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The effects of cannabis use on physical and mental health☆

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ABSTRACT

This paper investigates whether cannabis use affects physical and mental health. To do so, information on prime aged individuals living in Amsterdam in 1994 is used. Dutch data offer a clear advantage in estimating the health impacts of cannabis use because the legal status of cannabis in the Netherlands ensures that estimates are free from confounding with the physical and psychological effects of engaging in a criminal activity. Accounting for selection into cannabis use and shared frailties in mental and physical health, the results suggest that cannabis use reduces the mental wellbeing of men and women and the physical wellbeing of men. Although statistically significant, the magnitude of the effect of using cannabis on mental and physical health is found to be small.

1. Introduction

Cannabis users account for 80% of the 200 million illicit drug users in the world (UNODC, 2005). In countries such as the US, the UK and Australia, over 30% of the population have used cannabis. In part, its widespread use reflects the common belief that cannabis is not a particularly harmful drug.[1] The weight of evidence supports this belief, finding that the harms associated with cannabis use are much less serious than those associated with "hard" drugs such as cocaine or heroin and may even be smaller than those associated with alcohol and cigarettes (Nutt et al., 2007, 2010; Hall et al., 1999). And while it is generally acknowledged that there are risks associated with long-term heavy use of cannabis such as respiratory diseases, cancer and perhaps psychotic disorders, only a small fraction of those who ever use cannabis actually become long-term heavy users (Hall and Pacula, 2003; Macleod et al., 2004; Moore et al., 2007). For the vast majority, there is a dearth of information on the risks associated with their cannabis use. This is an issue because uncertainty about risk may lead to a higher demand for cannabis and a lower level of welfare than would occur if information on risks were publicly available (Orphanides and Zervos, 1995). It is in this context that we seek to make a contribution by providing new evidence on the impact of cannabis use on health.

In addition to benefiting individuals making decisions about their own cannabis use, knowledge of the health risks of more typical modes of cannabis consumption is a vital input for the development of cannabis policy. In the US state of California, for example, a referendum was recently held asking voters whether cannabis use should be legalized in that state. A casual reading of the debate that surrounded the referendum demonstrates clearly that the accounting of costs and benefits of such a policy change depended crucially on the currently uncertain health impacts of using cannabis (Pacula, 2010).

Despite the potential welfare benefits of reliable information on the health risks facing the typical cannabis user, there are very few contributions from the economics literature on this issue. Previous studies from economics that do attempt to tease out causal effects

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[1] This view was espoused in the prestigious journal, Lancet's editorial in 1995, where it was stated "The smoking of cannabis, even long term, is not harmful to health." (p. 1241 Editorial).

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suggest that there may be risks to both mental and physical health from using cannabis. For example Williams and Skeels (2006) find the probability of being in very good or excellent health to be 8% lower amongst those who consumed cannabis in the past year compared to those who had not and 18% lower for those who reported weekly use. Van Ours and Williams (2011) find that cannabis use increases the likelihood of mental health problems, with the probability of experiencing mental distress increasing with the frequency of use in the past year. While each of these studies considers a single dimension of wellbeing, there is significant evidence that poor mental health is correlated with poor physical health (Aneshensel et al., 1984).[2] This suggests that that the impact of cannabis use on health should be studied in a framework that accounts for the potential for shared frailties in the domains of physical and psychological wellbeing.

This paper is the first to address the potential for common frailties linking physical and mental wellbeing in studying the health effects of cannabis use. To do so we assume that unobserved heterogeneity determining each of the two domains of health is drawn from a joint discrete distribution. In addition to unobserved factors linking physical and mental health, a key challenge in studying the health effects of cannabis use is the potential for common unobserved factors affecting health and selection into cannabis use. This is an issue because the presence of endogenous selection renders standard estimation techniques unreliable. We deal with endogenous selection into cannabis by adapting Mroz's (1999) discrete factor method for addressing endogenous dummy variables. This is done by casting current and past cannabis consumption in terms of cannabis use dynamics and allowing the unobserved heterogeneity determining uptake and quitting to be drawn from a joint discrete distribution (Abbring and Van den Berg, 2003). We then explicitly account for endogenous selection in estimating the impact of cannabis use on health by permitting the heterogeneity terms in the cannabis use dynamics and health equations to be correlated.

A second contribution of this study is that it provides estimates of the physical and psychological effects of using cannabis that are free from confounding with the effects of engaging in a criminal activity. This is an issue for the previous studies as their empirical analyses are based on data from Australia, where cannabis use is a criminal offense in half of the States and Territories. As the criminal status of cannabis is not accounted for in these studies, the health effects they measure capture both the direct effects of using cannabis and the indirect effects attributable to dealing in illegal markets and breaking the law. In contrast, the empirical analysis in this paper is based on individuals living in Amsterdam. Dutch data offer a clear advantage in estimating the health impacts of cannabis use because, as explained below, cannabis can be purchased and consumed legally in the Netherlands. As a consequence, our estimates are free from confounding with the physical and psychological effects of engaging in a criminal activity.

A final contribution of this research is that it extends earlier studies by exploring a richer set of dimensions of cannabis use than previously considered. Earlier studies have considered the effect of being a current user and past user as well as the intensity of use in the last year. In this paper, in addition to considering the effect of being a current or past user, we explore the duration of use amongst current users and duration of use amongst past users in assessing the health effects of cannabis consumption. This allows us to determine whether the health effects of cannabis use accumulate with duration of use as one would expect from standard economic theories of health.

Our results suggest negative and significant health impacts of cannabis use for men and women. Although we are unable to detect differential health effects of cannabis use based on the duration of use for current or past users, for both women and men we find that cannabis use decreases psychological wellbeing. For men, using cannabis also has an adverse impact physical health. In order to give some perspective on the size of the estimated effects, we compare them to the effect size of having migraine headaches and chronic health conditions reported in the epidemiology literature. Doing so reveals that while statistically significant, the estimated effect of using cannabis on mental and physical wellbeing is small.

The rest of the paper is laid out as follows. Section 2 provides information on the legal system governing cannabis use in the Netherlands and describes the data used in our analysis and presents stylized facts from these data. Section 3 describes the empirical approach including the identifying assumptions employed, reports the baseline estimates and the results of an extensive sensitivity analysis. Section 4 discusses our findings and concludes.

2. Background, data and data limitations

2.1. Cannabis use in Amsterdam

The Netherlands has a special type of drug policy. The main aim is to protect the health of drug users, the people around them and society as a whole.[3] Regulations governing illicit drugs are laid down in the Opium Act, which draws a distinction between hard drugs, such as cocaine and heroin, and soft drugs such as cannabis. The possession of hard drugs is a crime. However, a policy of tolerance is applied to soft drugs. Under this policy, while the possession of small quantities of cannabis for personal use is a misdemeanor (and potentially punishable by a fine) official guidelines prescribe that these offenses are not prosecuted. The policy of tolerance has been in place since 1976. It has also been applied to the sale of cannabis by house dealers since 1979, and subsequently to "coffee shops" meeting strict criteria (no overt advertising, no hard drugs, no nuisance, no underage clientele, and no large quantities) (Korf, 2002). Consequently, both the use and procurement of cannabis can be can be achieved without turning to illicit markets and without fear of prosecution. This is a distinctive feature of the Dutch system and one that enables us to estimate the health consequences of cannabis use free from the confounding effects attributable to engaging in illegal behavior. The data used in the following analysis are on individuals living in Amsterdam. Amsterdam has a population of 700,000 inhabitants and around 300 recognized, so-called "coffee-shops" where cannabis can be purchased.

2.2. Data

We use data from the Licit and Illicit Drug Use in Amsterdam II survey. The individual level survey data were collected in 1994 and are representative of inhabitants of Amsterdam aged 12 years and older.[4] We focus on individuals aged 26–50 years. Because immigrant groups tend to underreport cannabis use the analysis is restricted to native Dutch inhabitants of Amsterdam. Our analysis is based on information on 818 men and 870 women. Further details on the survey is contained in Appendix A.

[2] This may be attributed to common unobserved confounders such as stress or a lack of social support, or it may reflect a causal link.

[3] An international perspective on Dutch drug policy is given in Boekhout van Solinge (1999).

[4] Information on cannabis use has been collected in other years as well, but the 1994 survey was unique in the collection of health information; see Abraham et al. (2003) for a detailed description.