of harmonization was required to make target variables comparable across time. Also not all the variables exist in all the years. For this reason, we clearly indicate in the tables and in the text which period is covered by the results.

Finally, Table 1 summarizes some of the most important characteristics of our sample (used as control variables): 51% are males; average age is 19.7 years; 31% live in a rural area, 43% in a medium-sized town and 25% in a large city; 66% are students, nearly 23% are employed, 2% are self-employed and 9% are unemployed. Finally, almost 52% of the sample had completed secondary school, while 18% held a university degree. The sample is largest for 2014, as that was the year when most countries participated; each country represents less than 5% of the total sample (see Table A1 in the online Appendix).[11] Naturally, we would have liked to include more control variables, had they been available, but it should be noted that some of the variables used in previous literature are not so relevant for the age group we focus on (for example, marital status or self-assessed health). Furthermore, we have treated as 'missing' the answers 'does not know', 'not available' or 'refuses to answer'; however, this is a very minor issue in the dataset to hand.[12]

Table 1
Summary statistics.

Variables	Mean	Std. deviation	Min.	Max.
Male	0.510	0.50	0	1
Age	19.725	2.74	15	24
Age squared	396.585	108.24	225	576
Rural area or village	0.316	0.46	0	1
Small or medium-sized town	0.436	0.50	0	1
Large town or city	0.249	0.43	0	1
Student	0.664	0.47	0	1
Employee	0.227	0.42	0	1
Self-employed	0.018	0.13	0	1
Not working/unemployed	0.091	0.29	0	1
Never been in full-time education	0.004	0.07	0	1
Primary education	0.295	0.46	0	1
Secondary education	0.521	0.50	0	1
Higher education	0.179	0.38	0	1
2004	0.169	0.37	0	1
2008	0.271	0.44	0	1
2011	0.271	0.44	0	1
2014	0.289	0.45	0	1

Source: Authors' computation, based on the Eurobarometer 'Young people and drugs' surveys for 2004, 2008, 2011 and 2014. Weighted results.

3. Methodology

In order to capture the possible relationship between the business cycle and drug consumption or changes in attitudes toward drugs, we matched the harmonized dataset of the four Eurobarometer surveys with data from Eurostat on the total and the youth unemployment rates at both country and regional level. The different impact of the Great Recession in Europe and the important variability of unemployment rates over time and across countries and regions allow identification of different consumption patterns or changes in opinions and attitudes toward drugs that are related to changes in macroeconomic conditions.

Fig. 1 shows the great variability in the incidence of unemployment within the population and especially among young people (under 25) over time and across countries according to data from Eurostat. As can be seen from the four years considered and the 28 European countries under analysis, the youth unemployment rate varies from as low as 7.7% in Germany (2014) to as high as 53.2% in Spain (2014). The variability is even greater if we consider all the regions (not shown) – with the figure lowest in Bayern (Germany) with 4.4% in 2014 and highest in Andalucía (Spain) with 60.2%, also in 2014. Furthermore, the within-country deviation in the annual youth unemployment rate for the period under analysis ranges from 0.8 to 13.4; Greece and Spain are the countries with the most variation, while Malta and Austria have the least. The within-country deviation rang is smaller for the total unemployment rate (from 0.2 to 7.2), but larger for both measures of unemployment at the regional level. Moreover, additional graphs (available from the authors upon request) show that not all changes across time in the unemployment rates move in the same direction and not all the changes are of the same size.

Our results are based on logit models and generalized ordered logit models (depending on the nature of the dependent variable under study) with fixed effects. In the case of simple logits, and using the subscript c for country (or r, in the case of regions) and t for time, the basic regression can be specified as follows:

$$Y_{ict} = \alpha + X_{ict}\beta + Unempl_{ct}\gamma + C_c + T_t + s_{ict} \quad (1)$$

where Y_{ict} represents the outcome of interest and X_{ict} is the vector of our control variables, which include gender, age, age squared,

are not derived from general health surveys, where typically the reported incidence of drug use is very low.

[9] For example, in 2014, respondents were called both on fixed and mobile phones, which may provide sufficient privacy for young people to decide to participate in the survey and to give truthful answers. The basic sample design applied in all countries was multi-stage random probability. In each household, the respondent was drawn at random following the 'last birthday rule'.

[10] Note that there are three levels *officially* defined by the European Commission, with two levels of local administrative units (NUTS-1 and NUTS-2) – see an interactive map at http://ec.europa.eu/eurostat/web/nuts. However, some countries, because of their small size, do not have such a division. For example, in Luxembourg the three levels correspond to the entire country. Moreover, while some countries provided information at the NUTS-2 and NUTS-3 level, other countries did not, which prevented us from working with more disaggregated data. This means that, in some countries, results at the regional level can refer to large geographical areas (as, for example, in Finland). See all the detail in Table A1 in the online Appendix (www.saraayllon.eu/web-appendices.html).

[11] The descriptive statistics for the dependent variables are presented at the beginning of each section and the unemployment rates used across time are shown in the next section.

[12] The number of observations treated as missing differs for each dependent variable. For example, in the case of cannabis consumption, it is 0.6% of the sample used, while in the case of effective policies it goes up to 4.0%. However, the percentage of 'refuse to answer' or 'not available' never exceeds 5% in the variables used.

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

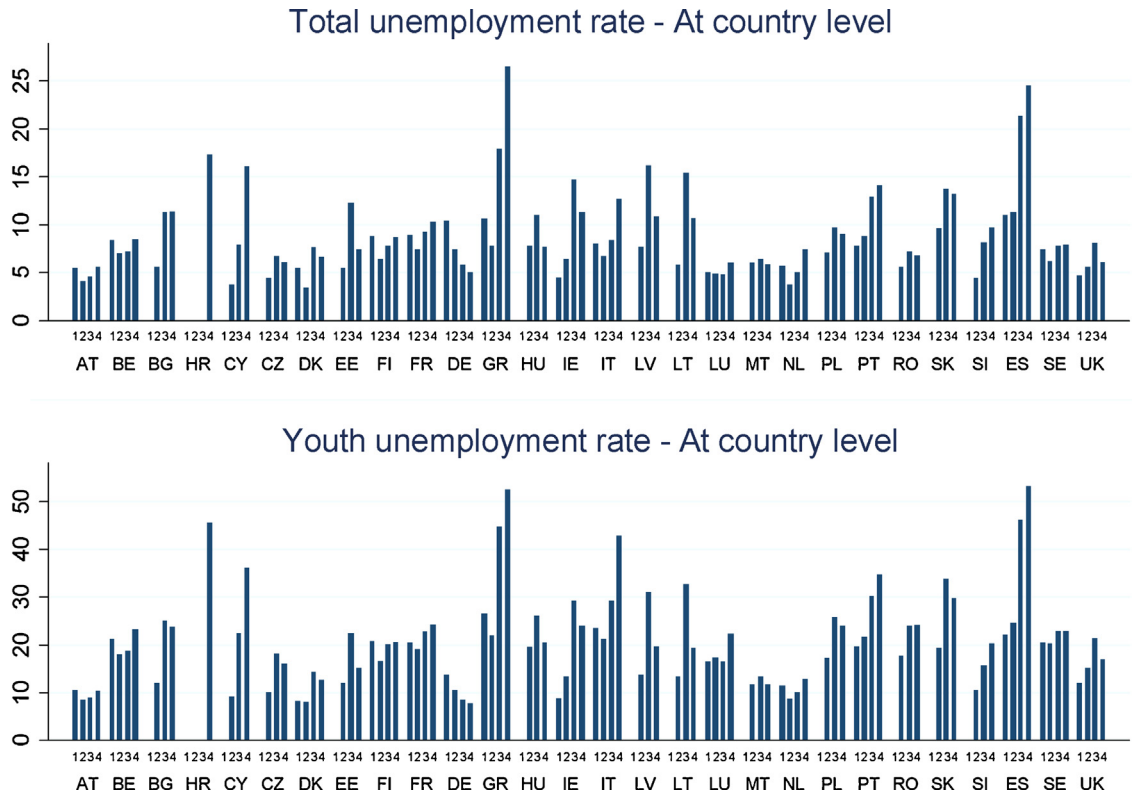

Fig. 1. Total and youth unemployment rate (less than 25 years of age) at country level, 2004, 2008, 2011 and 2014 (in %).
Note: In the graph, 1 refers to the year 2004, 2 to 2008, 3 to 2011 and 4 to 2014. The missing bars in the graphs indicate that the country is not present in the analysis in that year as it does not participate in the Eurobarometer surveys. Countries are displayed in alphabetical order, according to their full names in English.
Source: Eurostat.

educational level, status in the labour market and living in an urban, semi-urban or rural area.[13] The parameter of main interest is γ, which captures the relationship between the unemployment rate of the country (or region) in which each young person lives and the different outcomes examined. In other words, γ captures the association of within-country (or within-region) deviations in economic conditions over time on the outcomes of interest. Finally, s_{ict} is the usual error term.

The fixed effects C_c (or R_r in the case of regions) control for time-invariant country (or region) characteristics, while T_t accounts for time effects. In other words, country and region fixed effects control for a given pattern specific to an area, and time fixed effects control for possible shocks that could change, for example, attitudes toward drugs in a given year in all Europe.[14] This methodology allows us to control, for instance, for differences in the prices of drugs in the different areas and over time. All the regressions are weighted by the population weights provided in the different datasets and clustered standard errors at the country (or regional) level are used throughout the paper.

In the case of ordinal dependent variables – for example, ease of access to substances or young people's opinion on how harmful it is to consume drugs – we use generalized ordered logit models instead of the standard ordered logit model, because the ordered logit model assumption of parallel lines or proportional odds is violated in our data.[15] We use the Stata command *gologit2*, made available to researchers by Williams (2006). When using generalized ordered logits, it is important to remember how to interpret the results: generalized ordered logits are equivalent to a series of binary logistic regressions where the dependent variable is combined in different categories. So if, for example, the dependent variable has four categories (from 1 to 4), then the results for category 1 will need to be read in contrast to categories 2, 3 and 4. In a similar vein, the results for category 2 will contrast categories 1 and 2 against 3 and 4, while the results for category 3 will consider 1, 2 and 3 against 4. Note that the way to interpret the coefficients is different from the way in which results for marginal effects should be read: marginal effects indicate the probability that an outcome occurs, given certain values of the independent variables.

Finally, and as will be shown in the next section, we present all the results using four different measures of the unemployment rate: (1) the total unemployment rate at country level, (2) the total unemployment rate at regional level, (3) the youth unemployment rate (15–24) at country level and (4) the youth unemployment rate at regional level. Which of these rates is the best for the purposes of our analysis is still a matter of discussion in on-going research. On the one hand, for example, Arkes (2007) argues in favour of using a

[13] The information on educational level is not available for 2004, but various robustness checks have been carried out to ensure that our results are not dependent on this. It is important to note that there are potential confounding factors that can influence the link between our outcomes of interest and the level of education (or young people's status in the labour market). Particularly for the youngest individuals in our sample who have not completed education, there could be several unobservable factors that may cause school dropout or delay that can have an impact on drug consumption or attitudes towards drugs. The same is true of self-selection into a labour market status. The methodology applied in this paper does not deal with these issues.

[14] Phrased differently, year fixed effects capture trends that are not specific to a country (or region), for example, a cultural factor.

[15] The assumption requires that all the coefficients are the same for each category of the dependent variable. We tested the assumption with the Brant test and, in all cases, the assumption was violated.

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

total rate because it is derived from a larger number of observations than is the rate for young people (or teenagers in the case of Arkes, 2007). That way, potential sampling error may be less important. Moreover, Arkes (2007) points out that use of a youth unemployment rate could introduce some endogeneity if youth labour supply is affected by drug use. But such an effect is likely to have a minimal impact on the rate for the population as a whole. On the other hand, though, it can be argued that young people are more likely to make decisions about drugs while assessing the opportunities for their age group in the labour market, rather than the opportunities for the adult population as a whole. Given such different arguments, we use both measures; this has the advantage of assessing the robustness of the relationships found.

4. Results

We present our results in four main sub-sections. First, we show our findings on the consumption of cannabis and new substances. Second, we explore the relationship between changes in (local) labour markets and perceived drug availability. Third, we analyse risk behaviour toward drugs. And finally, we study changes in young people's opinions concerning the most effective ways in which the public authorities can combat the problems that drugs cause in society.

4.1. Drug consumption

The literature regarding the link between the business cycle and substance use is vast (see, among many others, Neumayer, 2004; Tapia Granados, 2005; Gerdtham and Ruhm, 2006; Charles and DeCicca, 2008; Catalano et al., 2011; Arkes, 2012; Bradford and Lastrapes, 2014; Currie and Tekin, 2015). However, most of the literature has focused on the consumption of tobacco and alcohol, while the specific relationship between illicit drug consumption and changes in the labour market has been less thoroughly analysed.

Among studies that focus on legal substances, the general results point to a pro-cyclical relationship (Xu, 2013; Ásgeirsdóttir et al., 2012; Dávalos et al., 2012; Charles and DeCicca, 2008; Johansson et al., 2006; Ruhm, 2005; Ruhm and Black, 2002).[16] Instead, results are not so clear among studies that include illicit drugs, as they often differ by age group or by country (or region). An example is the work of Chalmers and Ritter (2011). These authors analyse the implications of the business cycle on cannabis and alcohol consumption (number of users and frequency) in Australia for the period 1991–2007. The results for cannabis show that among young adults (under 24) the relation is counter-cyclical for participation and frequency. But among people over 24, although the frequency of cannabis use is pro-cyclical, the effect of the business cycle on participation is mixed: it decreases with a rise in the unemployment rate (pro-cyclical), but goes in the opposite direction if the income per capita falls (counter-cyclical). In their conclusions, the authors point out that for Australians, cannabis is not a normal good.

The work by Chalmers and Ritter (2011) is just one example of how differences in the age group analysed can lead to mismatched results in the literature. The key to understanding such differences among various age groups lies in the direction of the 'income effect'. Arkes (2007, 2012), who focused on young Americans (16–24), shows that the counter-cyclical link between drug consumption and the business cycle for this group is related to their limited response to the income effect. His studies indicate that during economic recessions, the young are more likely to sell drugs and are thus better able to fund their own consumption (Arkes, 2011). This finding is supported by other studies, which show that young people can even get cannabis for free (Caulkins and Pacula, 2006; Harrison et al., 2007).[17]

Concerning the impact of the Great Recession on substance use in Europe, the literature is still very scarce. Zuccato et al. (2011) find that during the recession in the North of Italy, drug consumers replaced expensive substances with cheaper ones.[18] The works of Colell et al. (2014) and Martin-Bassols and Vall-Castello (2016) centred on the consumption of illicit drugs in Spain. Both groups of researchers found a counter-cyclical relationship between cannabis use and the business cycle.[19] Despite the relevance of their findings, these works do not address the situation of young people.

As for evidence on the United States, Carpenter et al. (2017) contains a first analysis of the relationship between macroeconomic conditions and the use of several illicit drugs from 2002 to 2015, while drawing on restricted data from the National Survey on Drug Use and Health for individuals aged 12 and older. Their results provide mixed evidence on the relationship between state unemployment rates and drug consumption: economic downturns are associated with increases in the use of ecstasy and heroin, and with decreases in the use of LSD and crack (though results are sensitive to the time window used). In the case of cocaine, tranquilizers and inhalants, the coefficients for the unemployment rate do not differ statistically from zero. A positive relationship is also found between the unemployment rate and the timeframe within which individuals report having used 'any illicit drug' or analgesics. Their results also show that certain substance-use disorders (based on professionally developed diagnostic criteria) are countercyclical – e.g. mild disorder for marijuana or severe disorder for hallucinogens, to give two examples. The authors also find that the relationship between economic conditions and use disorders is symmetrical (similar in magnitude whether the state of the economy is improving or worsening). In turn, Pabilonia (2017) analyses the effects of the Great Recession on teenagers' risky behaviours in the US, including the use of marijuana in the past 30 days. She finds, for the period 2003–2011, that unemployment rates are associated with an increase in consumption, but only among black teenage males.

The information on drug consumption in the Eurobarometer surveys focuses on just two drugs: cannabis and the so-called 'new substances'.[20] In the case of cannabis, the question asked is exactly the same in 2011 and 2014, 'Have you used cannabis yourself?' with four possible answers (apart from 'do not want to answer' or 'do not know'): (1) 'No, I have never tried', (2) 'Yes, in the last 30 days', (3) 'Yes, in the last 12 months', and (4) 'Yes, but more than 12 months

[16] There are some studies that point to a counter-cyclical relationship, but they deal with specific population groups as teenagers or young adults (Arkes, 2012; Dee and Evans, 2003) or use individual employment status as a business cycle indicator (Aguilar-Palacio et al., 2015; Golden and Perreira, 2015). See Catalano et al. (2011) for a complete review.

[17] The first authors showed that 58% of cannabis users in the 2001 National Household Survey on Drug Use and Health in the United States obtained cannabis for free; the second study found similar percentages among 14–17 year-old cannabis-using students in Philadelphia, Toronto and Montreal.

[18] The authors used wastewater analyses to estimate loads of cocaine, heroin, methamphetamine and cannabis consumed daily in two cities (Milan and Como) for the period between 2005 and 2009.

[19] Both studies use the four editions of the Spanish Household Survey on Alcohol and Drugs for 2005, 2007, 2009 and 2011. Colell et al. (2014) focus on cannabis frequency use and Martin-Bassols and Vall-Castello (2016) on the consumption of legal (alcohol and tobacco) and illegal substances (cannabis and 'hard drugs').

[20] 'New substances' refer to powders, tablets, pills or herbs that imitate the effect of illicit drugs – some of these are sold as legal substances in several countries and are often known as 'legal highs'.

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

Table 2
Percentage of young people who respond that they have used cannabis or new substances at any point in time, during last 30 days, within last 12 months and more than 12 months ago, 2011 and 2014.

	2011	2014
Consumption of cannabis		
At any point in time	24.0	28.5
Last 30 days	5.0	5.7
Last 12 months	7.4	8.7
More than 12 months ago	11.6	14.1
Consumption of new substances		
At any point in time	4.7	7.4
Last 30 days	-	1.1
Last 12 months	-	2.2
More than 12 months ago	-	4.0

Source: Authors' computations, based on the Eurobarometer 'Young people and drugs' surveys for 2011 and 2014.

Table 3
Results for the unemployment rate coefficient of the logit regression models on cannabis and new substances consumption, 2011 and 2014.

	Total unemployment rate		Youth unemployment rate	
	Country	Region	Country	Region
Consumption of cannabis (at any point in time)				
Coeff.	0.0377*	0.0402***	0.0216*	0.0228***
Std. Error	0.0218	0.0150	0.0118	0.0079
Marg. Effect	0.644*	0.684***	0.369*	0.392***
Consumption of cannabis (last 30 days)				
Coeff.	0.0133	0.0167	0.0121	0.0116
Std. Error	0.0464	0.0354	0.0241	0.0166
Marg. Effect	0.065	0.081	0.059	0.057
Consumption of cannabis (last 12 months)				
Coeff.	0.0334*	0.0332*	0.0236**	0.0239***
Std. Error	0.0200	0.0180	0.0096	0.0081
Marg. Effect	0.241*	0.238*	0.171**	0.173***
Consumption of cannabis (more than 12 months ago)				
Coeff.	0.0391*	0.0422**	0.0165	0.0180*
Std. Error	0.0200	0.0187	0.0107	0.0107
Marg. Effect	0.412*	0.443**	0.174	0.191*
Consumption of new substances (at any point in time)				
Coeff.	0.0842***	0.0892***	0.0399***	0.0396***
Std. Error	0.0212	0.0178	0.0112	0.0089
Marg. Effect	0.462***	0.490***	0.219***	0.220***

Source: Eurobarometer 'Young people and drugs' surveys for 2011 and 2014.
Note: All the regressions include as control variables gender, age, age squared, type of residential area, status in the labour market, educational level and country (or region) and time fixed effects. *** significant at 1%, ** at 5% and * at 10%.[23]

ago'.[21, 22] In the case of 'new substances', the information is more scarce. In 2011, young people were simply asked if they had ever used such substances (yes or no), whereas in 2014 it was possible to determine when the last time such consumption occurred (in the last 30 days, the last 12 months, etc.). In order to make the information comparable, we created a variable in 2014 that adds up all the categories indicating that someone at a given point in time has used new substances.

Our first analysis focuses on the association between changes in the unemployment rate and the probability that young people have consumed cannabis at any point in time. According to our descriptive statistics, shown in Table 2, 24% of young Europeans had consumed cannabis in 2011, a percentage that increased to 28.5% in 2014. But can changes in the unemployment rate be associated with changes in the probability that young people experiment with cannabis? The answer is yes.

The first rows of Table 3 shows the results for the unemployment rate coefficient of logit models on the probability of experimenting with cannabis (any time), while using the total unemployment rate (at country and regional level) and the youth unemployment rate (also at both levels). Results clearly indicate a positive relationship between the level of unemployment in a given country or region and the use of cannabis among young Europeans. Thus, a 1% increase in the total unemployment rate at the regional level is associated with a 0.7 percentage point increase in the percentage of young people declaring that they have used cannabis. The marginal effects when considering the youth unemployment rates are smaller, but we need to take into account that youth unemployment rates contain more extreme values than the total unemployment rate. Note that such an effect is net of other possible circumstances that may affect a particular country (or region), given that we control for fixed effects.

Our analysis also takes into account how long ago young people used cannabis: during the last 30 days, during the last 12 months or more than 12 months ago. As is shown in Table 2, the percentage of young people who admit to having taken cannabis in the last 30 days is rather low: only 5.0% in 2011 and 5.7% in 2014. The percentages increase when we consider a longer period of time – the last 12 months, with 7.4% and 8.7%, respectively. The highest figures (11.6% and 14.1%) refer to the number of young people who consumed cannabis more than 12 months ago.

In the regressions, when we break down the results to account for the time when young people say that they have consumed cannabis, we can see that our main findings are driven by young people who respond that they have used cannabis during the last 12 months (particularly in the case of youth unemployment) and more than 12 months ago (particularly in the case of the total unemployment rate). Again, an increase in the regional unemployment rate of 1% is associated with a positive increase in the consumption of cannabis of 0.4 percentage points.

As explained, the Eurobarometer dataset also contains information about whether the young person has experimented with new substances. As Table 2 shows, 4.7% of young Europeans in 2011 stated that they had tried new substances that imitate the effects of illegal drugs. This figure increased considerably in only three years, as in 2014 7.4% admitted having done so. As with cannabis, when we account for the length of time since new substances were used (information available only for 2014), the largest percentage is for young people who admit to having used them more than 12 months ago –4.0%. Only 1.1% declared that they had consumed new substances in the last 30 days.

The last rows of Table 3 detail the results for the unemployment rates coefficients on consumption of new substances of the logit regressions with fixed effects. The association between them is very clear: increases in the unemployment rate are strongly and positively associated with increases in the consumption of new substances among young Europeans. The coefficients are all statistically significant at 1%, regardless of the unemployment rate used. This way, for example, a 1% increase in the regional total unemployment rate is associated with an increase of 0.49 percentage

[21] As earlier commented, missing values because of refusal or unavailability amount to only 0.6% of the sample used.
[22] In 2004, the questionnaire simply asked 'Which of the following applies to you?' with two possible answers: 'I have already tried cannabis' and 'I have used cannabis over the last month'. However, no further reference to time is made, and so, for this reason, we decided not to pool the information of 2004 with the variables for 2011 and 2014. For 2008, no information is available.
[23] The use of a categorical variable for age (instead of the continuous one) made no difference to any of the results presented in this paper.

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

points in the probability that young people declare having used new substances.[24]

Thus, our results present a worrying trend of increased cannabis and new substances consumption that evolved in a context of high unemployment rates following the strong impact of the Great Recession in many countries.[25, 26]

4.2. Access to drugs

Access to drugs or availability refers to the 'set of physical, social and economic circumstances surrounding the ease or difficulty of obtaining drugs, especially with respect to their costs and the amount of physical effort required to obtain them' (Smart, 1980: 47). Availability can be *actual* or *perceived*. Actual availability considers the cost of drugs and the number of sellers or places nearby where drugs can be obtained, while perceived availability refers to the subjective opinion of users and non-users as to ease of access to drugs. Our paper, as most of the literature in the field, needs to rely on perceived availability, as actual availability is unknown.

So, how are availability and drug consumption related? Most of the literature points to a positive relationship between availability and use (Hadland et al., 2012; Gillespie et al., 2009; Freisthler et al., 2005; Dembo et al., 1979).[27] According to the availability-proneness theory of illicit drug abuse, drug consumption occurs when a prone individual is exposed to a certain level of availability (Smart, 1980: 46). In general, when the availability or ease of access is high, the level of proneness required to engage in consumption can be lower than in situations of low availability.[28] Empirical evidence is found in multiple studies. For example, Gillespie et al. (2009) conclude that cannabis availability explains almost all the shared environmental risks in cannabis initiation and abuse between 1994 and 2004 among twins participating in the Virginia Adult Twin Study of Psychiatric and Substance Use Disorders. Similarly, Freisthler et al. (2005) find that drug sales in adjacent and surrounding areas are positively associated with self-reported drug use among youth.

Now, how can we expect perceived availability or ease of access to substances to change with the economic environment, and in particular with increasing unemployment rates? Supply and demand factors may intervene. As for the supply, Arkes (2007) argues that it is conceivable that the black market in drugs grows when the economy weakens, and finds evidence that teenagers are more likely to sell drugs when the economic environment offers fewer opportunities. On the demand side, a range of factors – from psychological influences to lack of income – may change young people's perceptions of the availability of drugs.

The question on perceived availability of substances was asked in the Eurobarometer surveys of 2008, 2011 and 2014. In 2008, the question read as follows: 'How difficult would it be for you to get hold of any of the following substances if you wanted to?', with four possible answers (apart from 'does not know' or 'not available'): (1) 'very difficult', (2) 'fairly difficult', (3) 'fairly easy', and (4) 'very easy'. In 2011 and 2014, the question was slightly different: 'How difficult or easy do you think it would be for you personally to obtain the following substances within 24 h if you wanted some?'. So unlike in 2008, in the later surveys reference was made to availability within 24 h. Also a new possible answer code was added in 2011 and 2014, referring to (5) 'impossible', which we added to category (4) 'very difficult'. Even though we acknowledge that the questions are not exactly the same for 2008 versus 2011 and 2014, we have pooled the three datasets for analysis, since we regard the inclusion of 2008 as crucial, given that it is the time when the Great Recession hit the majority of countries and regions analysed hardest. Moreover, having three years for the analysis allows a greater number of sample observations, which is important, given the need to estimate generalized ordered logit models (see below). Finally, note that we have recoded our dependent variable so that higher values indicate more difficult access to a certain drug.

Fig. 2 shows that the ease of access to a substance depends very much on the type of substance in question. For example, around 80% of young people say that finding tobacco or alcohol is 'very easy', while less than 10% in most years said the same for the availability of ecstasy, cocaine or heroin. As a matter of fact, in 2014 a larger percentage of young Europeans said that finding ecstasy, cocaine and heroin was 'very difficult/impossible' than in 2008. The ease of access to cannabis has remained much more stable over time.

Now, can changes in the labour market be associated with changes in the perception of young Europeans as to drugs availability? The answer is yes: in general, our results indicate that young people perceive it to be harder to have access to drugs when the unemployment rate rises, and the results are particularly strong in the case of ecstasy, cocaine and heroin. Table 4 contains the results of the coefficients for the unemployment rate of the generalized ordered logit models estimated.[29] As above, four regressions for each substance have been estimated using the total unemployment rate and the youth unemployment rate (both at the country and at NUTS-1 regional level). Marginal effects have been calculated as the average across observations and generalized ordered logit models were chosen because none of the regressions complied with the proportional odds assumption that would have allowed the estimation of simpler ordered logit models.

If we turn to ease of access to tobacco, the results indicate that as the unemployment rate increases, so young people are more likely to state that finding tobacco is 'fairly easy', 'fairly difficult' or 'very difficult', as opposed to 'very easy' (see the positive coefficient in the first cell of the table). And the same is true of the comparison between 'very' and 'fairly easy' against 'fairly' and 'very difficult'. Indeed, the results for marginal effects indicate, for example, that when the total unemployment rate increases by 1%, the probability of declaring 'very easy' access to tobacco falls by 0.49 percentage points and the probability of 'very difficult' access rises by 0.16 per-

[24] Separate regressions on cannabis and new substances consumption for the youngest group (15–19) and the oldest (20–24) indicated that there are no differences in our predictor of interest between the two groups.

[25] Note that our results refer to the *prevalence* of drug use, which differs from the notion of drug *demand* (or volume). As explained by Caulkins (2011), demand is dominated by heavy users of illicit drugs, whose consumption exhibits great inertia, is relatively stable and is therefore less likely to change because of the economic environment. Prevalence is dominated rather by light users. Thus, we are likely to be picking up the effects of the macroeconomic conditions on initiation and on consumption exacerbated by the economic environment – which is what we are interested in this paper.

[26] We explored models that replaced unemployment rates with employment rates. In the case of cannabis use, we confirm a negative relationship in all the specifications, with a loss of significance in the case of consumption 'at any point in time' (significant results only at the regional level) and 'more than 12 months ago'; but we can establish a more robust relationship for the analysis that refers to the 'last 12 months' (significant at 5% in all the regressions). As for the consumption of new substances, we also find a negative relationship that is statistically significant at 1% in all regressions – with the coefficients, standard errors and marginal effects at levels very similar to those presented in Table 3. All these additional results are available from the authors upon request.

[27] However, the relationship is not necessarily always direct. For example, Bachman et al. (1990) establish that the rise in cocaine's perceived availability can explain the increase in use in the 1970s in the United States, but it does not explain the decline in the 1980s, as perceived availability did not change.

[28] It is also true that individuals with high levels of proneness can become addicts, even if availability is low (Smart, 1980).

[29] In order to save space, we only show significance levels and not standard errors, but all the results are available from the authors on request.

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

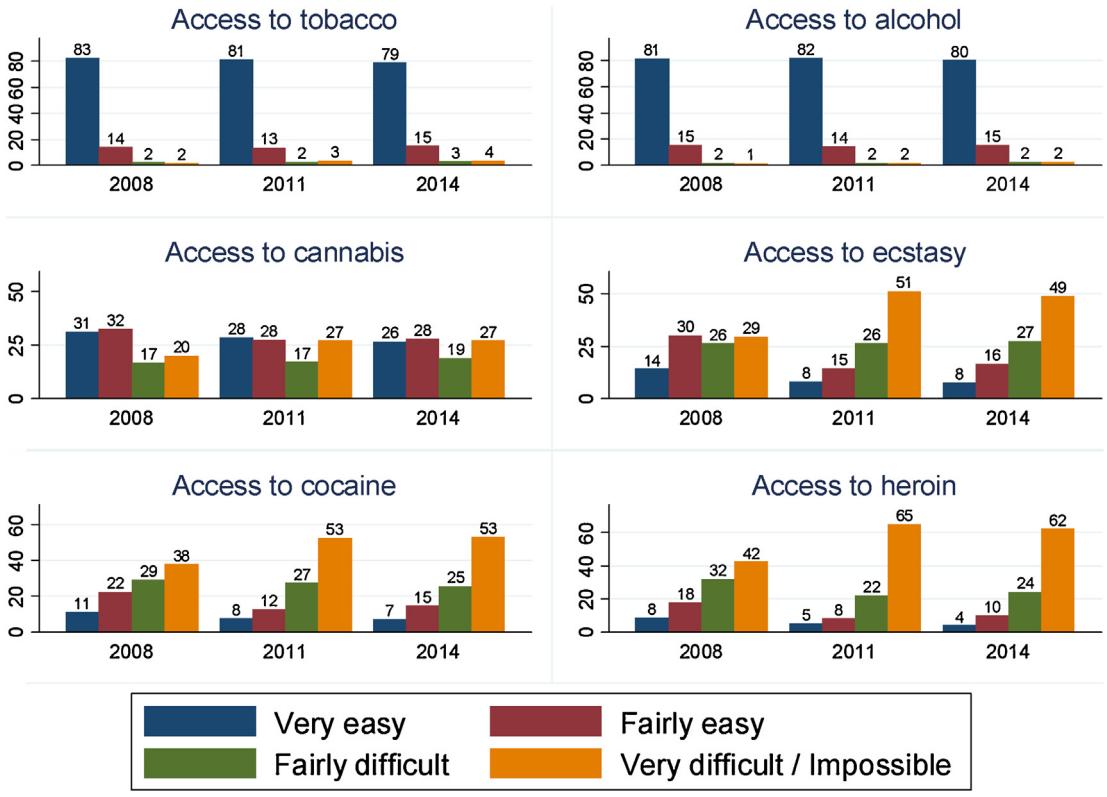

Fig. 2. Percentage of young people according to their opinion on how easy or difficult it is to have access to certain drugs, 2008, 2011 and 2014.
Note: Parallel graphs use the same y-axis to ease comparison.
Source: Authors' computations, based on the Eurobarometer 'Young people and drugs' surveys for 2008, 2011 and 2014.

centage points. Results for alcohol and cannabis go in the same direction, though the coefficients are less strong.[30]

In the case of more harmful drugs, such as ecstasy, cocaine and heroin, the results are very clear, indicating a strong relationship between a rising unemployment rate and more (perceived) difficulties in access to these three substances. The coefficients for a comparison between the categories of 'very' and 'fairly easy' against 'fairly' and 'very difficult', and between 'very' and 'fairly easy' and 'fairly difficult' against 'very difficult' are all statistically significant at least at 5% in the first three regressions.[31] According to the marginal effects obtained, when the total unemployment rate increases by 1%, the probability that young people find access to cocaine 'very difficult' increases by 0.91 percentage points. The figures for ecstasy and heroin are 0.79 and 0.77 percentage points, respectively.[32]

All in all, our results do not support the idea that a bad economy could make drugs more readily available to young people (possibly through a growing black market). At least, this is not the case according to the perceptions of those young people interviewed in the Eurobarometer surveys. However, it is important to remember at this point that there is a difference between actual and perceived availability, and that the great majority of young people interviewed are not substance users. That fact may limit their knowledge of how easy or difficult access really is.[33]

4.3. Perceived risk of drug consumption

Perceived risk plays an important role in substance use (Yeomans-Maldonado and Patrick, 2015; Calafat et al., 2009; Danseco et al., 1999; Graham, 1996) and it is often qualified as the 'leading indicator' of change in use (Johnston et al., 2014).[34] An inverse correlation between drug consumption and perceived risk has been established for cannabis (Volkow et al., 2014; Bachman et al., 1988), cocaine (Bachman et al., 1990) or the combined use of alcohol and cannabis (Yeomans-Maldonado and Patrick, 2015), among others. For example, Bachman et al. (1988, 1990) attribute the decline in cannabis and cocaine use that was observed in

[30] Results in italics indicate that these coefficients and marginal effects need to be read carefully because few sample cases have an outcome with a predicted probability that is negative, the reason being the small number of cases in certain regions for certain categories of the dependent variable.

[31] Naturally, the use of the unemployment rate at the regional level indicates less strong relationships, but we need to take into account the large number of coefficients being estimated when 96 regions are taken into account.

[32] Regressions using the employment rate do not allow these findings to be confirmed, as the great majority of coefficients do not differ statistically from zero. To our way of thinking, this could indicate that changes in perceived availability are driven rather by feelings of economic uncertainty and insecurity, which are much better captured by the unemployment rate.

[33] For the specific case of cannabis, we were able to investigate this issue further. It should be noted that cannabis users and non-users have very different views on how difficult it is to access the substance: 53% of young people who have consumed cannabis at some point in time state that it would be 'very easy' for them to obtain the substance within 24 hours, while the figure for non-users is 18%. Also, only 5% of users, but nearly 36% of non-users, maintain that it would be 'very difficult or impossible'. These differences help us in understanding the increased trend of cannabis consumption presented in Section 4.1: according to the results from simple logit models (not shown), cannabis users perceive access to the substance to become less difficult as unemployment increases. Unfortunately, we have limited capacity to provide further analysis on this, given the lack of data for other substances.

[34] Recently some authors have criticized the risk factor perspective, pointing out that it ignores the positive expectations young people may have of drugs (Duff, 2008; Holt and Treloar, 2008; Measham et al., 2001; O'Malley and Valverde, 2004; Parker and Stanworth, 2005). For these authors, pleasure and excitement should be taken into account in understanding drug use among youth.

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

Table 4
Results for the coefficients of the unemployment rate of the generalized ordered logit models (including fixed effects) for the perceived availability of drugs, 2008, 2011 and 2014.

	Total unemployment rate				Youth unemployment rate			
	Country		Region		Country		Region	
	Coeff.	Marg. Eff.	Coeff.	Marg. Eff.	Coeff.	Marg. Eff.	Coeff.	Marg. Eff.
Tobacco								
Very easy	0.0357***	−0.492***	0.0318***	−0.437***	0.0172*	−0.237*	0.0109	−0.148
Fairly easy	0.0545***	0.246**	0.0530***	0.199**	0.0275**	0.113	0.0183	0.069
Fairly difficult	0.0652**	0.080**	0.0609**	0.082**	0.0261	0.057**	0.0070	0.062**
Ref. Very difficult		0.166**		0.154**		0.066		0.016
Alcohol								
Very easy	0.0369**	−0.506**	0.0330***	−0.450***	0.0184*	−0.252*	0.0117	−0.158
Fairly easy	0.0392	0.366***	0.0356	0.324***	0.0174	0.189**	0.0059	0.138*
Fairly difficult	0.0329	0.082	0.0211	0.088	0.0166	0.033	0.0004	0.019
Ref. Very difficult		0.058		0.038		0.029		0.000
Cannabis								
Very easy	0.0084	−0.158	0.0045	−0.083	0.0041	−0.077	−0.0009	0.017
Fairly easy	0.0265**	−0.416***	0.0220**	−0.392***	0.0134*	−0.214**	0.0083	−0.197**
Fairly difficult	0.0358*	−0.038	0.0293**	−0.025	0.0158	0.020	0.0077	0.048
Ref. Very difficult		0.613*		0.502**		0.272		0.131
Ecstasy								
Very easy	0.0107	−0.090	0.0068	−0.057	0.0077	−0.065	0.0065	−0.055
Fairly easy	0.0294**	−0.465***	0.0250**	−0.414***	0.0148**	−0.214**	0.0122*	−0.175**
Fairly difficult	0.0348**	−0.234	0.0285**	−0.172	0.0160*	−0.084	0.0102	0.000
Ref. Very difficult		0.790**		0.644**		0.364*		0.230
Cocaine								
Very easy	0.0149	−0.109	0.0010	−0.007	0.0074	−0.054	0.0003	−0.002
Fairly easy	0.0313***	−0.417***	0.0229**	−0.376***	0.0147***	−0.192***	0.0098*	−0.159**
Fairly difficult	0.0391***	−0.379**	0.0324***	−0.363***	0.0175**	−0.159	0.0118*	−0.111
Ref. Very difficult		0.906***		0.748***		0.407**		0.273*
Heroin								
Very easy	0.0125	−0.064	0.0018	−0.009	0.0061	−0.032	−0.0005	0.003
Fairly easy	0.0259**	−0.283**	0.0205*	−0.265**	0.0120**	−0.129**	0.0070	−0.097*
Fairly difficult	0.0339***	−0.422**	0.0269***	−0.335**	0.0144**	−0.165	0.0085	−0.099
Ref. Very difficult		0.770***		0.610***		0.327**		0.193

Source: Eurobarometer 'Young people and drugs' surveys for 2008, 2011 and 2014.
Note: All the regressions include as control variables gender, age, age squared, type of residential area, status in the labour market, educational level and country (or region) and time fixed effects. Results in italics indicate that these coefficients and marginal effects need to be read carefully (see footnote 30). *** significant at 1%, ** at 5% and * at 10%.

the 1980s among college students in the United States almost exclusively to the increasing trend in perceived risk and personal disapproval. Individuals who perceive that substance use is highly risky for someone's health are far less likely to experiment with drugs.

In this section, we consider whether changes in the economic environment experienced by young Europeans in recent years could be associated with changes in their perceptions of how risky the use of drugs is. The information on risk perception could be harmonized only for the Eurobarometer surveys of 2011 and 2014. In these years, perceived risk is measured using the question 'To what extent do you think the following substances may pose a risk to a person's health?' and giving frequencies of (a) once or twice and (b) regularly. In the 2004 Eurobarometer survey, the question refers to how dangerous or not the interviewee perceives a substance to be without directly referring to someone's health; in the 2008 Eurobarometer survey, the question is the same as in 2011 and 2014, but no distinction is made between sporadic or regular use, and so, strictly speaking, the variables are not directly comparable.

Four possible answers are available: (1) 'high risk', (2) 'medium risk', (3) 'low risk' and (4) 'no risk' (apart from 'does not know' or 'not available'). For the regressions, we have recoded the variable so that higher values represent higher perceived risk and missing values have been ignored. In those cases where there was a high concentration of answers in one category, we have dichotomized the variable, adding up all categories against 'high risk'. Moreover, information is available for five substances: alcohol, cannabis, cocaine, ecstasy and new substances – the latter only in 2014.

As is shown in Table 5, youth perceptions of the health risks of the use of any substance depend on whether its consumption is on a regular basis or not. For example, more than half of European youth sees regular consumption of alcohol as highly risky (56% in 2014), while less than 2% sees no risk in it. But when asked about sporadic consumption, only 3–4% of young people answer that it is highly risky. Over time, the only changes worth mentioning are those that indicate an increase in the number of young people who maintain that sporadic consumption of alcohol implies no risk at all.

In the case of cannabis, 68% of young people believed in 2011 that its regular consumption is highly risky, while 23% felt the same way if consumption is sporadic. However, note that both percentages have decreased over time in parallel with an increase in the percentage of young people who believe that using cannabis does no harm at all.

The percentages for cocaine, ecstasy and new substances are much more concentrated in the 'high risk' category, with, again, important differences between regular and sporadic consumption. Once more, the percentages indicate a slight decrease in the percentage of young people who believe that sporadic consumption of cocaine is highly risky for someone's health. In the case of ecstasy, percentages have remained more stable.

In order to assess a possible link between changes in the economic environment and changes in the perceived risk of drug consumption we ran a series of logit and generalized ordered logit models (depending on the substance under analysis) with fixed effects while considering both the total and the youth unemployment rates, at both country and regional level. Interestingly, the

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

Table 5
Percentage of European youth according to how risky they perceive the use of drugs to be for someone's health, 2011 and 2014.

Year	No risk	Low risk	Medium risk	High risk	Total
Alcohol					
Regular consumption					
2011	1.9	8.4	34.7	55.0	100.0
2014	1.5	7.9	34.4	56.3	100.0
Sporadic consumption					
2011	31.3	45.8	18.8	4.2	100.0
2014	34.0	43.5	18.9	3.5	100.0
Cannabis					
Regular consumption					
2011	1.5	6.3	24.4	67.8	100.0
2014	2.8	8.1	24.8	64.3	100.0
Sporadic consumption					
2011	14.9	31.3	30.5	23.4	100.0
2014	18.9	30.4	28.9	21.8	100.0
Cocaine					
Regular consumption					
2011	0.3	0.5	3.1	96.1	100.0
2014	0.3	0.4	2.9	96.5	100.0
Sporadic consumption					
2011	2.2	7.4	25.8	64.7	100.0
2014	1.9	8.4	28.1	61.7	100.0
Ecstasy					
Regular consumption					
2011	0.5	0.9	6.0	92.7	100.0
2014	0.4	0.8	5.6	93.3	100.0
Sporadic consumption					
2011	2.9	11.4	31.0	54.8	100.0
2014	2.5	10.9	30.9	55.8	100.0
New substances					
Regular consumption					
2014	0.3	0.8	8.1	90.7	100.0
Sporadic consumption					
2014	1.6	8.2	30.7	59.5	100.0

Source: Authors' computations, based on the Eurobarometer 'Young people and drugs' surveys for 2011 and 2014.

coefficients of the unemployment rate in all the specifications considered and for most of the substances were not statistically significant at standard confidence levels. The only exception was ecstasy, for which we find that increasing total unemployment rates are associated with fewer young people believing that its consumption poses a risk to an individual's health.[35] In general, though, with the data to hand, we could not establish any association between changes in unemployment and changes in risk perception.

4.4. *Effective ways to combat the problems that drugs cause in society*

In the four Eurobarometer surveys, young people are also asked to state which, in their opinion, are the most effective ways in which the public authorities should tackle the problems that drugs cause in society.[36] In the 2008 survey, only two answers can be given and they must be stated in order of priority, whereas in the other years, young people can give at most three answers, not necessarily in any particular order. The different options given are: (a) 'information and prevention campaigns', (b) 'treatment and rehabilitation for users', (c) 'tougher measures against drug dealers', (d) 'tougher measures against drug users', (e) 'reduction of poverty and unemployment', (f) 'more leisure opportunities' (option not available in 2008), and (g) 'legalization' (option not available in 2004). In our analysis, we treat all the answers equally; that way, we build our dependent variables with dummies that equal 1 if a given measure is mentioned and 0 otherwise.

Fig. 3 shows the percentage of young people who stated that a given measure should be effective in combating the problems that drugs cause in society. Note that the interpretation of trends should disregard 2008 because, as mentioned, individuals can only give two options, and thus the percentages for this year are smaller. Also the percentages may add up to more than 100% because individuals can give three possible answers. Notwithstanding this, young people seem to have a clear preference for policies that include tougher measures against drug dealers, more information and prevention campaigns, and also more treatment and rehabilitation for users. Across time, both tougher measures against dealers and treatment and rehabilitation have seen their percentages fall, in favour of slight increases in the percentage of young people who see tougher measures against users and more leisure opportunities as effective policies. Moreover, in excess of one young person in five also mentions the reduction of poverty and unemployment as an effective policy; but it should be noted that this percentage has not varied much in recent years.

Now, can changes in the labour market be associated with changes in young people's opinion about the most effective ways that the authorities have to combat the problems that drugs cause in society? According to our findings, the answer is yes in relation to policies that reduce poverty and unemployment and measures against drugs users. Table 6 details the results of the logit regression models with fixed effects. We exclusively show the unemployment rate coefficients of the four regressions that consider the total and the youth unemployment rate at the country and the regional level. Thus, each coefficient (and its marginal effect) is the outcome of a separate regression.

Results are very clear and robust to the different specifications used: when the unemployment rate increases, a larger proportion of young people find that one of the most effective ways of combating the problems that drugs cause in society is precisely the reduction of poverty and unemployment. When the total unemployment rate increases by 1%, the percentage of individuals who agree with such policy increases by as much as 0.51 percentage points (if we take the information at the regional level). On the contrary, young people believe that when labour market conditions worsen, the public administration should not necessarily spend more on tougher measures against drugs users.[37] Again, when the unemployment rate increases by 1%, the number of individuals who believe in the effectiveness of tougher measures against users falls by as much as 0.53 percentage points in our first regression.[38, 39]

We interpret these results as a way in which young people acknowledge a close relationship between the economic environment and drugs use in Europe. Indirectly, young people point

[35] This result matches the conclusions reached by the European Drugs Report 2016 (EMCDDA, 2016) which highlights the fact that ecstasy is gaining ground as an important stimulant of choice for young people. According to the results, ecstasy is becoming more popular both among established stimulant consumers and with a new generation of young users.

[36] In the 2004 survey, the question does not explicitly mention the public administration.

[37] Separate regressions by age group indicated that this result is driven by the youngest group, those aged 15–19. Furthermore, specifications for those aged 20–24 showed a negative and robust relationship between a growing unemployment rate and the percentage of young people who believe in more 'information campaigns' and 'treatment and rehabilitation'. These results are available from the authors on request.

[38] Both results are confirmed in regressions that use the employment rate rather than the unemployment rate.

[39] As is shown in Table 6, information campaigns and tougher measures against dealers also yield some significant results, but their confidence levels are much lower and not robust across the different specifications. In any case, both measures receive less support from young people when the unemployment rate is rising.

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

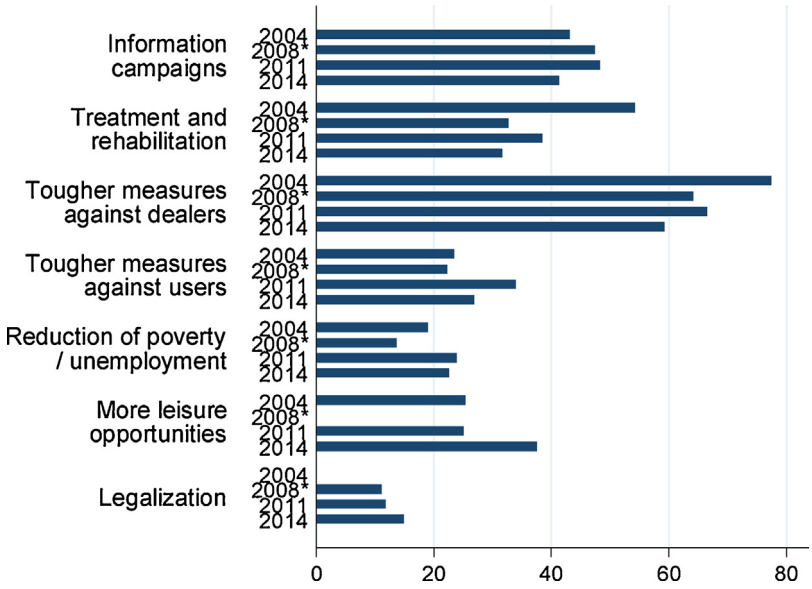

Fig. 3. Percentage of young people according to their opinion on the most effective ways to combat the problems that drugs cause in society, 2004, 2008, 2011 and 2014.
Note: In 2008, only two possible answers could be given, and therefore trends need to be interpreted cautiously. In a given year, results can add up to more than 100% because individuals can give up to three options.
Source: Authors' computation, based on the Eurobarometer 'Young people and drugs' surveys for 2004, 2008, 2011 and 2014.

Table 6
Results for the unemployment rate coefficient of the.logit models with fixed effects on the most effective ways to combat the problems that drugs cause in society, 2004, 2008, 2011 and 2014.

	Total unemployment rate		Youth unemployment rate	
	Country	Region	Country	Region
Information campaigns				
Coefficient	−0.0125	−0.0138*	−0.0056	−0.0072*
Std. error	0.0091	0.0070	0.0051	0.0042
Marginal effect	−0.301	−0.332**	−0.136	−0.174*
Treatment and rehabilitation				
Coefficient	−0.0034	−0.0063	−0.0020	−0.0034
Std. error	0.0055	0.0066	0.0033	0.0039
Marginal effect	−0.076	−0.141	−0.046	−0.075
Tougher measures against dealers				
Coefficient	−0.0084	−0.0130**	−0.0044	−0.0031
Std. error	0.0117	0.0061	0.0063	0.0033
Marginal effect	0.182	0.282**	−0.097	−0.067
Tougher measures against users				
Coefficient	−0.0279***	−0.0225***	−0.0125**	−0.0087**
Std. error	0.0092	0.0078	0.0049	0.0044
Marginal effect	−0.532***	−0.428***	−0.239**	−0.166**
Reduction of poverty and unemployment				
Coefficient	0.0308***	0.0332***	0.0148***	0.0128**
Std. error	0.0091	0.0081	0.0045	0.0053
Marginal effect	0.478***	0.515***	0.229***	0.198**
More leisure opportunities				
Coefficient	0.0154	0.0146	0.0068	0.0059
Std. error	0.0160	0.0128	0.0072	0.0062
Marginal effect	0.312	0.296	0.137	0.120
Legalization				
Coefficient	−0.0040	−0.0052	−0.0023	−0.0039
Std. error	0.0136	0.0109	0.0089	0.0063
Marginal effect	−0.043	−0.055	−0.025	−0.042

Source: Eurobarometer 'Young people and drugs' surveys for 2004, 2008, 2011 and 2014.
Note: All the regressions include as control variables gender, age, age squared, type of residential area, status in the labour market, and country (or region) and time fixed effects.
*** significant at 1%, ** at 5% and * at 10%.

out that worse labour market conditions may induce drug consumption, since in a direct way they also underline a relationship between the reduction of poverty and unemployment as an effective anti-drug measure. Moreover, young people seem to be empathetic or tolerant towards the situation that some individuals face in the labour market, because particularly in those areas where the unemployment rate increases, they would not recommend the use of tougher measures against users. These results should be informative for anti-drugs policies and for predicting the failure or success of different programmes targeted at young people.

To confirm our findings, we ran a series of robustness checks (we simply comment on these in what follows, but all the results

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

are available from the authors on request). First, we ran the series of logit regressions shown in Table 6, but excluding year 2008 of the analysis – because, as explained, only two answers could be given that year, instead of three. Our main findings are confirmed, but a new measure can be added to our conclusions: more 'information campaigns' is negatively associated with higher values of the unemployment rate in all four regressions.[40] Second, and in order to guarantee that our results do not depend on the lack of control for educational level (missing in 2004), we ran the logit regressions excluding this year and adding educational level as a control variable. Our main findings do not change, but we can add 'tougher measures against dealers' as negatively associated with higher unemployment rates since 2008.

5. Conclusions

This paper studies changes in the patterns of drug consumption and attitudes towards drugs among European youth in a context of rising unemployment rates brought about by the Great Recession. We use four Eurobarometer surveys on 'Young people and drugs' from 2004, 2008, 2011 and 2014; in that way, as far as the data allow, our results cover the period before and after the Great Recession. Our findings are based on logit and generalized ordered logit models with fixed effects which allow us to obtain a net effect for the association between unemployment and our outcomes of interest. Throughout the paper, we use four proxies for the business cycle: (a) the total unemployment rate at country level, (b) the total unemployment rate at NUTS-1 regional level, (c) the youth unemployment rate at country level, and (d) the youth unemployment rate at NUTS-1 regional level. Our results are mostly robust to the use of these different specifications.

Our findings on drug consumption indicate a positive relationship between the level of unemployment and cannabis consumption among young Europeans. And the same is true for the use of new substances that imitate the effects of illicit drugs. Despite our results being limited to 2011 and 2014, we find that an increase of 1% in the total unemployment rate at the regional level is associated with an increase of 0.68 percentage points in the percentage of young people who claim to have used cannabis at some point in time. In the case of new substances, the figure is 0.49 percentage points. Thus, our findings capture a worrying counter-cyclical trend of increased drugs consumption possibly (or partly) explained by the negative or depressive economic environment experienced by young people during the period under analysis. Moreover, our results are likely to be conservative: we only have information for two substances and only since 2011, which means that we are probably not capturing the total effect of the Great Recession. Our results have important consequences for anti-drugs policies targeted at young people across Europe: particular attention needs to be focused on those countries and regions where unemployment has increased most, as these are the places where drug consumption has become more likely.

Following the premise that 'only available drugs can be consumed' (Smart, 1980), we have analysed whether changes in the labour market can be associated with changes in the availability of drugs, in particular, changes in the perceptions that young people have of ease of access to certain substances. Our findings capture a change in the opinion of young people, according to which higher unemployment rates are associated with more perceived difficulties in obtaining drugs; this is especially the case for more harmful drugs, such as ecstasy, cocaine and heroin.

Unlike the other dependent variables, no link could be established between changes in the unemployment rate at the country and the regional level and changes in young people's opinion of how risky drug use is for someone's health. That does not mean that information campaigns about the risks of drug consumption are not useful as an anti-drugs policy.

Our results are very clear as to the relationship between rising unemployment rates and young people's opinion of which are the most effective measures to be used to combat the problems that drugs cause in society. According to young Europeans, when the economy worsens, policies should focus on the reduction of poverty and unemployment and not on tougher measures against drugs users. As mentioned above, our results seem to (indirectly) indicate that young people are well aware of the economic environment in which they live and its possible association with substance use. In their own way, young people respond with tolerance to drug users when the labour market has little to offer their age group. In terms of anti-drugs policy design, young people are saying that the emphasis should be on reducing demand by enhancing young people's life opportunities.

This paper has a number of limitations that offer avenues for future research. First, we have analysed the link between drugs and changes in the labour market measured by the unemployment rate. It could be argued that if there are large numbers of 'discouraged young workers', the unemployment rate may not capture well enough the effect of such discouragement on drug consumption and attitudes towards drugs. So, other measures of economic uncertainty could be used to learn more about changing patterns – i.e. underemployment or labour underutilization, consumer confidence, mass layoffs or the percentage of young people in a precarious contract. Second, our results have been limited to the information available and the degree of harmonization that was possible within the four Eurobarometer surveys on 'Young people and drugs'. Future analyses could, for example, focus on the distinctive impact of the Great Recession on soft and hard drugs (which we could not undertake here because of unavailable data) and on its cumulative effect over the next decade or two. Also, it would be very important to collect data that would allow understanding of the mechanisms behind our results. Third, our analysis is quite exceptional, in the sense that our results refer to a severe economic crisis that has hit young people particularly hard. Thus, it is possible that the observed changes are stronger than would have been the case if the business cycle fluctuation had been smoother. For this reason, more research is needed that focuses both on young individuals and on less exceptional years in terms of macroeconomic conditions. Finally, future research should predict the consequences of the austerity measures imposed in some European countries during the Great Recession, which have translated into important budget cuts for drug-related policies (Costa Storti et al., 2011).

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jhealeco.2017.08.005.

References

Ásgeirsdóttir, T.L., Corman, K., Ólafsdóttir, Þ., Reichman, N.E., 2012. Are Recessions Good for Your Health Behaviors? Impacts of the Economic Crisis in Iceland, Discussion Paper 18233. National Bureau of Economic Research.
Aguilar-Palacio, I., Carrera-Lasfuentes, P., Rabanaque, M.J., 2015. Youth unemployment and economic recession in Spain: influence on health and lifestyles in young people (16–24 years old). Int. J. Public Health 60 (4), 427–435.

[40] In the fourth regression, the one that uses the youth unemployment rate at the regional level, 'reduction of poverty and unemployment' is not statistically significant any longer. Thus it seems that excluding the year when youth unemployment rates are highest has some effect on results at the regional level. However, the rest of the regressions keep confirming our findings.

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005

Almlund, M., Duckworth, A., Heckman, J., Kautz, T., 2011. 'Personality psychology and economics'. In: Hanushek, E., Machin, S., Woessmann, L. (Eds.), Handbook of the Economics of Education, Vol. 4. Elsevier, pp. 1–181 (Chap. 1).
Arkes, J., 2007. Does the economy affect teenage substance use? Health Econ. 16, 19–36.
Arkes, J., 2011. Recessions and the participation of youth in the selling and use of illicit drugs. Int. J. Drug Policy 22 (5), 335–340.
Arkes, J., 2012. How does youth cigarette use respond to weak economic periods? Implications for the current economic crisis. Subst. Use Misuse 47 (4), 375–382.
Böckerman, P., Ilmakunnas, P., 2009. Unemployment and self-assessed health: evidence from panel data. Health Econ. 18 (2), 161–179.
Bachman, J.G., Johnston, L.D., O'Malley, P.M., Humphrey, R.H., 1988. Explaining the recent decline in marijuana use: differentiating the effects of perceived risks, disapproval, and general lifestyle factors. J. Health Soc. Behav. 29 (1), 92–112.
Bachman, J.G., Johnston, L.D., O'Malley, P.M., 1990. Explaining the recent decline in cocaine use among young adults: further evidence that perceived risks and disapproval lead to reduced drug use. J. Health Soc. Behav. 31 (2), 173–184.
Beenstock, M., Rahav, G., 2002. Testing gateway theory: do cigarette prices affect illicit drug use? J. Health Econ. 21 (4), 679–698.
Boles, S.M., Miotto, K., 2003. Substance abuse and violence': A review of the literature. Aggression Violent Behav. 8 (2), 155–174.
Bradford, W.D., Lastrapes, W.D., 2014. A prescription for unemployment? recessions and the demand for mental health drugs. Health Econ. 23 (11), 1301–1325.
Bretteville-Jensen, A.L., Melberg, H.O., Jone, A.M., 2008. Sequential patterns of drug use initiation: can we believe in the gateway theory? BE J. Econ. Anal. Policy 8 (2).
Calafat, A., Fernández, C., Juan, M., Becona, E., 2009. Recreational nightlife: risk and protective factors for drug misuse among young Europeans in recreational environments. Drugs Edu. Prev. Policy 15 (2), 189–200.
Carpenter, C.S., McClellan, C.B., Rees, D.I., 2017. Economic conditions, illicit drug use, and substance use disorders in the United States. J. Health Econ. 52, 63–73.
Catalano, R., Goldman-Mellor, S., Saxton, K., Margerison-Zilko, C., Subbaraman, M., LeWinn, K., Anderson, E., 2011. The health effects of economic decline. Annu. Rev. Public Health 32.
Caulkins, J.P., Pacula, R.L., 2006. Marijuana markets: inferences from reports by the household population. J. Drug Issues 36 (1), 173–200.
Caulkins, J.P., 2011. The global recession's effect on drug demand—Diluted by inertia. Int. J. Drug Policy 22, 374–375.
Chalmers, J., Ritter, A., 2011. The business cycle and drug use in Australia: evidence from repeated cross-sections of individual level data. Int. J. Drug Policy 22 (5), 341–352.
Charles, K.K., DeCicca, P., 2008. Local labor market fluctuations and health: is there a connection and for whom? J. Health Econ. 27 (6), 1532–1550.
Coffey, C., Carlin, J.B., Lynskey, M., Li, N., Patton, G.C., 2003. Adolescent precursors of cannabis dependence: findings from the victorian adolescent health cohort study. Br. J. Psychiatry 182 (4), 330–336.
Colell, E., Sánchez-Niubò, A., Delclos, G., Benavides, F., Domingo-Salvany, A., 2014. Economic crisis and changes in drug use in the Spanish economically active population. Eur. J. Public Health 24 (Suppl. (2)).
Costa Storti, C., De Grauwe, P., Reuter, P., 2011. Economic recession, drug use and public health. Int. J. Drug Policy 22 (5), 321–325.
Currie, J., Tekin, E., 2015. Is there a link between foreclosure and health? Am. Econ. J. Econ. Policy 7 (1), 63–94.
Dávalos, M.E., Fang, H., French, M.T., 2012. Easing the pain of an economic downturn: macroeconomic conditions and excessive alcohol consumption. Health Econ. 21 (11), 1318–1335.
Danseco, E.R., Kingery, P.M., Coggeshall, M.B., 1999. Perceived risk of harm from marijuana use among youth in the USA. School Psychol. Int. 20 (1), 39–56.
Dee, T.S., Evans, W.N., 2003. Teen drinking and educational attainment: evidence from two-sample instrumental variables estimates. J. Labor Econ. 21 (1), 178–209.
Dee, T.S., 2001. Alcohol abuse and economic conditions: evidence from repeated cross-sections of individual-level data. Health Econ. 10 (3), 257–270.
Dembo, R., Farrow, D., Schmeidler, J., Burgos, W., 1979. Testing a causal model of environmental influences on the early drug involvement of inner city junior high school youths. Am. J. Drug Alcohol Abuse 6 (3), 313–336.
Duff, C., 2008. The pleasure in context. Int. J. Drug Policy 19 (5), 384–392.
European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), 2016. European Drug Report 2016: Trends and Developments, Discussion Paper. European Monitoring Centre for Drugs and Drug Addiction.
Fergusson, D.M., Boden, J.M., Horwood, L.J., 2006. Cannabis use and other illicit drug use: testing the cannabis gateway hypothesis. Addiction 101 (4), 556–569.
Freeman, D.G., 1999. A note on economic conditions and alcohol problems. J. Health Econ. 18 (5), 661–670.
Freisthler, B., Gruenewald, P., Johnson, F., Treno, A., Lascala, E.A., 2005. An exploratory study examining the spatial dynamics of illicit drug availability and rates of drug use. J. Drugs Educ. 35 (1), 15–27.
Gerdtham, U.-G., Ruhm, C.J., 2006. Deaths rise in good economic times: evidence from the OECD. Econ. Hum. Biol. 4 (3), 298–316.
Gillespie, N., Neale, M., Kendler, K., 2009. Pathways to cannabis abuse: a multi-stage model from cannabis availability, cannabis initiation and progression to abuse. Addiction 104 (3), 430–438.
Golden, S.D., Perreira, K.M., 2015. Losing jobs and lighting up: employment experiences and smoking in the Great Recession. Soc. Sci. Med. 138, 110–118.
Graham, N., 1996. The influence of predictors on adolescent drug use: an examination of individual effects. Youth Soc. 28 (2), 215–235.
Hadland, S., Marshall, B., Kerr, T., Lai, C., Montaner, J., Wood, E., 2012. Ready access to illicit drugs among youth and adult users. Am. J. Addic. 21 (5), 488–490.
Harrison, L.D., Erickson, P.G., Korf, D.J., Brochu, S., Benschop, A., 2007. How much for a dime bag? an exploration of youth drug markets. Drug Alcohol Depend. 90, S27–S39.
Holt, M., Treloar, C., 2008. Pleasure and drugs. Int. J. Drug Policy 19 (5), 349–352.
Johansson, E., Böckerman, P., Prättälä, R., Uutela, A., 2006. Alcohol-related mortality, drinking behavior, and business cycles. Eur. J. Health Econ. 7 (3), 212–217.
Johnston, L.D., O'Malley, P., Miech, R., Bachman, J., Schulenberg, J.E., 2014. Monitoring the Future National Survey Results on Drug Use, 1975–2013: Overview, Key Findings on Adolescent Drug Use', Discussion Paper. Institute for Social Research, The University of Michigan, Ann Arbor.
Martin-Bassols, N., Vall-Castello, J.V., 2016. Effects of the Great Recession on drugs consumption in Spain. Econ. Hum. Biol. 22, 103–116.
Measham, F.C., Aldridge, J., Parker, H., 2001. Dancing on Drugs: Risk, Health and Hedonism in the British Club Scene. Free Association Books.
Melberg, H.O., Jones, A.M., Bretteville-Jensen, A.L., 2010. Is cannabis a gateway to hard drugs? Empirical Econ. 38 (3), 583–603 (27).
Neumayer, E., 2004. Recessions lower (some) mortality rates: evidence from Germany. Soc. Sci. Med. 58 (6), 1037–1047.
O'Malley, P., Valverde, M., 2004. Pleasure, freedom and drugs: the uses of pleasure in liberal governance of drug and alcohol consumption. Sociology 38 (1), 25–42.
Pabilonia, S.W., 2017. Teenagers's risky health behaviors and time use during the great recession. Rev. Econ. Household 15 (3), 945–964.
Parker, J., Stanworth, H., 2005. Go for it! Towards a critical realist approach to voluntary risk-taking. Health Risk Soc. 7 (4), 319–336.
Pudney, S., 2003. The road to ruin? Sequences of initiation to drugs and crime in Britain. Econ. J. 113 (486), C182–C198.
Ruhm, C.J., Black, W.E., 2002. Does drinking really decrease in bad times? J. Health Econ. 21 (4), 659–678.
Ruhm, C.J., 2005. Healthy living in hard times. J. Health Econ. 24 (2), 341–363.
Smart, R., 1980. An availability-proneness theory of illicit drug abuse. In: Lettieri, D., Sayers, M., Wallenstein Pearson, H. (Eds.), Theories on Drug Abuse. NIDA Research Monograph, pp. 46–50.
Swift, W., Coffey, C., Carlin, J.B., Degenhardt, L., Patton, G.C., 2008. Adolescent cannabis users at 24 years: trajectories to regular weekly use and dependence in young adulthood. Addiction 103 (8), 1361–1370.
Tapia Granados, J.A., 2005. Recessions and mortality in Spain 1980–1997. Eur. J. Popul. Revue européenne de Démographie 21 (4), 393–422.
Van Ours, J.C., 2003. Is cannabis a stepping-stone for cocaine? J. Health Econ. 22 (4), 539–554.
Volkow, N., Baler, R., Compton, W., Weiss, S., 2014. Adverse health effects of marijuana use. N. Engl. J. Med. 370, 2219–2227.
Williams, R., 2006. Generalized ordered logit/partial proportional odds models for ordinal dependent variables. Stata J. 6 (1), 58–82.
Xu, X., 2013. The business cycle and health behaviors. Soc. Sci. Med. 77, 126–136.
Yeomans-Maldonado, G., Patrick, M.E., 2015. The effect of perceived risk on the combined used of alcohol and marijuana: results from daily surveys. Addic.Behav. Rep. 2, 33–36.
Zuccato, E., Castiglioni, S., Tettamanti, M., Olandese, R., Bagnati, R., Melis, M., Fanelli, R., 2011. Changes in illicit drug consumption patterns in 2009 detected by wastewater analysis. Drug Alcohol Depend. 118 (2), 464–469.
von Sydow, K., Lieb, R., Pfister, H., Höfler, M., Sonntag, H., Wittchen, H.-U., 2001. The natural course of cannabis use, abuse and dependence over four years: a longitudinal community study of adolescents and young adults. Drug Alcohol Depend. 64 (3), 347–361.

Please cite this article in press as: Ayllón, S., Ferreira-Batista, N.N., Unemployment, drugs and attitudes among European youth. J. Health Econ. (2017), http://dx.doi.org/10.1016/j.jhealeco.2017.08.005