Are we facing Social and Economy Zombification?
The Impact of Recreational Marijuana Legalization on People's Cognition, Economic Activity, Business Performance, and Firm Innovation.

Abstract

We investigate the social and business impact of legalizing recreational marijuana in North America. We find that sate- and province-level legalization reduce the prevalence of cannabis for the children population and overall high school performance improves with better score in science and literacy. On the downside, marijuana prevalence among young adults worsens and is associated with more car and working accidents. Marijuana legalizing states and provinces creates more opportunities for growth with an increase in companies' incorporation, less unemployment, more local tax revenues, and see the house price market stimulated. However, we also observe a substantial increase in the number of bankruptcies. At the firm-level, post-legalization, we find worsen firm's productivity with less patents disclosed and less citations, whereases firms increase their investment in research and development and recruit more employees. Overall, firms located in marijuana legalizing states and provinces experience less sales, less profitability, lower liquidity, diminish their capital expenditure, and receive lower financial valuations. Nevertheless, to tackle this loss in productivity, firms adjust their managerial behaviors as evidenced by better social responsibility practices.

Keywords: Education, Cognitive Factors, Firm Behavior, Firm Performance, Corporate Diversity, Social Responsibility

JEL codes: H75, D91, I21, G30, G32, M14

1. Introduction

Employee' cognition performance and diversity in the context of abilities to implement new innovative ideas and solutions, to simplify company's processes, to improve collaboration and to achieve a higher level of organizational performance are crucial for firms to gain and maintain a higher level of productivity, economic growth, and competitive advantage (Ogbonnaya and Valizade, 2016; Martins and Terblanche, 2003; Lin , Han, Saixing, Haijian, and Chao 2018; Mitchell, Rebecca, Boyle, O'Brien, Malik, Tian, Parker, Giles, Joyce, and Chiang. 2017). Given the fast increase in soft drugs consumption such as marijuana over the last decades among the North American population and knowing that such substances are associated with serious consequences on people's brains and cognitive abilities, it is worth investigating its further impact on society, and more specifically, on business performance.

Indeed, according to the National Center for Drug Abuse Statistics (NCDAS), approximately 78 million people, claimed to have used marijuana in their life, and according to the Centers for Disease Control and Prevention (DCD), 55 million Americans in total had reported using marijuana within the past year. Totally, there are about 51% more marijuana users than are tobacco smokers in the U.S. In Canada, according to the Canadian Community Health Survey and Mental Health (CCHS-MH), 12.2% of Canadians aged 15 or older used marijuana in the past year. Moreover, marijuana consumption concerns all ages, studies from the Substance Abuse and Mental Health Services Administration (SAMHSA), an estimated of 1.2 million youths aged 12 to 17 tried marijuana for the first time in 2017 – that's approximately 3,300 kids each day.

The rising popularity of marijuana can be attributed to its growing acceptability in post-modern society, often considered as being less harmful than other substances. Given the fact

that marijuana usage become more and more democratized, over the last decade, its recreational legalization has become a crucial topic of debate between politicians in both the U.S. and Canada.

The marijuana legalization advocates argue that legalizing marijuana should have a direct and positive impact on the local economy, on social and public health issues. First, it could generate significant monetary tax revenue to local government by the raise of a new industry and the replacement of an existing black market, creating new job opportunities. Furthermore, legalization should reduce government's spending on marijuana laws' enforcement, reduce criminality and costs linked to incarceration. Second, the fast expansion of black market in the U.S. and Canada has created lawless zone with drug dealers taking control of the distribution of marijuana, which is a major risk for the well-being of children. Removing this illegal access could reduce the youth access to illegal substances and reduce drug dealers' powers, which in the long term, may contribute to reduce the overall population consumption. Finally, legalizing marijuana implies a rigorous approval process, and a regulatory approach of standardized products conforms to rules and specifications, including testing to ensure products don't contain pesticides or mould, and contain the promised levels of tetrahydrocannabinol (THC) and cannabidiol (CBD).

However, some argue that marijuana is an addictive drug that poses significant health consequences to its users, including those who may be using it for medical purposes. Some health issues, especially psychiatric illnesses including mood disorder, latent schizophrenia and clinical dependence could be substantially impactful for the society. Studies shed light on the fact that short-term and long-term use of marijuana are known to cause cognitive impairment affecting sensorimotor functioning, attention span, memory, self-control, learning and educational attainment. Therefore, marijuana-impaired workers could contribute to a decrease in productivity due to an increase in employees' attentional deficits, absenteeism, and illness.

Given the fact that a good population health is essential for substantial economic growth and society prosperity, decisions making on the legalization of marijuana must be considered with tweezers. We attempt to bring answers to the controversies associated with this debate, by addressing a fundamental question: How does legalizing recreational marijuana affect education attainment, people cognition, firm productivity, profitability, and innovation?

To conduct our empirical study, we first identify states and provinces that have legalized recreational marijuana from both the Unites States and Canada as our treated group, otherwise, we consider them as controls.

This identification strategy enables us to employ a dynamic difference-in-difference (DID) methodology by using the year when the recreational legalization become effective across different U.S. states and Canadian provinces and at different periods as identification strategy. The dynamic DID methodology has been widely used in previous studies such as Sun and Abraham (2020), Callaway and Saint'Anna (2020), and Goodman-Bacon (2021).

To ensure the exogeneity of recreational marijuana legalization, we use the Weibull hazard model to confirm that the timing of legalizing is not related to pre-existing state- and province- year-level conditions, such as pre-existing drug use prevalence, death rates due to drug use, drug-related law offenses or economic factors.

We start our main empirical analysis by investigating how the legalization of recreational marijuana, and the proliferation of cannabis outlets affect people lives from early to elder ages. We focus on several aspects such as the legalization impact on people's marijuana prevalence, drug trafficking, and on several indicators that proxy the change in people's cognitive abilities such as educational attainment and accidents often related to alertness loss. We find surprising results. In average, the prevalence of marijuana uses by youth aged between 12 and 17

years old is decreasing. We somehow explain this result with the fact that we also observe not only a decrease in the number of marijuana drugs arrests but also a decrease in the number of arrests related to hard drugs trafficking, meaning that legalizing recreational marijuana significantly limit proliferation of illicit black market. We paralleled these results with the Global Drug Survey (GDS) released in 2017 showing that among all drugs consumed, cannabis represent more than 60% of the demand. Given that during the pre-legalization periods, the black market was the only way to get drugs for minors and adults, the reduction of illegal demand from adults contribute to limiting adolescents from experiencing drug trafficking in their neighborhoods reducing any sort of temptation. Echoing with the reduction of marijuana prevalence on youth, we observe better high school performance after the legalization. This finding suggests that the reduction in marijuana consumption from teenagers, improve student's attention span, memory, self-control, learning and educational attainment. However, we also observe negative impact on individual's safety. Indeed, we find that post-legalization, both the number of car and working accidents increase. We highlight this result with the fact that we observe significant increase in marijuana prevalence for young adult aged between 18 and 25 years old. Knowing that people's brain undergoes a "rewiring" process that is not complete until approximately 25 years old (Arain, Haque, Johal, Mathur, Nel, Rais, Sandhu and Sharma, 2013), the impact of consuming marijuana during this age range might be devastating for the brain health, specifically the parts of the brain responsible for attention, decision-making and reaction-time.

We then study how the legalization of recreational marijuana affect local economics at state-level. Some people may argue that the post Covid-19 pandemic situation is reminiscent of what the United States faced during the Great Depression. At that time, one of the government's solutions was to end alcohol prohibition. Consequently, turning cannabis as a potential business

opportunity may be a source of tax revenues and jobs for citizen. We find that after the legalization of recreational marijuana the number of firm's incorporation increase, we find a substantial decrease in unemployment rate, more tax revenues for local government and we observe that the house market is being stimulated. However, some may argue that if the number of business and job opportunities do increase, it does not tell anything about the long-term sustainability and success of these new businesses. According to the U.S. Bureau of Labor statistics, the failure rate for new businesses is around 70% to 80% in the first year and only half of those who survive the first year will remain in business the next five years. Thus, if legalizing recreational marijuana stimulate businesses, how about its impact on the rate of business bankruptcy? We find that after the legalization, the number of Business Bankruptcy increase mitigating previous results on business incorporation, and suggesting that if business and job opportunities increase, failure also significantly increase.

We next study the impact on firm behaviors. For both private and public firms, we observe that the total number of employees is increasing echoing with previous finding regarding the decrease in unemployment rate at state-level. We paralleled these results with the fact that post-legalization, we observe substantial increase of firm's investment in Research & Development, suggesting a rapid changes in consumer demands and the emerging of new business opportunities, forcing companies to invest in new prototyped for further research, testing and product development. Surprisingly, although more investment in R&D, we find worsen firm's innovation, as implied by lower patents disclosure and less patents citations. These results suggest that the productivity of capital invested becomes worsen, with a lower capacity to achieve a range of objectives. Correspondingly, firms have worse performance, as evidenced by lower sales growth, lower profitability, lower liquidity, and lower fixed capital investment.

To strengthen our DID setting, we also establish a causality test by implementing a regression discontinuity design (RDD) framework using the U.S. ballot vote and the Canadian parliament vote results regarding the legalization of marijuana for recreational use. In our RDD analysis, we use Imbens and Kalyanaraman (2012) methodology to estimate an optimal data dependent bandwidth limiting our sample to firms located in states and provinces that narrowly vote in favor (or against) the legalization of recreational. By assuming a meaningful component randomness in the outcome of these realized close votes, we can isolate the impact of recreational marijuana legalization on our baseline variables of interest. Within the RDD framework, we confirm our baseline results and find that the legalization of recreational marijuana leads to lower the firm's profitability, worsen the firm's productivity with less patents disclosure although more investment in R&D, and better social responsibility practices with firm's receiving higher social score valuation. Our RDD setting is advantageous because it allows us to draw causal inference regarding the impact of recreational marijuana on firm's financial, innovation and social characteristics. However, due to the limited number of states and provinces votes, and because of the optimal bandwidth estimation, our sample size is reduced compared to the bargaining unit sample. Given the advantages and disadvantages of both analyses (DID and RDD), we present our results for both settings and show consistent finding.

Also, some may argue that because the legalization of marijuana for medical reasons is prior to the legalization of recreational marijuana, our results could be also attributed to medical consumption. We admit this statement and perform a placebo test on group where marijuana is legal for medical use. We observe no significant impact on legalizing medical marijuana on our variables of interests, probably because its access is more constrained as it implied having a physician's prescription.

Finally, we examine the pretreatment trends to validate the parallel trends assumption of the DID methodology.

Our analysis extends the literature in several ways. We contribute to the Economic Behaviors literature. First, the literature has expanded into areas of economics and has mainly focus on how an individual's use of marijuana impacts their responsiveness to monetary incentives and risk-taking. For example, Lane, Cherek and Tcheremissine (2005) conducted a study with 10 subjects and active marijuana dosing and found that subjects who received a relatively large dose of marijuana were more likely to take financial risks. Our research complements their finding by observing that post-marijuana legalization for recreational use, the level of entrepreneurship and new job opportunities increase although in average the risk of failure and bankruptcy also increase.

Second many studies investigate the effect of marijuana user on memories and cognitive motricity on individuals, but do not measure its final impact on businesses. For example, Bolla, Brown, Eldreth, Tate, and Cadet (2002) identified a negative correlation between marijuana use and performance on several tasks and found that as marijuana smoked per week increases, scores on tests measuring memory, executive functioning, and psychomotor all decreased. However, these studies do not measure the impact of consuming marijuana on corporate's employee's productivity, performance, and innovation. Especially, studies analyzing the impact of marijuana legalization on corporate's behavior is rare. Our paper fills this gap and establishes that while the legalization of marijuana legalization creates new market opportunities for firms, it also reduces firm's productivity reduces firm's capacity to innovate.

Finally, we contribute to previous studies which empirically address the potential endogeneity of cannabis use in decisions about formal education. Yamada and Kendix (1996) report that heavy cannabis use in 12th grade is associated with a reduced probability of graduating.

Bray and Ringwalt (2010) find that initiation into cannabis prior to age 16-18 is associated with an increases probability of dropping out of high school at these ages. Wider studies on the relationship between drug use and education emphasized by Chatterji (2006) or Pacula (2005), are all unanimous in finding that cannabis use in high school reduces educational attainment. Consequently, our paper complements these previous results by showing that the legalization of recreational marijuana is an effective policymaker's approach that significantly reduce the probability of adolescents' initiation into cannabis use.

2. Data, Sample and Variables

This section describes our data sources, sample, and variable definitions. For full definitions of all variables, we list them in Appendix Table A1. Table 1 presents the summary statistics, with all variables winsorized at the 1st and 99th.

2.1.Recreational Marijuana

Information regarding marijuana recreational vote results in the U.S. and Canada are available on open-source data sources. From the encyclopedia "Ballotpedia" we collect the Ballot results for each U.S. state at different time periods[1]. From the Canadian House of Commons, we collect the parliament vote result taking place in 2017 regarding the legalization of recreational marijuana. We then classify and identify states or provinces in our treated group when the corresponding ballot or parliament vote exceed 50% and from the year the vote becomes effective. For example, the Canadian parliament voted the legalization in 2017, but it becomes effective from 2018. States and Provinces where the recreational marijuana remains illegal are considered in our sample as controls. Totally, in 2021, we identify 19 U.S. states and 12 Canadian provinces in our treated group, and 32 U.S states and 2 Canadian provinces in our controlled group. Table A2

[1] Ballotpedia is a nonprofit and nonpartisan online political encyclopedia that covers federal, state, and local politics, elections, and public policy in the United States and is sponsored by the Lucy Burns Institute.

emphasizes the list of U.S. states and Canadian Provinces with the respective vote results at different periods of time and the year when the law become effective. Figure 1 depicts the distribution of years when the marijuana legalization votes occur across the U.S. states used in our main analysis[2]. As shown, the time of votes is dispersed over different years instead of clustering within a few years. This staggered recreational marijuana legalization allows us to use the difference-in-difference (DID) methodology and investigate its social and economic impacts at both state- and firm-level.

To construct our empirical analysis at different levels, our main independent variable should describe the specific event when it becomes legal for local population to consume marijuana in a recreational way. We propose to construct a dummy variable called *1(LegRec)* that identify whether recreational consumption is legal. This dummy equal 1 from and after the year when the recreational marijuana's favorable vote result become effective, otherwise it equals 0. Figure 2 depicts a mapping of the recreational marijuana vote in each respective U.S. states and Canadian provinces. States (provinces) are characterized by a green color when the recreational marijuana vote exceed 50%, by a red color when the vote is less than 50%, and grey when no votes occurred yet, meaning that recreational marijuana remains illegal. The map color's scale represents the vote's percentage results. Stronger the green color, closer the result is from 100%, stronger the red color, closer the result is from 0%.

To obtain information about the current marijuana outlets' situation in the U.S. and Canada, we draw on Freisthler, Gruenewald (2014) and Freisthler, Ponicki, Gaidus, Gruenewald (2016) methodology. First, we use internet-based methods, such as the search engines "Weedmaps" to scrap information from all licensed outlets, such as their licensed number, their address, and

[2] We only focus on the U.S. states because if the recreational vote in Canada was at province-level, the final result was at federal level, therefore the vote took place the same year for each province.

their license type (medical, recreational, hybrid). Indeed, in some states, the recreational use of marijuana remains illegal, however, for medical purposes it might be legal. Then, given the outlet's licensed number and name, we determine the incorporation year of each outlet from local secretary of state website[3]. Also, we identify respective outlets' addresses from Google Map and convert each of them into geospatial data (i.e., latitude and longitude) using the Google Geocoding API through the python geocoding web services. Finally, we identify 10,624 outlets across the Unites States and Canada and determine the exact incorporation year for only 4,158 shops. In our sample, 2,721 outlets are in the U.S. and 1,066 located in Canada, with in average, an incorporation year occurring in 2014 and 2015 respectively. Some outlets' incorporation year occurred before the recreational legalization year whether because they initially operate for medical marijuana, or whether they simply have other business. From Figure 2, in the U.S., we observe that recreational marijuana is mainly legal on the west side, however, we observe more medical shops' concentration homogeneity across states, whereases in Canada, we assess those shops ae mainly located in Ontario.

2.2. Education Attainment and People Cognition

In our research, we first investigate how the legalization of recreational marijuana, and the proliferation of cannabis outlets affect people lives from early to elder ages at states- and provinces-level. We focus on several aspects such as the legalization impact on: (1) people's marijuana prevalence, (2) high schools' performance, and (3) other indicators that proxy the change in people's cognitive abilities.

[3] Local government secretary of state provides business search engine giving access to available information for corporations, limited liability company and limited partnership. For instance, we identify outlets licensed in California from the California Business Search of Secretary of state https://bizfileonline.sos.ca.gov/search/business.

To investigate marijuana prevalence, we introduce the variables *MarijuanaUse(12-17)* and *MarijuanaUse(18-25)* that respectively measure the proportion of a population who have used marijuana over the last month. We focus on the two most important ages' ranges (i.e., 12-17 and 18-25 years old) corresponding to the period where marijuana affect the most people's brain. We first collect the number and percentage of young people ages from 12 to 25 who consume marijuana in the past month from 2004 to 2021 at state-level from the U.S. Census Bureau, the KIDS COUNT Data Center reports (Shore, Rima; Shore, Barbara, 2009) and at Canadian province-level from governmental Canadian Cannabis Survey. We obtain 271 treated state- and province-year observations from 2008 to 2021. We then refine previous investigation on marijuana prevalence by studying the impact of recreational legalization on illegal drug trafficking. We focus on the total number of hard drugs trafficking arrests by introducing the variable *log(NumHardDrugsArrest)* and on the total of arrests linked to illegal marijuana trafficking or consuming by introducing the variable *log(NumDrugsArrestMarijuana)*. We collect data from the Federal Bureau of Investigation (FBI) crime data explorer when considering U.S. States, and from the government Crime Statistics Data website when considering Canadian provinces. We obtain 169 treated state- and province-year observations.

We then introduce several variables to investigate the potential impact of recreational legalization on people cognitive abilities. First, when considering the teenager population, we propose to examine the students' performance in fundamental disciplines such as literacy, languages, and mathematics. We introduce the proxy variable *HighSchoolPerformance* following the methodology described by Henson (2009). We collect U.S. states' high-school level data on performance by scrapping the internet website schooldigger.com. In the same way, we collect high school performance located in Canadian provinces by scrapping the website Fraser Institute that

identify performance for both elementary and secondary schools. We obtain a total of 13,575 treated high school-year observations ranging from 2010 to 2021 which correspond to 136 state- and province-year observations.

Second, when considering the adult population, we focus on proxy variables that are often related to a loss in cognitive motricity such as individual's accidents. We analyze the impact of legalizing recreational marijuana on the number of car accidents by introducing the variable *log(NumCarAccidents)* and on the number of working accidents by introducing the variable *log(NumWorkingAccidents)*. We collect data from the U.S. National Highway Traffic Safety Administration (NHTSA) when considering U.S. states car accidents and from the Center for Disease Control and Prevention (CDC) when considering U.S. states working injuries. Regarding Canadian provinces, we collect data from the Canadian Government Statistics Data website. Totally, we obtain 365 treated state- and province-year observations for the car accidents and 262 observations for the working accidents.

2.3. Local Economic

To investigate how the legalization of recreational marijuana affect local economics at state- and province-level we study four variables.

First we study the impact on the business opportunities by introducing two variables: *log(NumBusinessIncorp)* defined as the natural logarithm of one plus the number of firm's incorporation and *log(BumBusinessBankruptcy)* the natural logarithm of one plus the number of bankruptcy. We collect data on Business incorporation from the U.S. Census Bureau and from the Canadian Innovation, Science and Economic Development report. We collect data on bankruptcies from the American Bankruptcy Institute (ABI) and the governmental Canadian Statistics Data website to obtain 157 treated state- and province-year observations.

Second, we measure how it impacts the job markets. To this end, we introduce the variable *UnemploymentRate* corresponding to the percentage of people being unemployed. We collect U.S. and Canada unemployment data from the U.S. Department of Labor's Bureau of Labor Statistics and from the Canadian labor force statistics, respectively. We obtain a sample of 359 observations.

Third, we measure if local government collect more tax revenues after the recreational legalization, and introduce the variable *log(TaxRevenue)* defined as the natural logarithm of one plus the local government's tax revenue. We collect data on tax revenues generated by local government from the U.S. Federation of Tax Administrations (FTA) and from the governmental Canadian Statistics Data website and obtain a sample of 443 treated state- and province-year observations.

Finally, we propose to investigate how recreational marijuana legalization impact the house market at both city- and state-level. We introduce the variable *log(HousePriceIndex)* defined as the natural logarithm of one plus the house price index. We collect house price index data at city- and state- (province) level by scrapping information from Zillow.com website for the United States and from housepricehub.com website for Canada. We obtain a sample of 5,052 treated city-year observations, and 308 treated state- and province-year observations corresponding to 24 unique treated states (provinces).

2.4.Private and Public Firms

Our data of private firms are from *Orbis* (*Bureau Van Dick*) database. After excluding observations with missing controls (describe in the next section), we have a sample of 9,093 firms-year observations, corresponding to 2,665 different firms from 1997 to 2021.

We use six measures for measuring the performance of a private firm: the percentage of annual sales growth rate (*Sales Growth*), the firm's profitability (*ROA*), the fixed and long-term investment respective (*Capex Ratio AT*, *Capex Ratio PPENT*) and the firm's investment in Research and Development (*RD Ratio AT*). We use also another measure related to the employment status: the natural logarithm of one plus the total amount of employees (*log(NumEmployee)*).

For public firms, we obtain financial fundamentals data from Worldscope (*Refinitv*). We use eights variable related to firm performance: market value divided by replacement cost (*TobinQ*), raw and benchmark-adjusted annual buy-and-hold stock returns (*Stock Returns*), the ratio of EBITDA to total assets to measure the profitability (*ROA*), the annual growth rate (*Sales Growth*), the ratio of cash holdings to total assets to measure liquidity (*Cash Ratio AT*), the ratio of research and development expense to total assets (*RD Ratio AT*), the ratio of capital expenditures to total assets (*Capex Ratio AT*), the ratio of capital expenditures to net PPE (*Capex Ratio PPENT*). Similarly to private firm, we define *log(NumEmployee)* as the natural logarithm of one plus the total amount of employees.

We collect each firm's patents and their forward citations from subsequent patents from *USPTO* using the patent database accessible from the University of Virginia[4] and construct two variables to measure firm's innovation: the natural logarithm of one plus the number of patents (l*og(NumPatents)* and the natural logarithm of one plus the number of citations (*log(NumCitations)*. By considering each firm's patents and citations, we can capture global firm's innovations activities comprehensively. The two measures of patents numbers and citations mainly

[4] The data can be access through the following link https://patents.darden.virginia.edu/get-data. The detailed instruction for the data construction can be found in Bena, Ferreira, Matos and Pires (2017).

focus on the intensives margin of innovation. Hence, we can examine how recreational marijuana legalization affects the propensity of a firm to file a patent in the given year.

Finally, from the database *Asset4* we construct four variables related to firm's social score: the firm's capacity to generate trust and loyalty with its workforce, customers and society, through its use of best management practices (*EW_S*), the firm's capacity to increase its workforce loyalty and productivity by promoting an effective life-work balance, a family friendly environment and equal opportunities (*EW_S Diversity*), the firm's capacity to increase its intellectual capital, workforce loyalty and productivity by developing the workforce's skills, competences, employability and careers in an entrepreneurial environment (*EW_S Training*) and finally, firm's capacity to increase its workforce loyalty and productivity by integrating into its day-to-day operations a concern for the physical and mental health, well-being and stress level of all employees (*EW_S Health*).

We obtain a final sample of 22,117 public firms corresponding to 1,661 different firms ranging from 1997 to 2020.

2.5.Control Variables

At the state-year-level, the high-school level and the city-level analyses, we control for economic growth variables (*log(GDP), GDP Growth*), for the change in demography (*log(Population), log(Density)*), the number of police officers (*log(NumPoliceOfficers)*), and one year lagged of different dependent variables of interests.

For firm-year level regressions, we also add commons lag controls at the firm level, including the natural logarithm of total assets firm size (*Size*), the ratio pre-tax income to total assets (*PTBI*) and its standard deviation over the last five years (*PTBI Vol*), leverage ratio (*Leverage*), and firm age in natural logarithm (*log(Firm Age)*).

3. Empirical Specifications and Results

3.1.Dynamic Difference-in-Difference Setting

Our empirical analyses rely on the assumption that the timing of the vote on the recreational marijuana legalization is not a function of preexisting operational, economic, health, security, or other observable factors. To validate this assumption, we follow Acharya and Baghai (2014) and Gao, Wang and Shen (2020) and estimate the Weibull hazard model in which the "failure event" is the year when the recreational use of marijuana becomes effective in a given state or province.

We construct a sample that consist in 24 states and provinces, where the dependent variable *Recreational Legalization Event* is a dummy that equals one the year of the effectiveness of the recreational marijuana use following the vote and equals zero otherwise. In each regression, we include the following independent variables aggregated to the state- and province-level: *Average Tobin's Q, Average Stock Return, Average Sales Growth, Average ROA, Average Capex Ratio AT, Average Capex Ratio PPENT, Average Cash Ratio AT, Average R&D Ratio AT, Average EW_S, Average EW_S Health., Average EW_S. Training, Average EW_S Diversity*. We also control for several state- and province-year level variables in all regressions, including *log(GDP), GDP Growth Rate, log(Population),* and *log(Density), log(Num Business Incorp), log(Num Business Bankruptcy), log(Num Police Officers), log(Num Car Accidents), log(Num Drugs Arrest Marijuana), log(Num Hard Drugs Arrest), MarijuanaUse(12-17), MarijuanaUse(18-25), HighSchoolPerformance, log(House Price Index), log(Tax Revenue), Unemployment Rate, log(Working Accident)*. Table 2 presents the regression results for the Weibull hazard model. The coefficients are not statistically significant in all regressions, which implies that the recreational marijuana effectiveness event is unrelated to these preexisting factors. These results based on the Weibull hazard model further ensure that the effectiveness year of recreational marijuana is a good

identification event to study causal impact of recreational marijuana legalization on education, public health, public security, local economics and on corporates' behaviors.

3.2.Impact on Marijuana Prevalence and Drug Trafficking

To investigate the impact of legalizing recreational marijuana on the society, we first want to answer the following question: (1) Is the legalization has any impact on the youth's prevalence of marijuana? (2) Does legalizing recreational marijuana reduce drugs criminality?

To this end, establish the following regression model at state-year level:

$$Y_{st} = \alpha + \beta_1 1(LegRec)_{st} + \beta_2 X_{st} + \beta_3 Y_{st-1} + FE_s + FE_t + \epsilon_{st} \quad (1)$$

where Y_{st} denotes whether a variable characterizing the marijuana prevalence for a group of people aged within a specific range, whether a variable charactering the criminality associated to drugs, whether a variable characterizing the individual risk of accidents, in a given state (province) s in year t. The dummy variable $1(LegRec)_{st}$ equals one from and after the year when the recreational marijuana legalization becomes effective in state (province) s, otherwise equals zero. The vector X_{st} represents a group of state- and province-year controls variables, including *log(GDP)*, *GDP Growth*, *log(Population)*, *Density* and *log(NumPoliceOfficers)*, as described in section 2.5. The vector Y_{st-1} represents one year lagged of our dependent variables of interest. We control for state (province) fixed effect, time fixed effect, and cluster errors at state (province) level.

From Equation (1), we first want to check whether the proportion of a given population who have used a drug over the past month is increasing, decreasing, or is staying unchanged after the legalization of recreational marijuana. We propose to focus on two specific groups of population. The first one is a group of people aged between 12 and 17 years old, the second one is

aged between 18 and 25 years old. The choice of these two groups of age is motivated by several research demonstrating that adolescents and young adults are more vulnerable to the harmful effects than people older than 25 years older, primary because the brain is still developing. For example, Copeland, Rooke and Swift (2013) show that adolescents and young adults are especially more vulnerable to mental health disorders associated with cannabis than elder people. Also, according to the National Institute of Health survey (NIH, 2012) on Drug Abuse, in most western societies, 15- to 25-years-ols have higher rates cannabis use than those aged 25 and older, which demonstrates that marijuana is particularly problematic among teenagers and young adults.

We present results on marijuana prevalence in Table 3. First, we observe a substantial increase of 6.95% in marijuana prevalence for the group of people aged between 18 and 25 years old (columns 1).[5] We explain this result by the fact that after the legalization, the proliferation of outlets as shown by Figure 2 has significantly increased in both the U.S. and Canada, democratizing the consumption of cannabis, and facilitating its access. However, surprisingly, we observe a totally different picture when looking at the group of people aged between 12 and 17 years old (columns 2). Indeed, after the vote on recreational marijuana legalization becomes effective, the proportion of people within this range that have used marijuana in previous month is significantly decreasing. More specifically we find that in average the marijuana prevalence for teenagers reduces by 2.77%, suggesting that legalizing marijuana limit access to marijuana.[6] Figure 3 highlight the evolution of marijuana prevalence for both groups pre- and post-legalization, and corroborate previous findings.

[5] 6.95% = 0.0153 (coefficient) / 0.22 (mean).
[6] 2.77% = 0.0025 (coefficient) / 0.09 (mean).

This is echoing with our results presented in Table 4 regarding the impact of marijuana legalization on criminality related to marijuana and drugs trafficking. We observe that both the number of arrests related to illegal marijuana trafficking (column 1) and related to any type of drugs trafficking (column 2) are both significantly decreasing by 28.31% and 5.62%, respectively.[7] Thus, legalizing recreational marijuana significantly limit proliferation of illicit black market on drugs, and knowing that during the pre-legalization periods, the black market was the way of supplying drugs especially marijuana for minors and adults, post-legalization, it becomes more complicated for teenagers to have access to marijuana and drugs in general.

3.3.Impact on People Cognition

In this subsection, we examine the potential impact of recreational marijuana legalization on people cognition by focusing on: (1) the change in number of individual's accidents, and (2) the change in high school performance in fundamental disciplines.

Given the fact we find in previous section an increase in marijuana prevalence for people aged between 18- to 25-years old, it is natural to question the impact on individuals' cognitive motricity by investigating the proxy variables defined in section 2.2 and drawing on Equation (1). From Table 5, we observe that both the number of car accidents (column 1) and the number of working accidents (column 2) has significantly increased by 1.13% and 0.61% respectively.[8] These results are supported by several studies such as Baler and Volkow (2006) and Hofmann, Friese and Strack (2009) emphasizing the fact that people consuming cannabis experiment a sharp reduction of their self-cognitive capacity affecting sensorimotor functioning, attention span, memory, self-control, and reflexivity.

[7] 28.31% = 1.973 (coefficient) / 6.97 (mean). 5.62% = 0.382 (coefficient) / 6.80 (mean).
[8] 1.13% = 0.066 (coefficient) / 5.82 (mean). 0.61% = 0.018 (coefficient) / 2.97 (mean).

Finally, to study the direct impact of legalizing recreational marijuana on education performance, we propose to establish the following regression model at high-school-year level:

$$Y_{ht} = \alpha + \beta_1 1(LegRec)_{st} + \beta_2 X_{st} + \beta_3 Y_{hst-1} + FE_h + FE_t + \epsilon_{ht} \quad (2)$$

where Y_{ht} denotes the rank of given high school h in a given state (province) s in year t. The dummy variable $1(LegRec)_{st}$ equals one from and after the year when the recreational marijuana legalization becomes effective in state (province) s, otherwise equals zero. The vector X_{st} represents the same group of state- and province-year controls variables of Equation (1). The vector Y_{st-1} represents one year lagged of our dependent variables of interest. We control for high-school fixed effect, time fixed effects and cluster errors at high-school level (province) level. We also draw directly on Equation (1) to conduct an ordinary least squares (OLS) regression at state-year level, and we control for state (province) fixed effect, time fixed effect, and cluster errors at state (province) level.

Table 6 presents the results of high-school performance. We observe that both at state-year level and at high-school-year level, the legalization of recreational marijuana consumption has a significant and positive impact on the score of each respective school. More specifically, we find that at high-school-level (column 1) the average score increases by 2.17% and observe stronger results at state-level (column 2), where in average the overall high-school performance increase by 3.38%. [9] These results are echoing with finding from section 3.2, showing that recreational legalization significantly decreases the prevalence of marijuana consumption from teenagers aged between 12 to 17 years old. Given the fact that studies have shown in average an 8-point drop in Intellectual Quotient (IQ) from children aged 13 years old who used marijuana regularly (Meier,

[9] 2.17% = 1.506 (coefficient) / 69.15 (mean). 3.38% = 2.379 (coefficient) / 70.42 (mean).

Caspi, Ambler, Harrington, Houts, Keefe, McDonald, Ward, Poulton and Moffitt 2012), the fact that the consumption of marijuana from this group of population decrease, logically explain better students' performance in literacy, languages, and mathematics.

3.4.Impact on Local Economics

The last impact on the society that we want to study concern the change in local economic dynamism after recreational marijuana become legal. After the end of alcohol prohibition, between the 1920 and 1929, the Unites States have known an immediate influx of vital strength into the whole economic structure, with trade becoming better and the entire standard of living of the American people was stepped up to a distinctly higher level (Pickett, 1932). By consequent, some may argue that we may observe similar effect on the economics after legalizing the recreational consumption of marijuana. To test this last statement, we rely on Equation (1) and study the impact on the variables of interest emphasized in section 2.3. From Table 7 Panel A, we observe that the number of new business incorporation significantly increase by 0.73% (column 1), stimulated job opportunities and decreasing unemployment rate (column 2) and increasing the local government tax revenues by 0.81% (column 3).[10] These finding coincide with the previous statement and suggest that the legalization of recreational marijuana have stimulated business opportunities and people's risk appetite. However, other may also argue that given the previous results in subsections 3.1 and 3.2, the increase of marijuana consumption and the loss of cognitive motricity associated to it, may limit in the short-term businesses' sustainability. We accept this statement and investigate how the legalization of recreational marijuana also affect the success rate of new business by studying as proxy variable the change in the number of firm's bankruptcy. Post-legalization, we find a significant increase in corporates' bankruptcy by 1.19% (column 4).[11]

[10] 0.73% = 0.064 (coefficient) / 8.79 (mean). 0.81% = 0.033 (coefficient) / 4.04 (mean).
[11] 1.19% = 0.044 (coefficient) / 3.70 (mean).

Finally, in Table 7 Panel B, we show results on the impact of recreational marijuana legalization on the house market. At both city-level (column 1) and state- and province-level (column 2), we observe a substantial increase by 0.14% in the change in house price index.[12]

3.5. Impact on Public Firms

3.5.1. Public Firm Fundamentals and Innovation

In this section, we examine how the legalization of recreational marijuana affects public firms' behaviors, including operating performance, investment, and innovation. The following equation describes our main regression model:

$$Y_{fsit} = \alpha + \beta_1 1(LegRec)_{st} + \beta_2 X_{st} + \beta_3 X_{ft-1} + FE_f + FE_{it} + \epsilon_{fsit} \quad (3)$$

where Y_{fit} denotes for a performance measure for firm f in in state s in industry i in year t. The dummy variable $1(LegRec)_{st}$ equals one from and after the year when the recreational marijuana legalization becomes effective in state (province) s, otherwise equals zero. The vector X_{st} represents the same group of state- and province-year controls variables as Equation (1). The vector X_{ft-1} represents a group of lagged firm characteristics. We control for firm and industry-year fixed effects and cluster standard errors at the firm level.

Table 8 presents the results of public firm's fundamentals. Echoing with results at state-level where we find that businesses, and job opportunities become stimulated after the legalization, we find that public firms invest more in Research and Development (R&D) and recruit more employees (columns 1 and 2). More specifically we observe a significant increase by roughly 3.21% in R&D.[13] This finding suggests that post-legalization, firms are facing a rapid change in consumer demands associated with the emergence of new business opportunities. Therefore, companies are

[12] 0.14% = 0.0169 (coefficient) / 12.33 (mean), and 0.14% = 0.0167 (coefficient) / 12.17 (mean).
[13] 3.21% = 6.88e-3 (coefficient) / 0.214 (mean).

forced to invest in new prototyped for further research, testing and product development to not be overtaken by new and more disruptive companies. However, if we expect that more investment in R&D may lead to better firm's performance with the release on the market of new products, in fact, we observe a totally different picture. Indeed, we find that post-legalization, sales growth decreases by 0.39% (column 3), profitability is significantly worsened and decreases by 1.21% (column 4), liquidity is substantially reduced by 0.17% (column 5), and long-term fixed capital investment are decreasing (column 6 and 7) with the capital expenditure respective to firm's total assets diminishing by 1.18%.[14] Additionally, we observe lower firm's valuation (column 8) and stock returns (column 9). From Table 9, we corroborate these findings with the fact that although firms invest more in R&D, the number of patents (column 1) and the number of citations (column 2) both are decreasing. We argue that the negative impact of marijuana on people cognitive abilities lower employees' productivity and effectiveness. These results reinforce previous finding regarding firms' need to increase their working force to compensate the loss in productivity.

3.5.2. Public Firm Social Policies

We previously found in section 3.3 that the democratization of recreational marijuana uses across the adult's population affect individuals' cognitive motricity. Therefore, in this subsection, we want to test whether public firms adjust their social strategies in response to such social change. Given the fact that regular consumers of marijuana present a risk of reduced attention and concentration span, behavioral disorders, poor stress management, and are more subject to depressiveness, public firms may use better practices to demonstrate its capacity of taking social responsibility and hence generate loyalty from their workforce. Indeed, because recreational use

[14] 0.39% = 0.0407 (coefficient) / 10.3% (mean). 1.21% = 1.97 (coefficient) / 1.63% (mean). 0.17% = 0.037 (coefficient) / 0.214 (mean). 1.18% = 0.052 (coefficient) / 0.044 (mean).

becomes legal, firms have no legal recourse anymore and must adapt their managerial response. One managerial response is to generate trust from employees by guaranteeing their safety and good working conditions, given the risk linked to consumed marijuana regularly. Also, public firm may try to overcome the loss in their employees' productivity by helping them to develop new skills, and competencies, or by stimulating their careers via a more entrepreneurial environment, rather than applying a traditional and hierarchical promotion system. To test whether this conjecture is true, we examine the firm's social score *EW_S*, and the following three subcategories: *EW_S Diversity*, *EW_S Training*, and *EW_S Health*. We present the corresponding results in Table 10 using one of the above variables as the dependent variables in Equation (3). In all four columns, the coefficients on $1(LegRec)$ are significantly positive, suggesting that to limit negative effects on their operating performance, firms adapt their managerial behavior by implementing new social policies supposed to facilitate the working life experiences of their employees and stimulate their working ability as their motivation.

3.6.Private Firm

Because private firms differ from public firms in terms of objective, ownership, management capital structure and flexibility, we pursue analysis on corporates 'behaviors by focusing now on private firms' response and presents results in Table 11. We find that private firms' business performance and fixed investment are more impacted than public firms. Indeed, after the legalization of recreational use, we find a significant increase in R&D (column 1) by 0.39%, and an increase in number of employee (column 2).[15] Regarding firm's operating performance, we observe that sales growth decreases by 2.29% (column 3), we find lower profitability (column 4),

[15] 0.39% = 0.02 (coefficient) / 0.05 (mean)

liquidity (column 5) decreases by 0.24%, and fixed investment significantly drop by 0.12% (column 6) and 1.27% (column 7).[16]

4. The Discontinuity Setting

One concern with the empirical strategy presented in section 3 is that it might be still challenging to claim causality. Indeed, it could still be possible the case that there are unobservable firm characteristics that relate to both recreational marijuana legalization and our dependent variables of interests. While we have done our best to control for unobservable firm-year level characteristics by saturating the model with time-varying and firm-level fixed effects, endogeneity remains a concern. To address this identification concern, we substantiate our finding by using a cleaner regression discontinuity design framework within an optimal marijuana recreational vote bandwidth. Within this setting, we establish causality and compare outcomes of firms located in states and provinces that have narrowly passed marijuana recreational vote against those that failed to pass the legalization. To cut clutter, we focus on *Sales Growth*, *ROA* and *Cash Ratio AT* for investigating firm's profitability and liquidity, on *RD Ratio AT* and *Patents* for studying firms' innovation capacity, and finally, we focus on *EW_S*, *EW_S Health*, *EW_S Diversity* and *EW_S Training* to examine firm's response on social policies. The strength of this RDD analysis is that it potentially eliminated any confounding selection and omitted variables biases thereby allowing us to credibly estimate the effect of marijuana recreation legalization on firms 'fundamentals, innovation, and social policies.

4.1. RDD Framework Validation

Implementing an RDD framework requires that we show "local" exogeneous variation in recreational marijuana legalization that is generated from ballot and parliament votes that pass or

[16] 2.29% = 0.62 (coefficient) / 0.27 (mean). 0.24% = 0.04 (coefficient) / 0.17 (mean). 0.12% = 0.03 (coefficient) / 0.25 (mean). 1.27% = 0.47 (coefficient) / 0.37 (mean).

fail by a small margin of votes around the 50% threshold. To estimate the optimal local bandwidth, we use the *IK algorithm* for bandwidth selection (Imbens and Kalyanaraman. 2012). To the extent that there is some randomness in the outcome of the votes, we can establish a causal relationship between firms located in states and provinces that barely legalized recreational marijuana and those who did not. An additional advantage of RDD setting is that we do not have to include observable firm covariates in our analysis to obtain identification (Lee and Lemieux, 2010).

Another requirement for implementing the RDD framework is that we need to show that both decision makers at state- and province-level such as politicians or lobbying, corporates, and the citizen who vote cannot manipulate the outcome variable near the known cutoff (Lee and Lemieux, 2010). By satisfying this assumption, we can consider that the variation in firms behaviors located in states and provinces where recreational marijuana become legalized is as good as those from a randomized experiment. Figure 4 shows the number of votes by year and the average passage rates by year in the U.S. states between 2000 and 2020. As Figure 4 shows, the passages rate was mostly between 30.08% and 69.92% in our sample period.

To further test this assumption, following Bradley, Kim and Tian (2017), Figure 5 plots the distribution of pro-recreational marijuana vote shares, shown on the x-axis with a width of 5% corresponding to 15 equally spaced bins. Figure 5 indicates that the distribution of vote shares is relatively smooth and, that there is no sharp discontinuity around the 50% vote threshold. Although this distribution suggests that there is no strong evidence that voting outcomes could be manipulated, we also observe an increase in the number of votes favoring recreational marijuana just beyond 50%, suggesting a not perfect continuity around the threshold.

We admit this observation and propose to perform an additional test following the McCrary (2008) two-step procedure. We emphasize this formal test for discontinuity of the density in Figure

6. The x-axis plots represent the percentage of pro-recreational marijuana votes, while y-axis show the density estimates. The lines represent the fitted density function of the votes with 95% confidence interval. We observe that around 50%, the confidence interval of our fitted lines is overlapping, corroborating with the fact that there is no precise evidence of manipulation in voting outcomes. Nevertheless, through the McCrary test, the existing discontinuity at 50% level between the fitted lines becomes more evident and highlight more accurately an imperfect continuity around the threshold. We acknowledge this result and will take it into account when considering future results from the discontinuity setting.

4.2. RDD Results

Our RDD results confirms that recreational marijuana legalization exhibits lower firm's performance, profitability, liquidity, worsen capacity to innovate with less patents disclosed although a significant increase in R&D investment, and exhibit positive firm's social response. We visually check our relations around the cutoff in Figures 7 and Figures 8, highlighting graphically the regression discontinuity design and the global regression discontinuity design respectively. Similar to Figures 4 and 5, our x-axis represents the share of pro-recreational marijuana votes, and the y-axis is our dependent variables of interest. The red dots in both Figures 7 and 8 depict the average value of the variables of interests being examined, the black dots in Figure 8 denotes the respective mean value of the variable of interests, and the solid line represents the fitted polynomials (linear, quadratic) estimate with 95% confidence interval around the fitted value. More specifically, Figure 7&8 A, show results on firm's performance: *Sales Growth* (Panel A) , *Cash Ratio AT* (Panel B) and *ROA* (Panel C), Figure 7&8 B show results on firm's innovation: *RD Ratio AT* (Panel A) and *Patents* (Panel B), and Figures 7&8 C show results on firm's social performance: *EW_S* (Panel A), *EW_S Health* (Panel B), *EW_S Training* (Panel C) and *EW_S*

Diversity (Panel D). For all figures, we observe a sharp and significant discontinuity around 50% threshold: one a pro-recreational vote cross 50% threshold, the firm's performance and innovation drop substantially and both the firm's investment in R&D and firm's social score all jump, regardless the weighted scheme employed. Also, the confidence intervals on the left and right side of the threshold do not overlap, suggesting that the legalization of recreational marijuana leads to worsen firm's operating performance, worsen research and development productivity, but increase firm's social performance.

To conduct this analysis, we draw on the IK algorithm and estimate the optimal bandwidth to constrain our sample to firms located in states and provinces that just narrowly pass or fail to pass the vote in favor recreational marijuana legalization. This sample allow us to establish causality and compare firms located in states and provinces that just barely vote in favor of recreational marijuana and those who did not. More specifically, we test the effect of recreational marijuana legalization on firm's financial, innovation and social score behaviors by estimating the model in Equation (4):

$$Dep_{ft+1} = \alpha + \beta_1(Vote\ Result_{st}) + \beta_2 g(Vote\ Share_{st}) + \epsilon_{ft} \quad (4)$$

where Dep_{ft_1} is replaced by our dependent variables of interests*: Sales Growth, ROA, Cash Ratio AT, RD Ratio AT, Patents, EW_S, EW_S Health, EW_S Diversity* for firm f in year $t+1$, the dummy variable $Vote\ Result_{st}$ takes a value of one if the recreational marijuana vote result is greater than 50% in state (province) s in year t; $Vote\ Result_{st}$ takes a value of zero otherwise. $g(Vote\ Share_{st})$ denotes a higher-order polynomials of $Vote\ Share_{st}$ to consider potential non-linearity. We present detailed results in Table 12 where the weighted scheme used in column 1 is a linear polynomial, and in column 2 is a quadratic polynomial. We report the results in Tables 12

Panel A for firm's performance outputs, Panel B for firm's innovation, and Panel C for firm's social score variables.

In line with previous findings presented in Tables 8, 9 10 and 11, and corroborating with our graphically findings, we find that the coefficient $Vote\ Result_{st}$ is negative and statistically significant for *Sales Growth*, *ROA*, *Cash Ratio AT* and Patents, and is positive and statistically significant for *RD Ratio AT*, *EW_S*, *EW_S Health*, and *EW_S Diversity*.

While our RDD framework is a powerful test and allows us to draw causal inference on the effect of legalizing recreational marijuana on firm's performance, innovation, and social policies, it has limitations, such as the imperfect continuity of our sample around the threshold. Nevertheless, our findings shed light on the impact of recreational marijuana legalization in North America. Furthermore, we believe that the consistency between our DID and RDD setting adds credibility to our findings.

5. Robustness Checks

5.1.Pretreatment Trends Analysis

One essential requirement of the dynamic DID methodology is that the parallel trends assumption is satisfied. Because our treatment is staggered across countries, we propose to rely on Sun and Abraham (2020) recent paper, and implement the following DID event-study regression:

$$Y_{fit} = \alpha + \sum_{e \notin C} \sum_{l \neq -1} \delta_{e,l} (\mathbf{1}\{E_i = e\} * D_{it}^{l}) + \beta_{L+1} X_{st} + \beta_{L+2} X_{ft-1} + FE_f + FE_{it} + \varepsilon_{fcit} \quad (5),$$

where Y_{fit} is the outcome of interest for firm f in industry i and time t, and D_{it}^{l} is a dummy variable that equals 1 if the relative time to firm f's first treated year is l and 0 otherwise (and 0 for all never-treated groups). Firms f are categorized into different cohorts' groups e (treated, control) based on their initial treatment timing. The vector X are controls covariates and we control for firm fixed effects, industry-year fixed effects and cluster the standard errors at firm level. To

avoid perfect multicollinearity the time lag $\{l = -1\}$ is used as the dropped reference, and $l = L$ corresponds to the total number of lags used in the event study DID regression. Finally, the number of pre- and post-treatment period must be equal.

To validate the parallel trends assumption, we want to show that for each period before and after treatment the coefficients on the pre-treated periods are statistically insignificant. We estimate equation (9) and we are interested in the estimates of the coefficients $\delta_{e,l}$ as measures of dynamic treatment effects. We aggregate the estimated coefficients $\delta_{e,l}$ at the relative time l level following Sun and Abraham (2020) to get the dynamic DID estimator β_l. We want to determine how large the amount of treatment effects heterogeneity needs to be for β_l to be contaminated by treatment effects from other relative periods. We present results in an intuitive way by emphasizing the DID-event study regression coefficients results graphically, with confidence intervals. Figures9 (Panel A to L) and Figures10 (Panel A to F) show results on Public Firm and Private Firm respectively. On each graph, the dots plots represent the regression coefficients, and the vertical line represents their respective confidence intervals. When the confidence intervals do not cover the red zero horizontal line, the coefficient is significant, and its degree of uncertainty is defined by the width of the intervals, otherwise, the coefficient is insignificant. Additionally, Table 13 presents the results on public firms' fundamentals, Table 14 presents the results on public firm's innovation and Table 15 present results on public firms social performance. Finally, Table 16 presents the detailed results on private firm analysis

Across all columns of the three tables, the pre-treatment coefficients β_l are close to zero and insignificant, suggesting the validity of the parallel trends assumption for the event-study DID methodology. The absence of any significance implies that the exact year when recreational marijuana becomes effective is not anticipated by treated group. The coefficient β_l on the post-

implementation indicator is significant during both the treatment year and 1 lead-year, indicating an immediate impact of recreational marijuana legalization on firms' behaviors.

5.2. Placebo Test

In this subsection, we conduct a placebo tests to ensure that the significant results resulting from the DID setting only stand for the legalization of recreational marijuana and not for the prior existing medical marijuana legalization. To do so, we conduct the same DID framework following Equations (1) and (2) from section 3.2 to investigate the impact of medical marijuana legalization of marijuana prevalence, people cognition and local economics. We follow Equation (3) from section 3.4 to investigate the impact on both private and public firm. Table 17 Panel A, Panel B, and Panel C show results on marijuana prevalence, on drug trafficking respectively, and on people cognition as described in section 2.2. Table 18 Panel A and Panel B shows result on local economics variables and house market variables respectively, as described in section 2.3. From Table 19 Panel A, B, and Panel C, we show results on public firm's fundamentals, on public firm's innovation variables, and on public firm' social score variables respectively, and Table 20 emphasize the Placebo test results on private firm, all variables are described in section 2.4. In all columns of each table, we observe no significant coefficients, suggesting that the legalization of marijuana for medical use do not have any substantial impact on marijuana consumption, on drug trafficking, on education attainment, on individual's cognitive motricity, on employment and entrepreneurship, and have no impact on firms' behaviors and performance. The Placebo test comfort our choice of recreational marijuana legalization as our identification strategy for the DID event-study setting.

6. Conclusion

Psychologists and economic studies have shown that the average intelligence quotient (IQ) of populations could be considered the root cause of economic growth, but also the cause of international development inequalities. Therefore, any new policies that could potentially affect people's cognitive abilities and educational attainment, should be considered cautiously. In this context, we evaluate the impact of recreational marijuana legalization in North America on the society and on the economy.

On society, we study the impact of the legalization on the prevalence of cannabis consumption among youth and focus on several indicators that proxy the change in people's cognitive abilities such as educational attainment and individual's accidents often related to alertness loss. First, we find that the prevalence rate of marijuana uses for the group of population aged within 12- and 17-years old significantly decreases, whereases the prevalence for the group of population aged between 18- and 25-years old increases. This result suggests that marijuana becomes less accessible for minors reducing their usage, meanwhile, the democratization of its consumption among young adults increases. Second, post-legalization we find substantial increase in high school performance suggesting better skills from students in literacy, languages, and mathematics. However, we also find an increase in driving and car accidents implying potential loss in people's attention span, reflex, highlighting more difficulties to focus. Therefore, recreational marijuana legalization has a positive impact on cognitive abilities for the minor population by limiting their access to it, but it negatively affects the young adult population.

On the economy, we evaluate the legalization impact at both state- and firm-level. At the state level, post-legalization, we find a better economic breeding ground with more business incorporation, less unemployment, more local tax revenues, and find that the house market is

greatly stimulated. On the downside, the number of businesses falling to bankruptcy significantly increases, suggesting that this economic dynamism might not be sustainable. At firm level, we find that for both private and public firms, the investment in research and development substantially increases, suggesting that firms perceive a paradigm shift and business opportunities, and decide to allocate more capital towards the development of new prototyped, testing and product to not be overtaken by new and more disruptive companies. Their need in human capital also increases as we observe more recruitment. However, the overall firm's performance, profitability, long-term investment, and valuation, are all negatively affected. More worrying, although more investment in R&D, we observe significant drop in the number of patents disclosed, associated with a sharp decrease in the number of patents cited in the literature, suggesting lower qualitative innovation. This loss in productivity can also corroborate with the firm's need to enlarge their working force. We argue that the negative impact of marijuana on people cognition lower employees' productivity and effectiveness. In response to this legalization impact, firms seek internal solutions to improve their employee working condition as evidenced by better managerial behaviors and policies.

Our study covers a large scope regarding the causal effect linked to the legalization of recreational marijuana and should have a resounding impact especially in Europe, where this question is more than topical. For example, in October 2022, Germany became the first European country to open the way to legalizing the purchase and possession of small among of marijuana for recreational use. Based on our finding, such policy could be seen as an effective solution to tackle black market, drugs related criminality and protect the children population. Nevertheless, on the downside, the impact on the remaining population, especially on young adults' cognition is worrying, and it seriously affects businesses' innovation, performance, and productivity, and overall, threaten long term economic growth.

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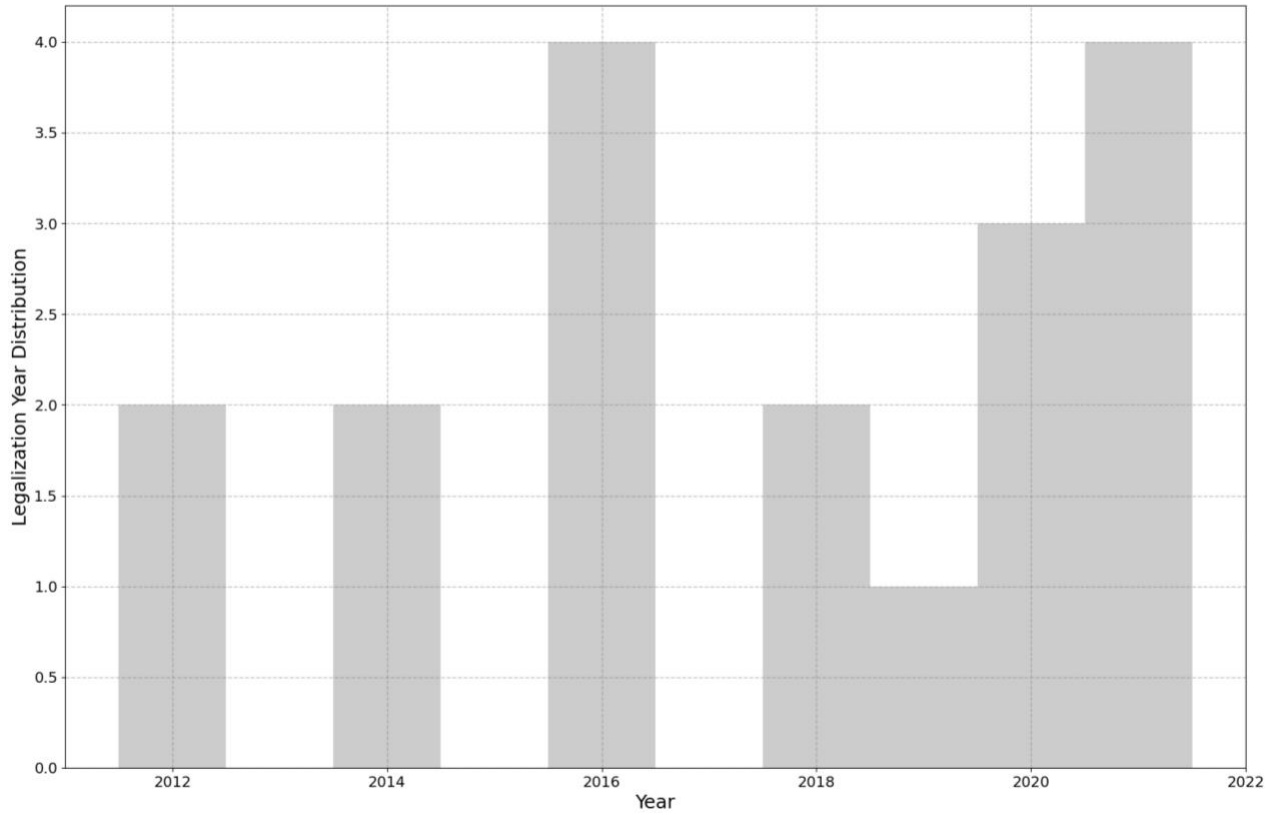


Figure1: Distribution of the years of recreational marijuana legalization across the U.S. states. The figure presents the number of U.S. states that have legalized the recreational use of marijuana in each year ranging from 2012 to 2021.

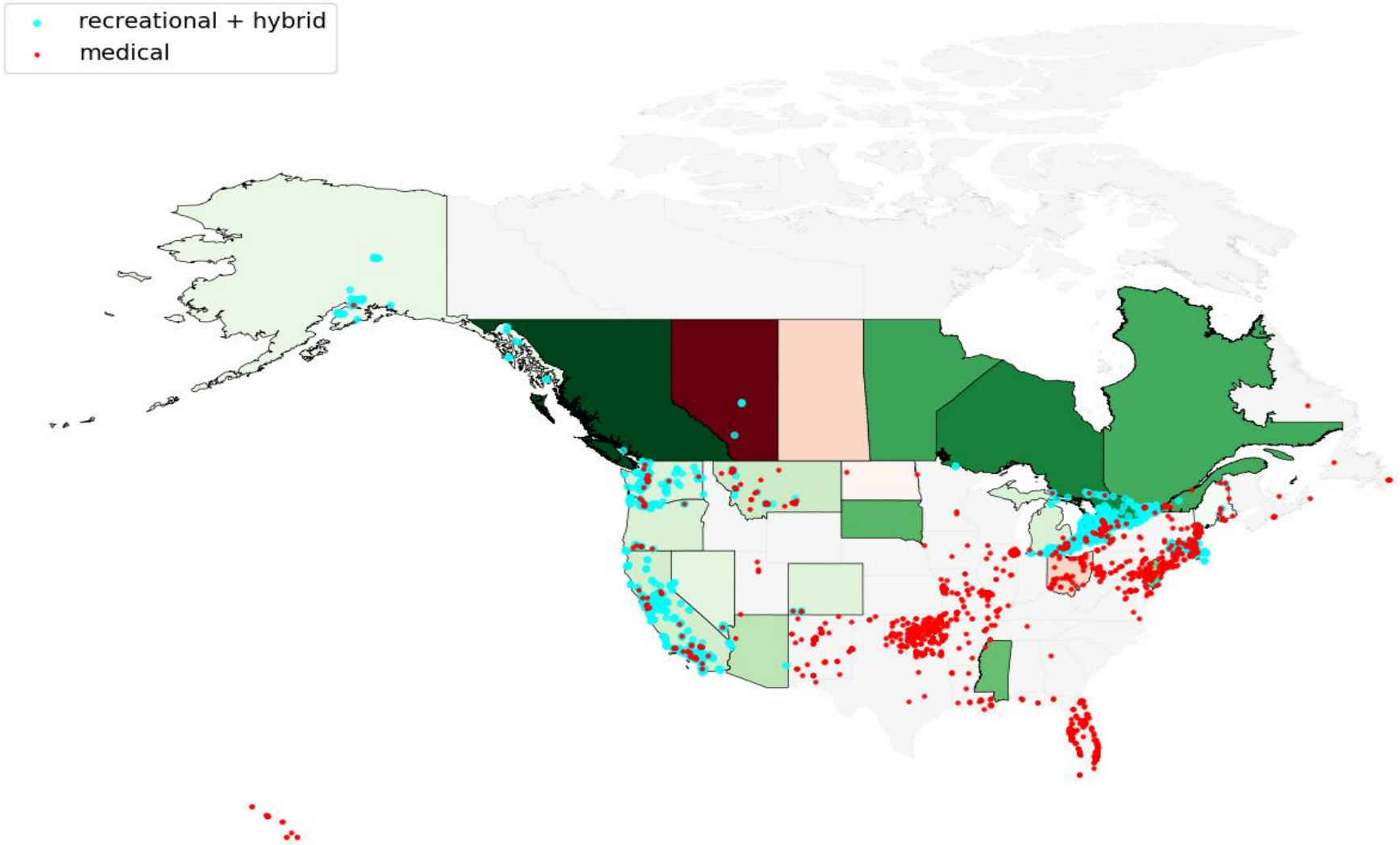


Figure 2: Mapping of both the marijuana outlets and the recreational vote results in the U.S and Canada. The recreational marijuana vote results are represented by the map color and its opacity. A green color means that the vote result exceeds the threshold of 50.00%, and the recreational consumption is legal. Stronger the opacity, greater was the percentage of favor votes. A red color means that the vote result is below the threshold of 50.00%, and the recreational consumption remains illegal. A grey color means that no vote take place yet, the recreational consumption remains illegal. The dots points correspond to the location of a marijuana outlet. When the dot color is "blue cyan", the shop can sell marijuana for recreational and medical use. When the dot color is red, the outlet can only sell marijuana for medical use.

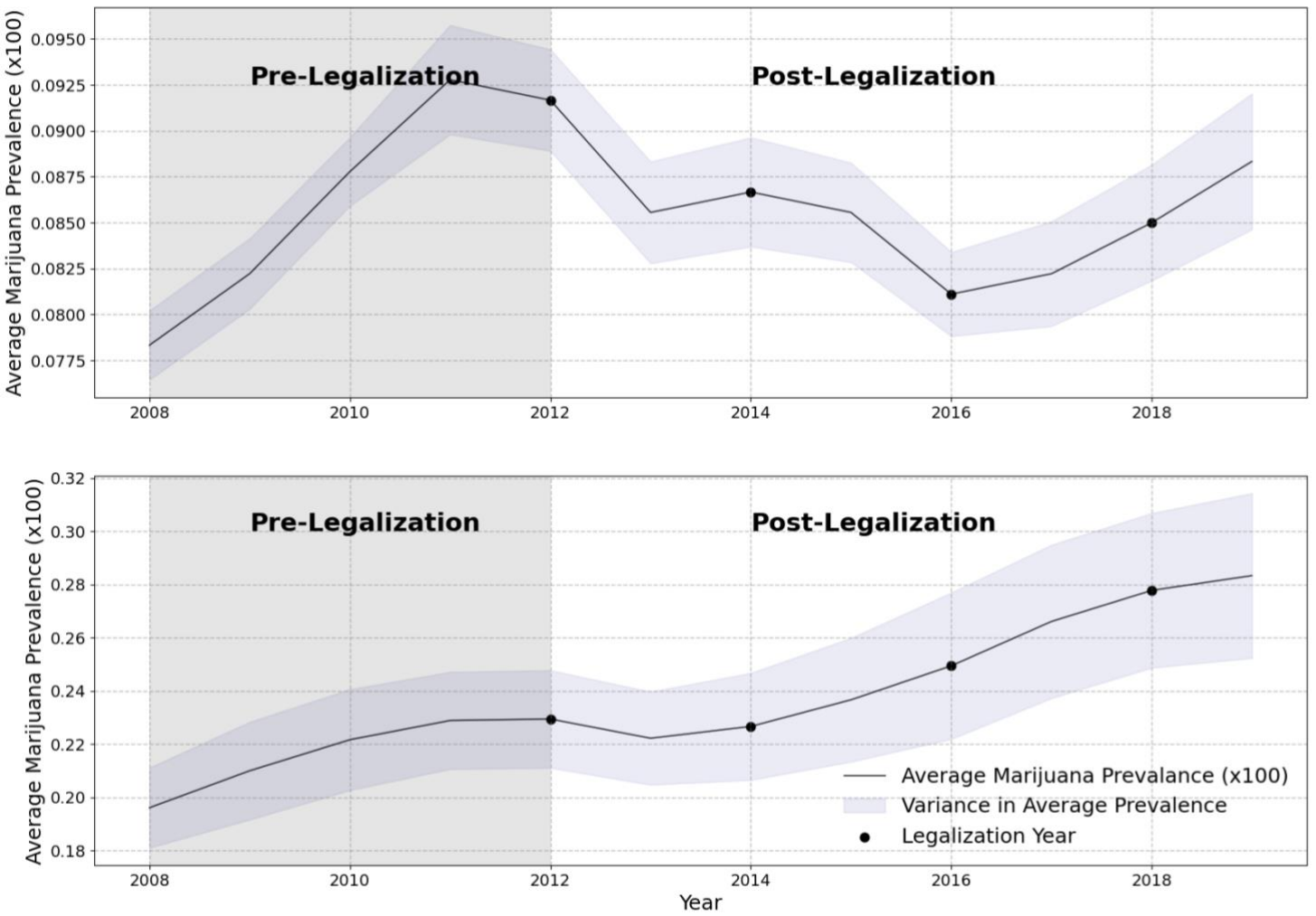


Figure 3: Trends in the Average Prevalence of Marijuana by group of ages. From high to low we present the average prevalence use of marijuana by group of ages in states where recreational use has become legal. The upper graph presents the prevalence trend on a group of population aged between 12 and 17 years old. The lower graph presents the trend on a group of population aged between 18 and 25 years old. The dark grey area corresponds to the period where no states had legalized recreational marijuana yet. The dot points correspond to the year where at least one state has legalized recreational marijuana. For example, in 2012, Washington was the first and only state legalizing recreational marijuana.

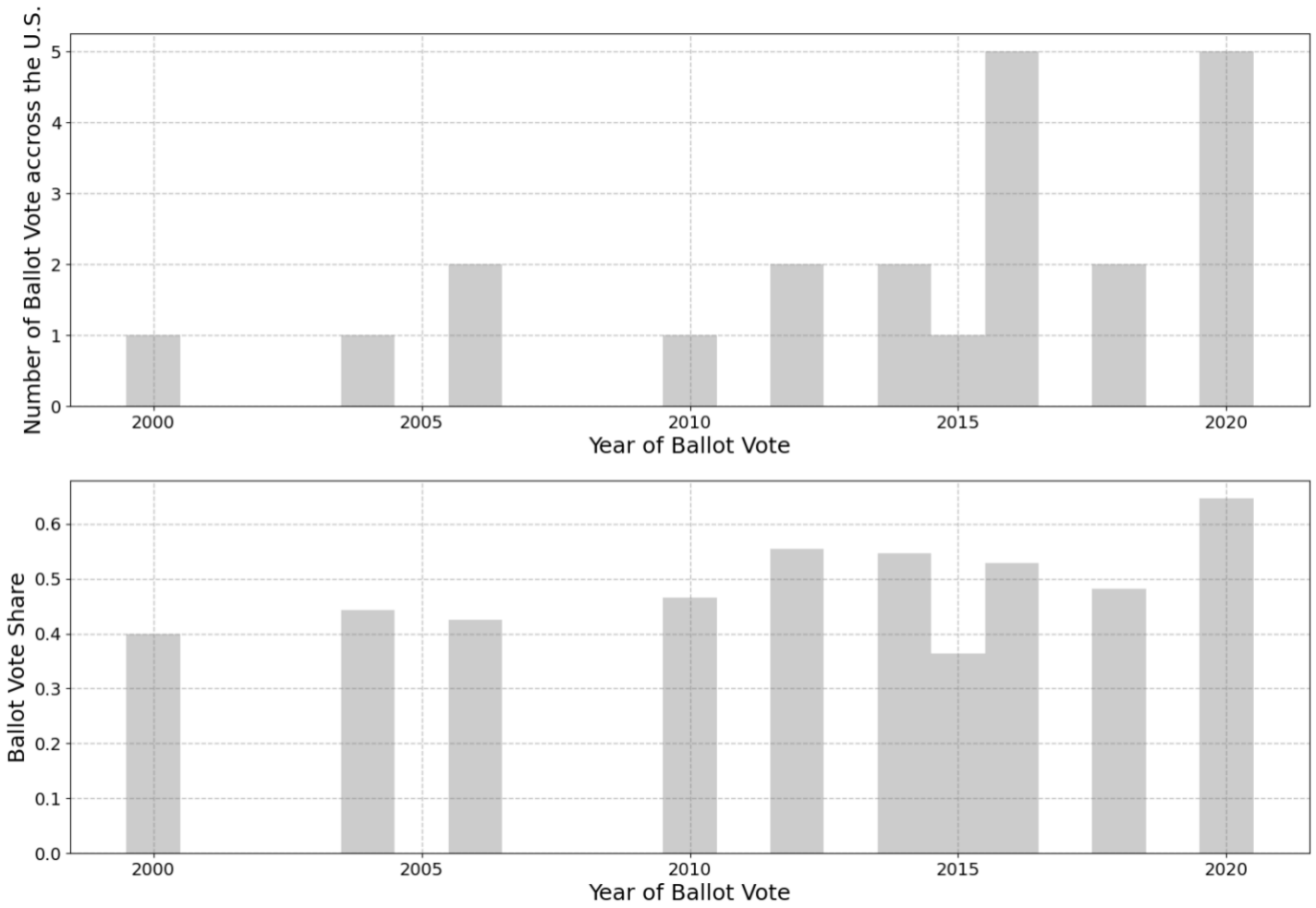


Figure 4: Number of Votes and Passage Rates by Year. This figure plots the number of votes for legalizing the recreational use of marijuana (upper plot) and the average passage rates by year (lower plot).

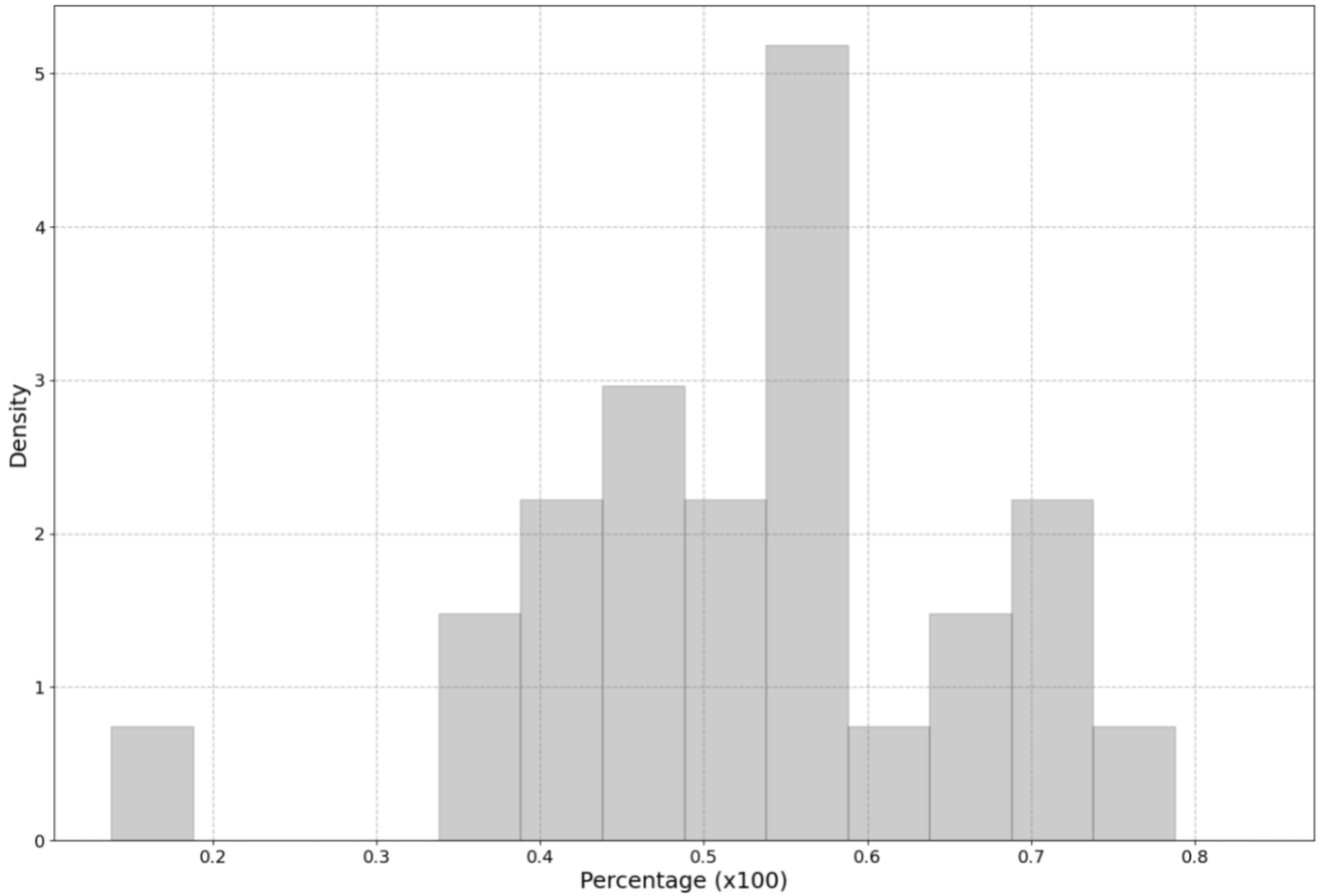


Figure 5: Distribution of Ballot Vote Results in U.S. states. This figure plots the histogram of the distribution of the number of Ballot votes with the percentage of votes in favor of marijuana for recreational use in our sample with a width of 5% corresponding to 15 equally spaced bins.

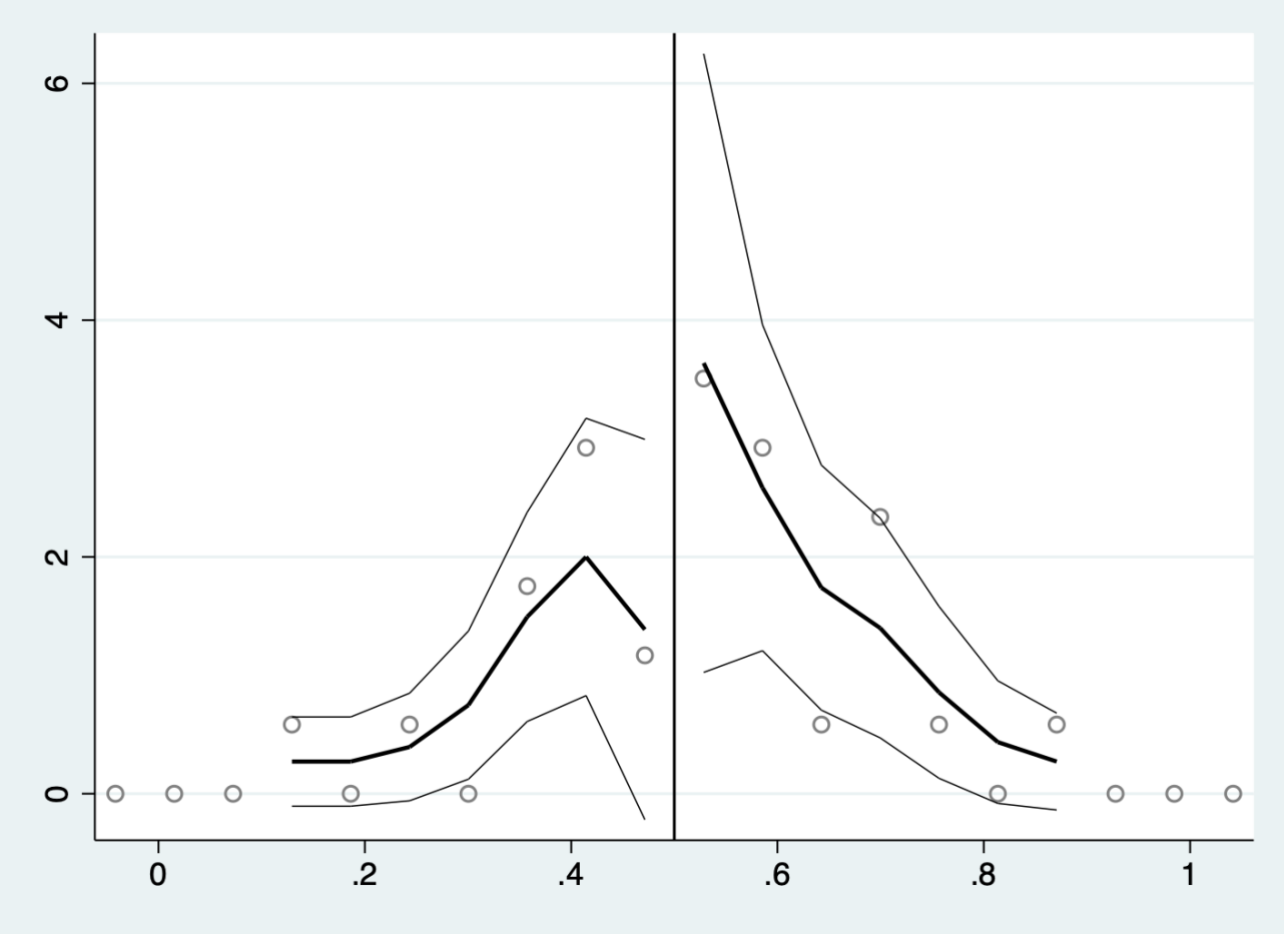
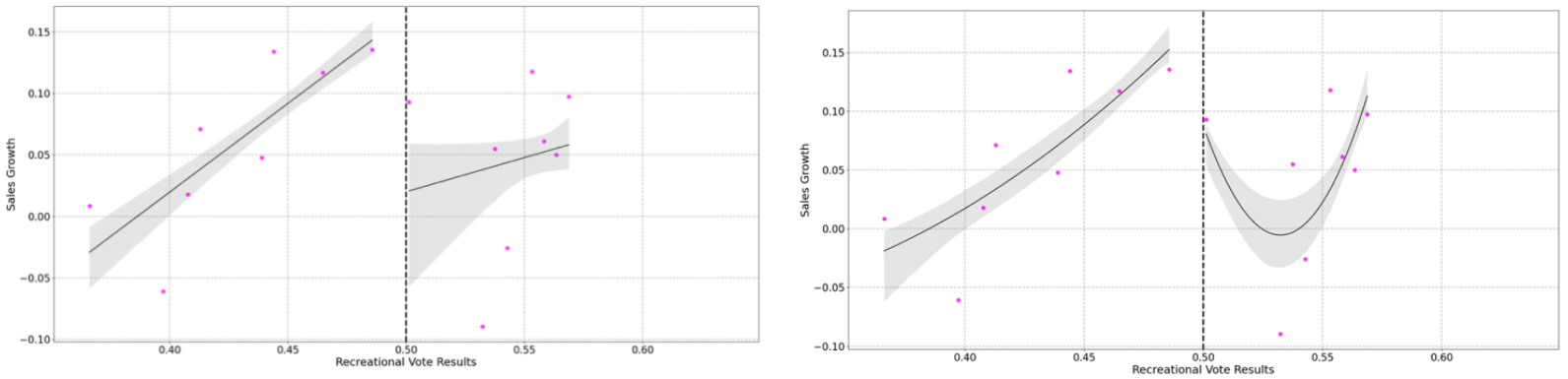


Figure 6: McCrary Density Test. This figure plots the density of votes results in the U.S. and Canada following the procedure in McCrary (2008). The x-axis is the percentage (x100) of votes favoring the legalization of marijuana for recreational use. The solid line represents the fitted density function of the forcing variables (number of Ballot votes) with a 95% confidence interval around the fitted line.

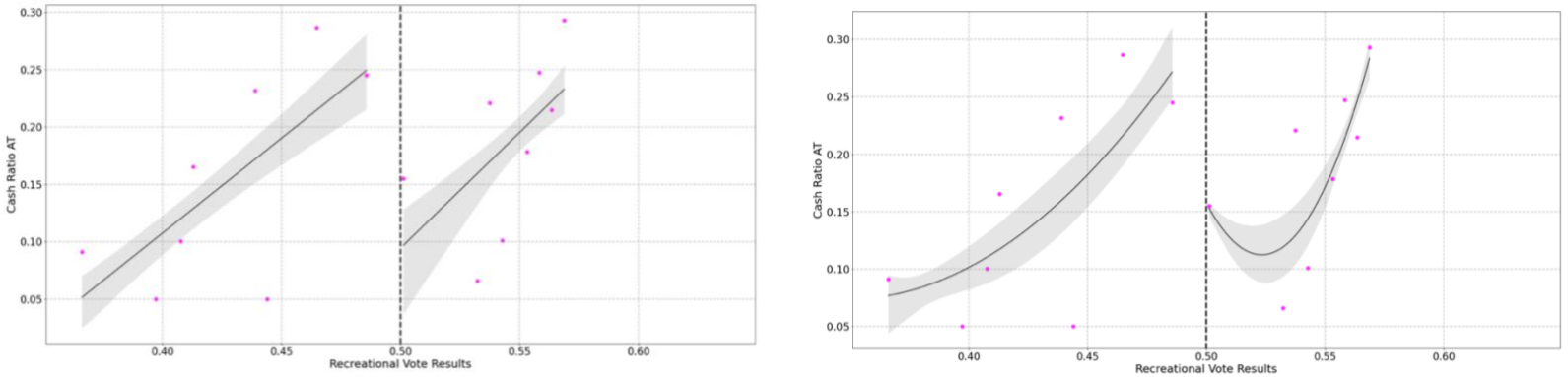
Figure 7A: Regression Discontinuity Design on Firm's Performance

This figure plots the fitted linear (left side) and quadratic (right side) estimates with 95% confidence intervals around the fitted value. The x-axis plots represent the percentage of pro-recreational marijuana votes, while y-axis show the mean value of the following variable of interests: *Sales Growth* (Panel A), *Cash Ratio AT* (Panel B), and *ROA* (Panel C).

Panel A: Sales Growth



Panel B: Cash Ratio AT



Panel D: ROA

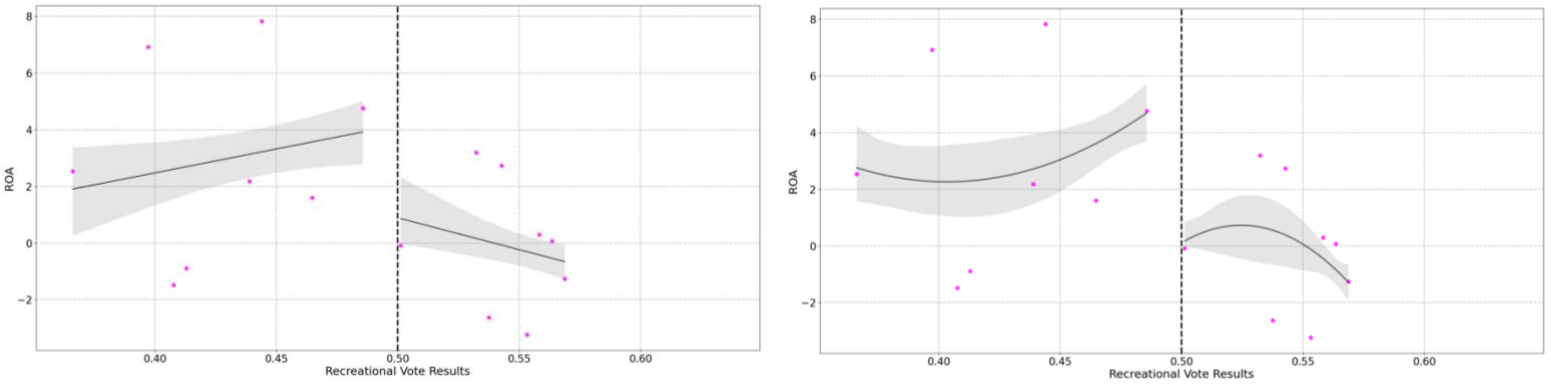
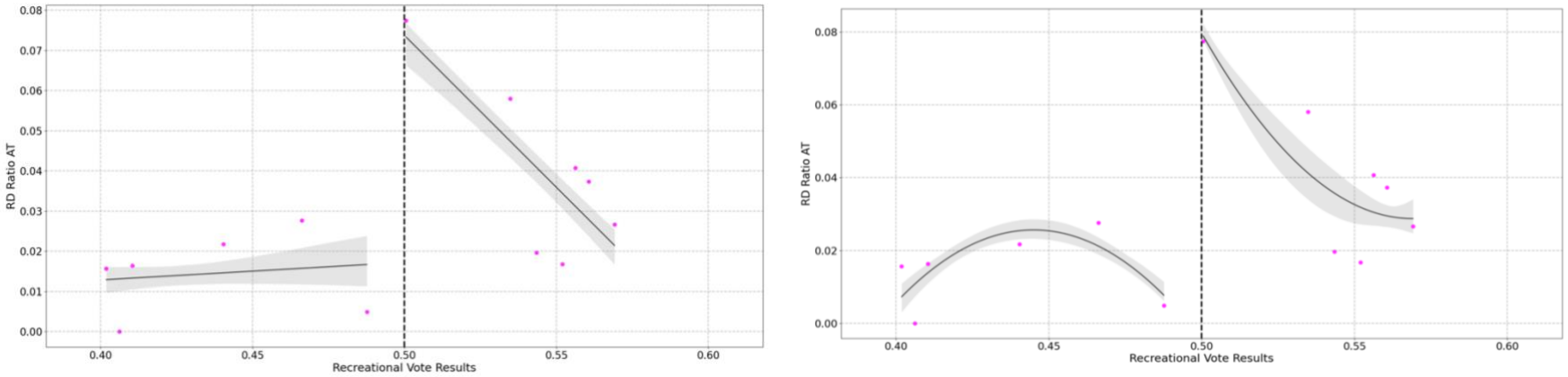


Figure 7B: Regression Discontinuity Design on Firm's R&D and Innovation

This figure plots the fitted linear (left side) and quadratic (right side) estimates with 95% confidence intervals around the fitted value. The x-axis plots represent the percentage of pro-recreational marijuana votes, while y-axis show the mean value of the following variable of interests: *RD Ratio AT* (Panel A), *NumPatents* (Panel B).

Panel A: RD Ratio AT



Panel B: log(NumPatents)

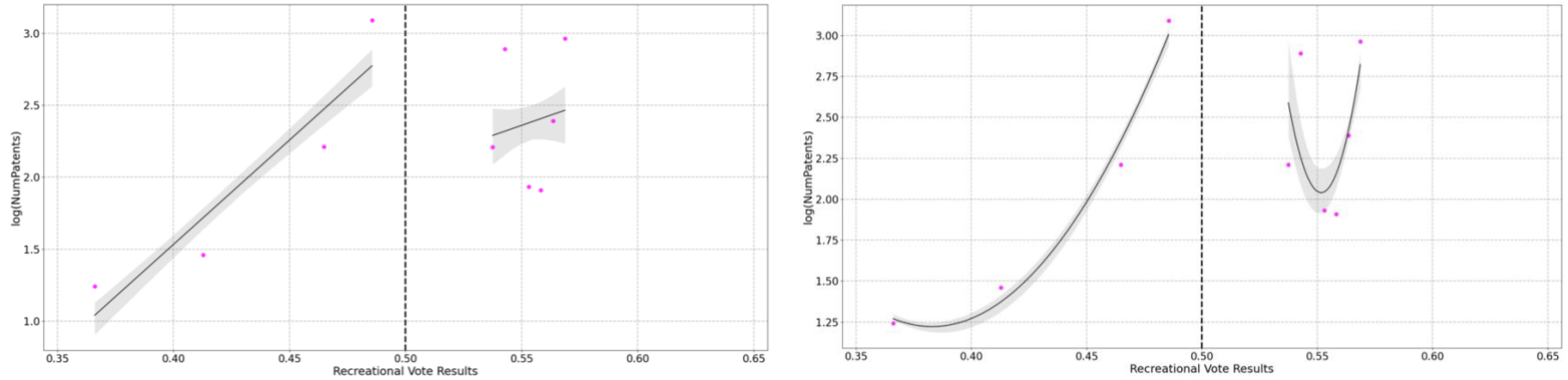
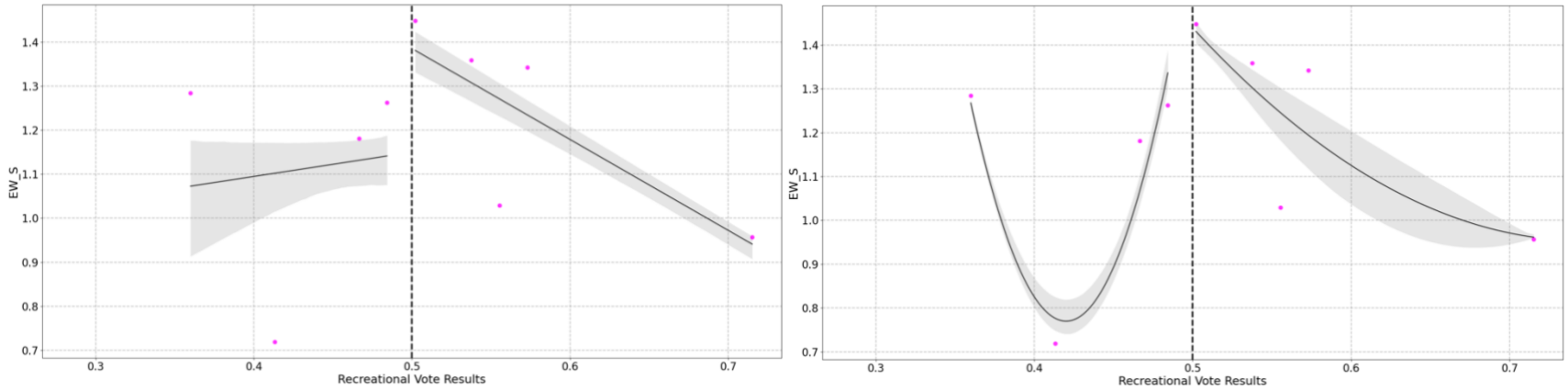


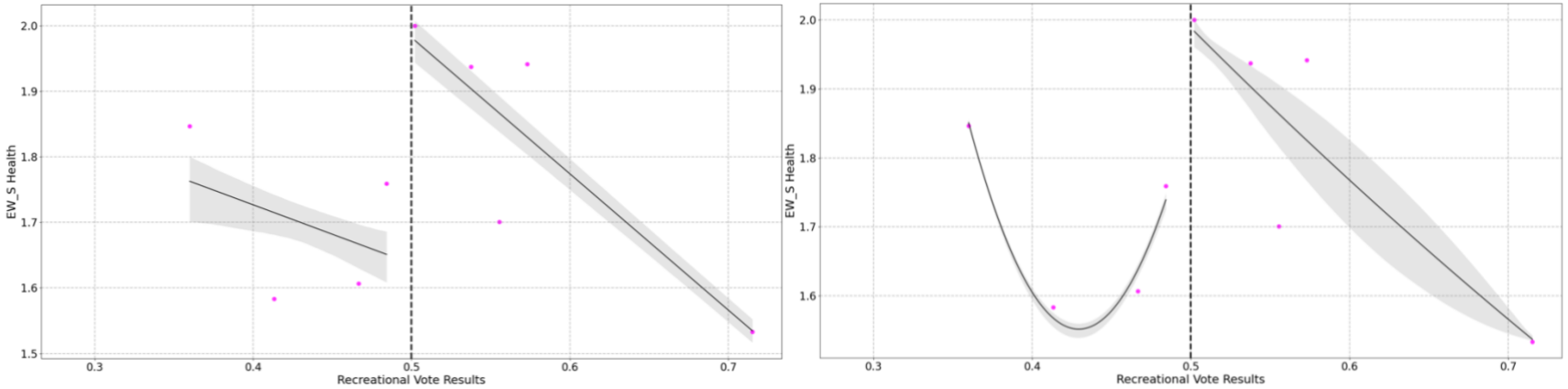
Figure 7C: Regression Discontinuity Design on Firm's Social Performance

This figure plots the fitted linear (left side) and quadratic (right side) estimates with 95% confidence intervals around the fitted value. The x-axis plots represent the percentage of pro-recreational marijuana votes, while y-axis show the mean value of the following variable of interests: *EW_S* (Panel A), *EW_S Health* (Panel B), and *EW_S Diversity* (Panel C).

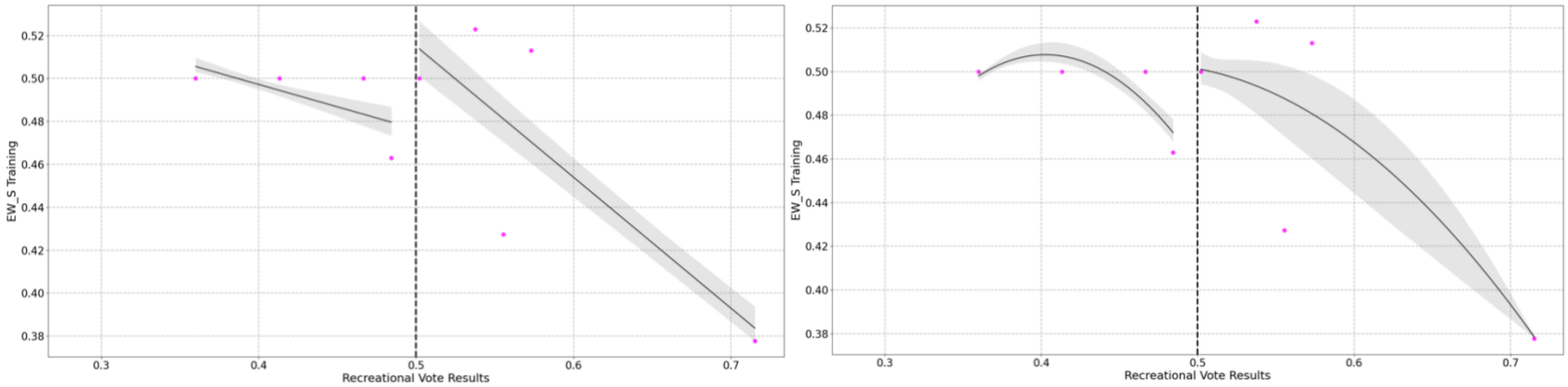
Panel A: EW_S



Panel B: EW_S Health



Panel C: EW_S Training



Panel D: EW_S Diversity

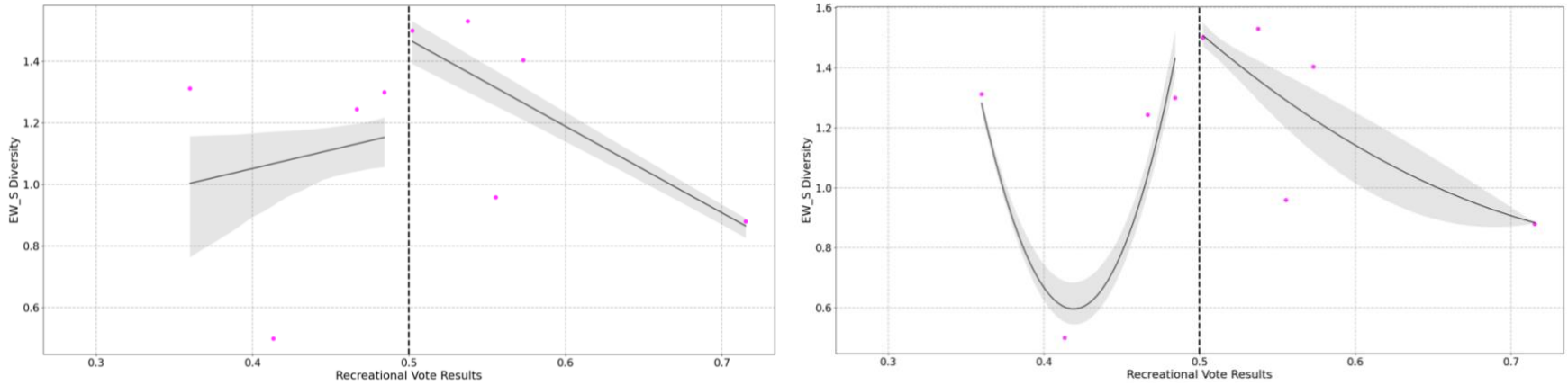
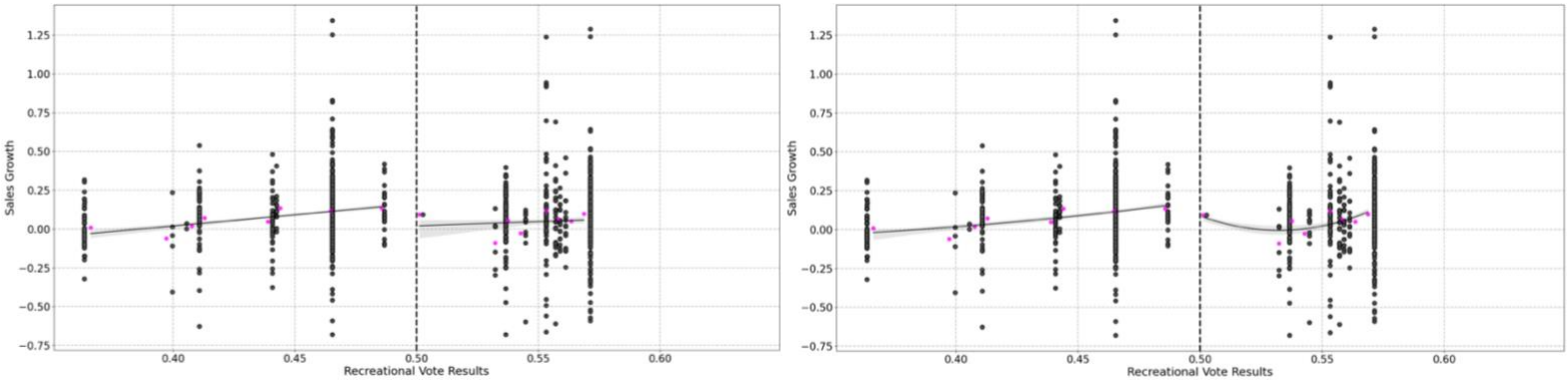


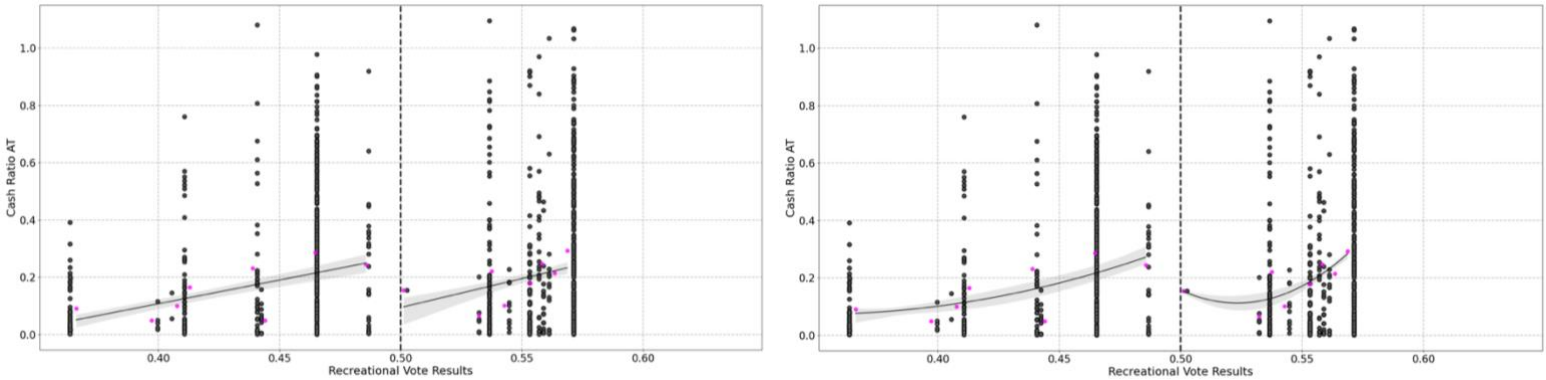
Figure 8A: Global Regression Discontinuity Design on Firm's Performance

This figure plots the fitted linear (left side) and quadratic (right side) estimates with 95% confidence intervals around the fitted value. The x-axis plots represent the percentage of pro-recreational marijuana votes, while y-axis show the value of the following variable of interests: *Sales Growth* (Panel A), *Cash Ratio AT* (Panel B), and *ROA* (Panel C). The red dots represent the mean value of the independent variables for all firms, and the black dots represent the value of the dependent variable of interest for each respective firms in our sample.

Panel A: Sales Growth



Panel B: Cash Ratio AT



Panel C: ROA

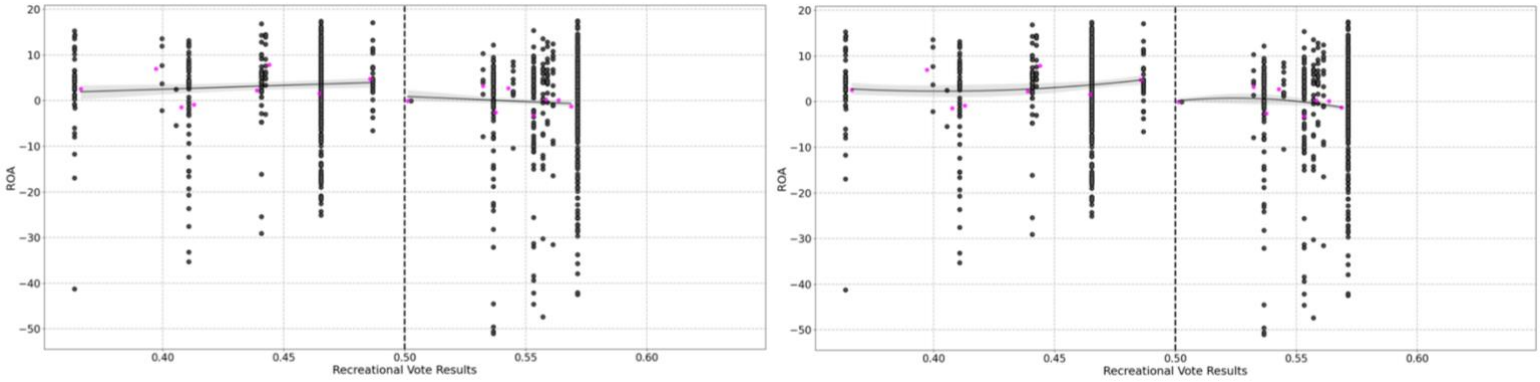
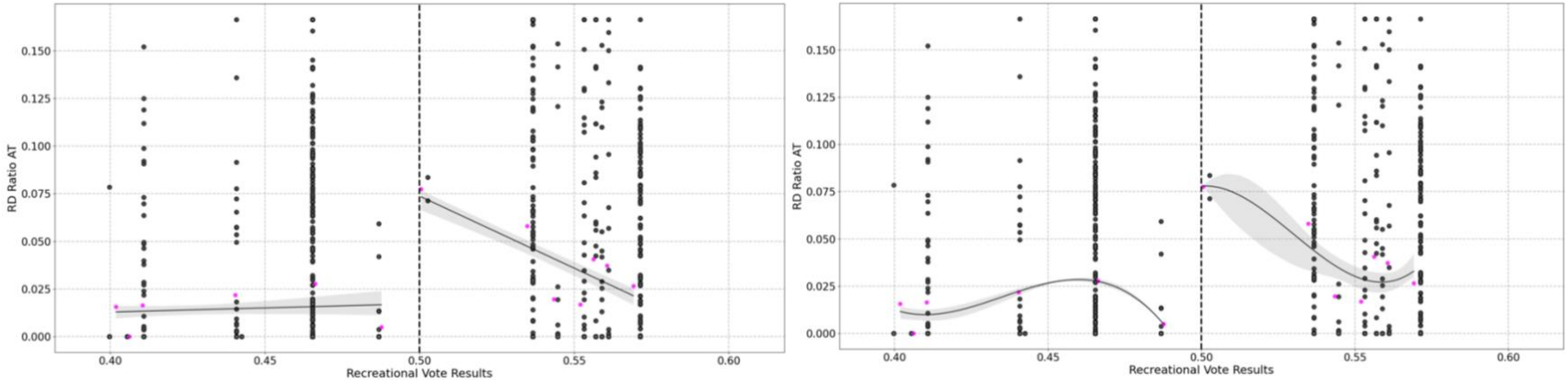


Figure 8B: Global Regression Discontinuity Design on Firm's R&D and Innovation

This figure plots the fitted linear (left side) and quadratic (right side) estimates with 95% confidence intervals around the fitted value. The x-axis plots represent the percentage of pro-recreational marijuana votes, while y-axis show the value of the following variable of interests: *RD Ratio AT* (Panel A), *NumPatents* (Panel B). The red dots represent the mean value of the independent variables for all firms, and the black dots represent the value of the dependent variable of interest for each respective firms in our sample.

Panel A: RD Ratio AT



Panel B: log(NumPatents)

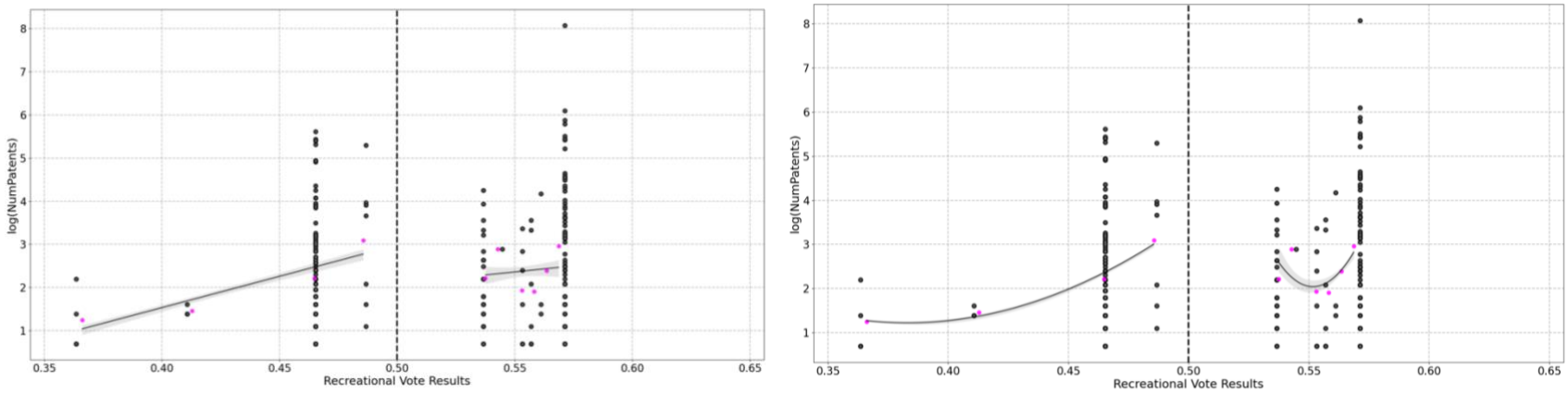
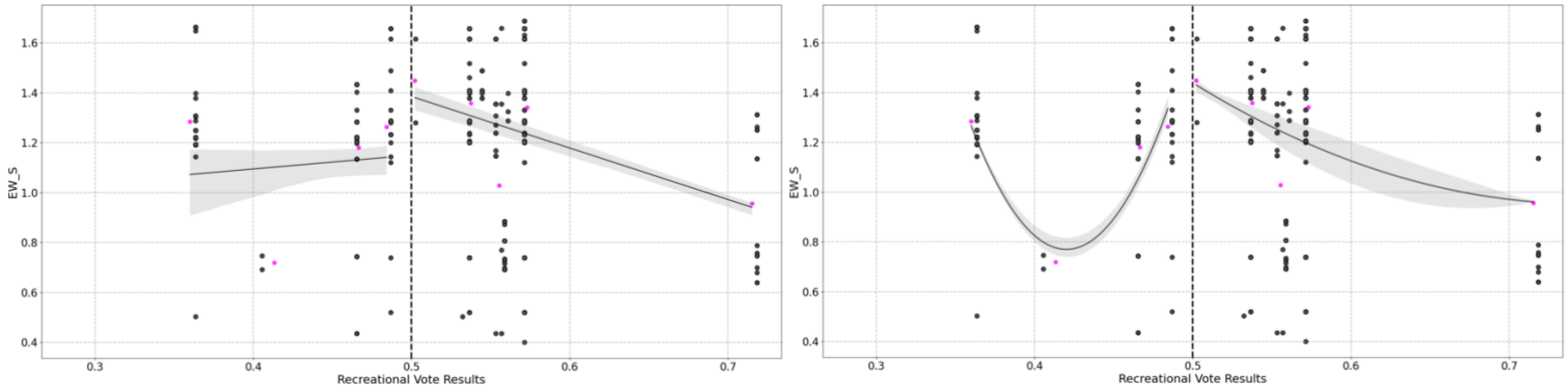


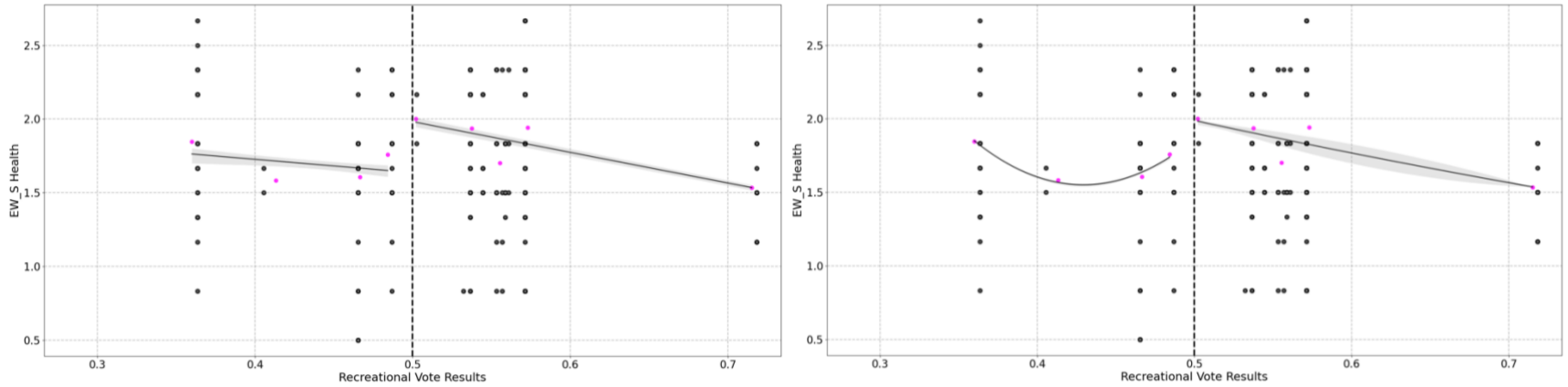
Figure 8C: Global Regression Discontinuity Design on Firm's Social Performance

This figure plots the fitted linear (left side) and quadratic (right side) estimates with 95% confidence intervals around the fitted value. The x-axis plots represent the percentage of pro-recreational marijuana votes, while y-axis show the value of the following variable of interests: *EW_S* (Panel A), *EW_S Health* (Panel B), *EW_S Training* (Panel C), *EW_S Diversity* (Panel D). The red dots represent the mean value of the independent variables for all firms, and the black dots represent the value of the dependent variable of interest for each respective firms in our sample.

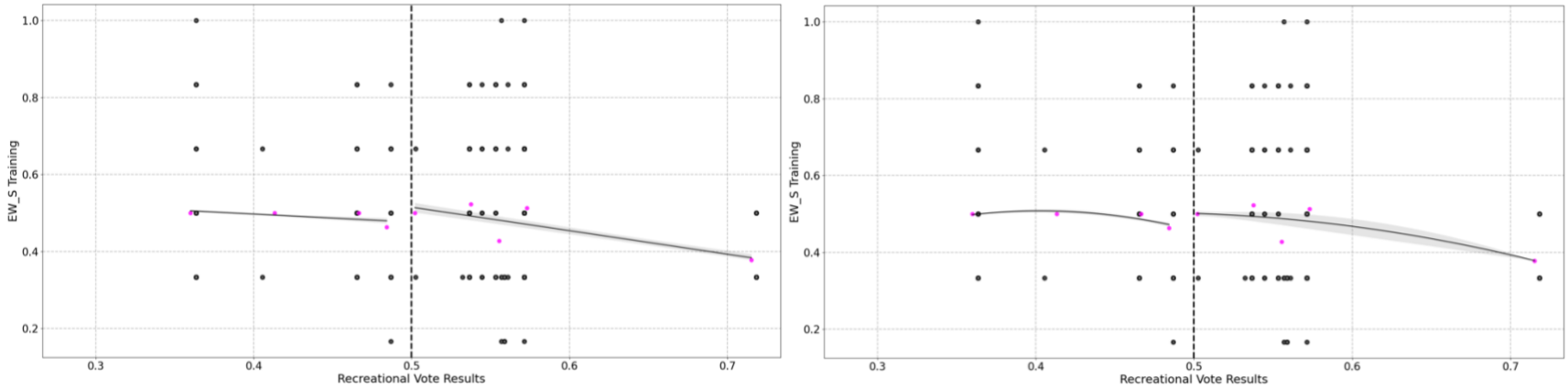
Panel A: EW_S



Panel B: EW_S Health



Panel C: EW_S Training



Panel C: EW_S Diversity

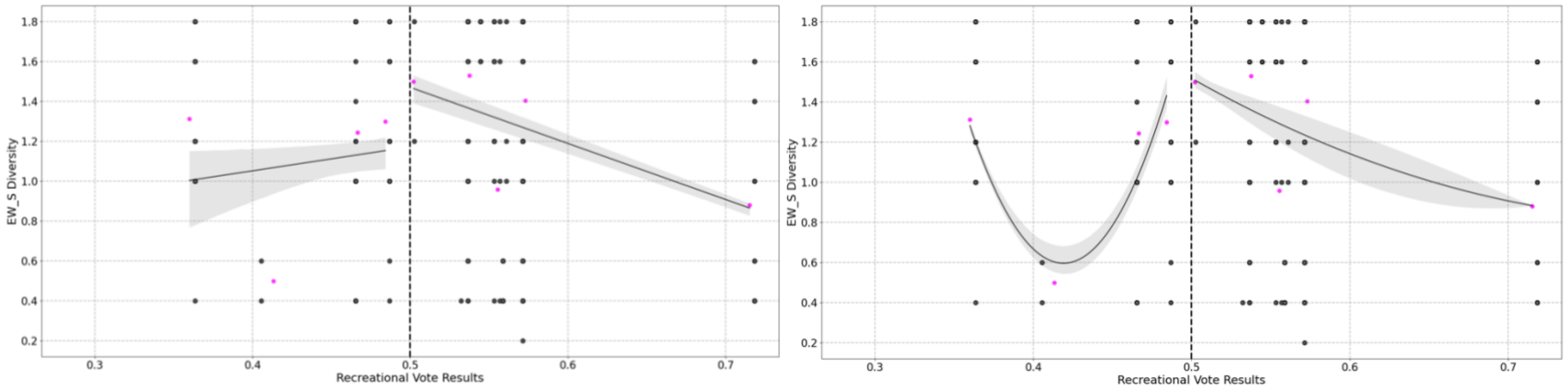
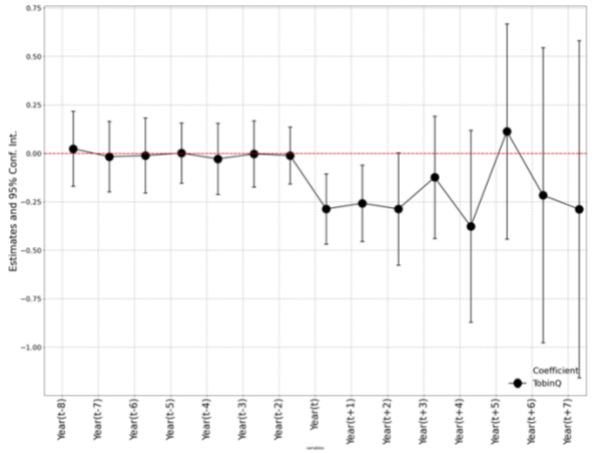


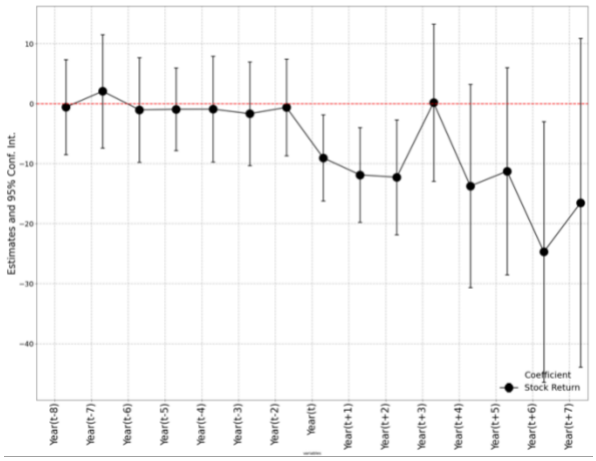
Figure 9. Coefficients plots of the Pretreatment Trends Analysis on Public Firm.

These figures present the coefficients plots (black dots) with 95% confidence interval (marked by the vertical lines) obtained from the DID-event study regression following Sun and Abraham (2020) methodology. The dependent variables of interests are *TobinQ* (Panel A), *Stock Return* (Panel B), *ROA* (Panel C), *Sales Growth* (Panel D), *Cash Ratio AT* (Panel E), *RD Ratio AT* (Panel F), *Capex Ratio AT* (Panel G), *Capex Ratio PPENT* (Panel H), *log(Patents)* (Panel I), *log(Citations)* (Panel J), *log(Employee)* (Panel K), *EW_S*, *EW_S Health*, *EW_S Training*, *EW_S Diversity* (Panel L). All coefficients whose confidence interval does not touch the zero line are significant.

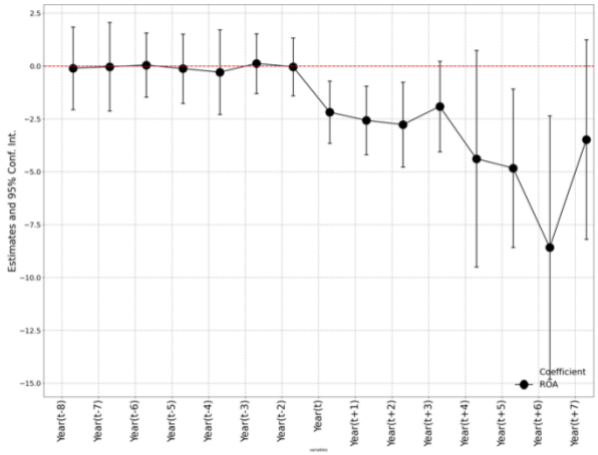
Panel A: Tobin Q



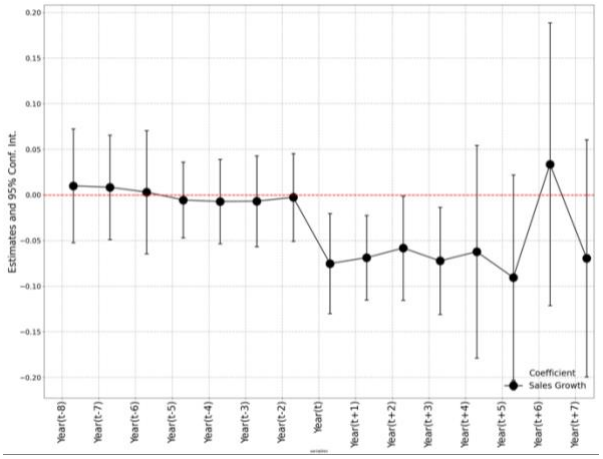
Panel B: Stock Return



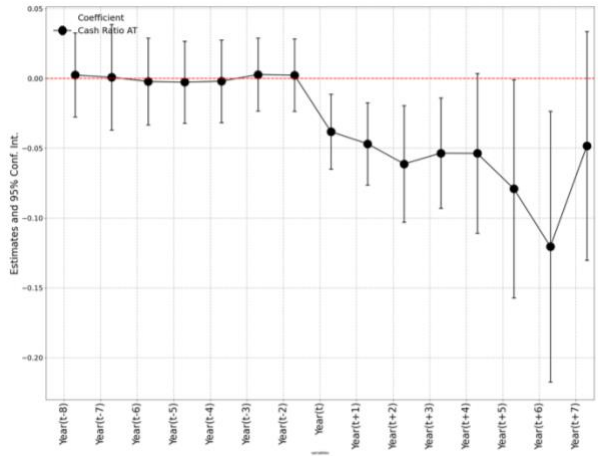
Panel C: ROA



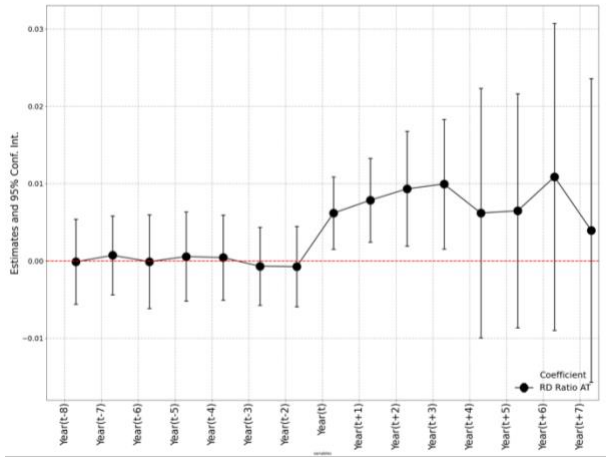
Panel D: Sales Growth



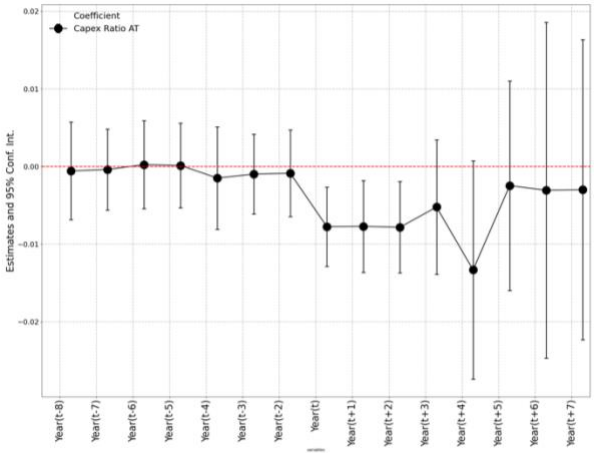
Panel E: Cash Ratio AT



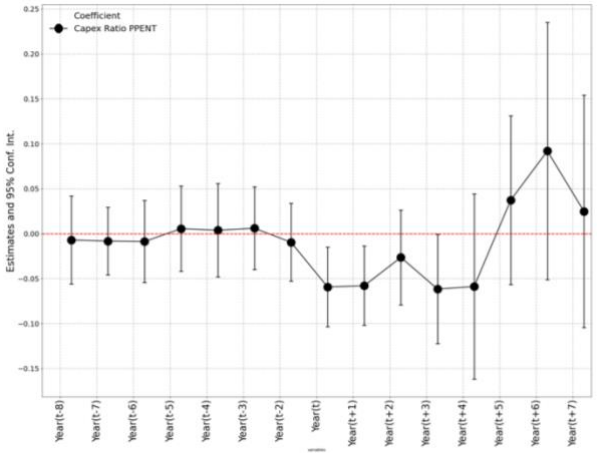
Panel F: RD Ratio AT



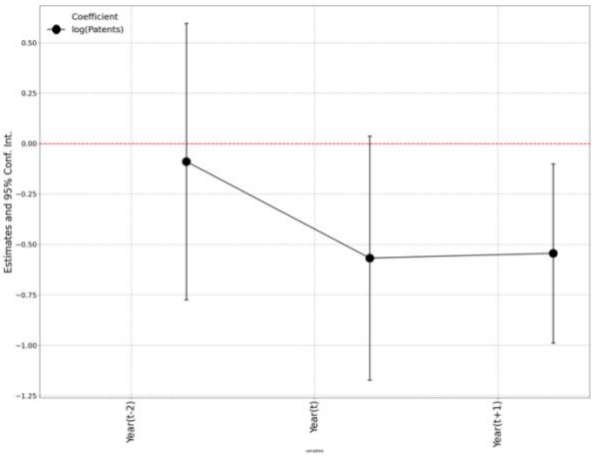
Panel G: Capex Ratio AT



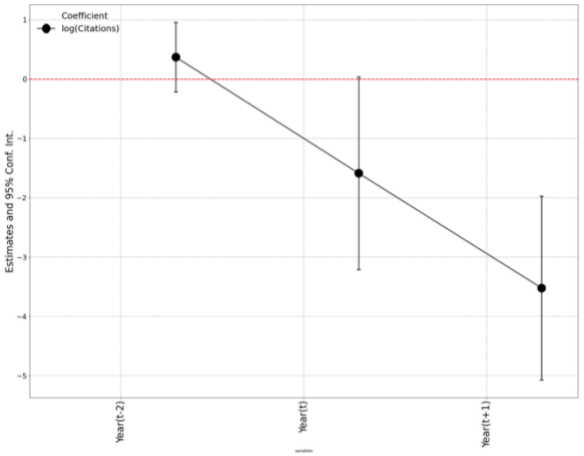
Panel H: Capex Ratio PPENT



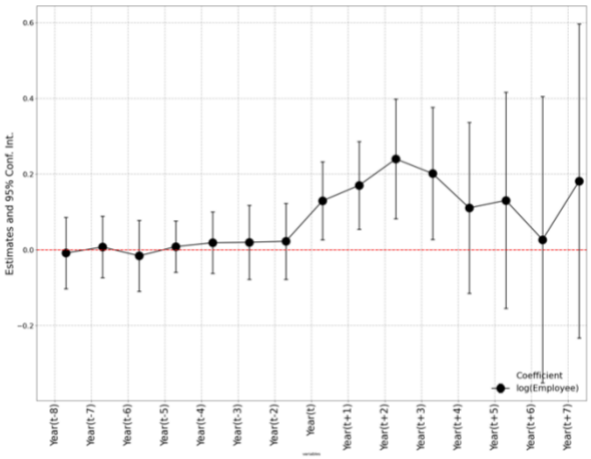
Panel I: log(Patents)



Panel J: log(Citations)



Panel K: log(Employee)



Panel L: EW_S, EW_S Health, EW_S Training, EW_S Diversity

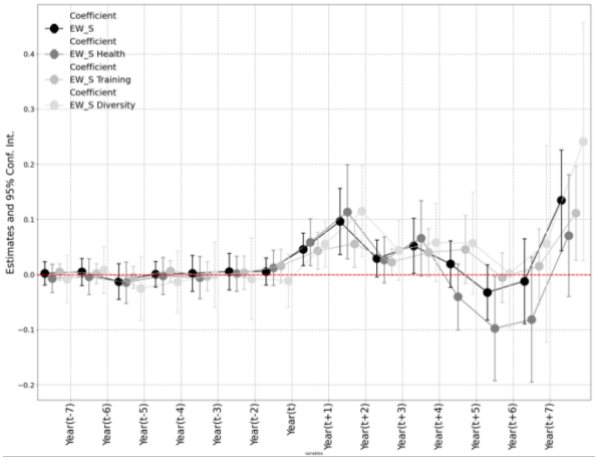
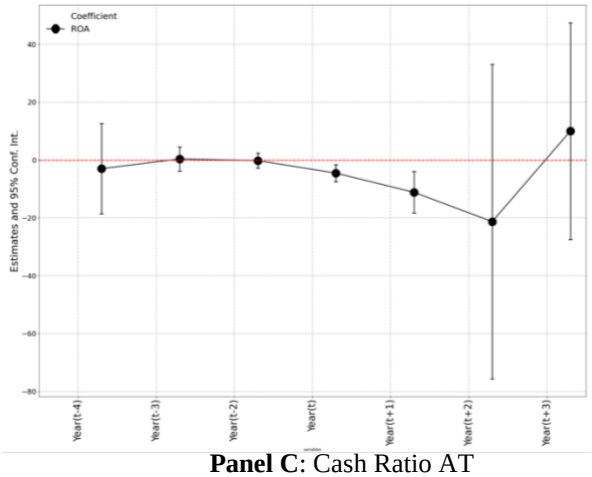


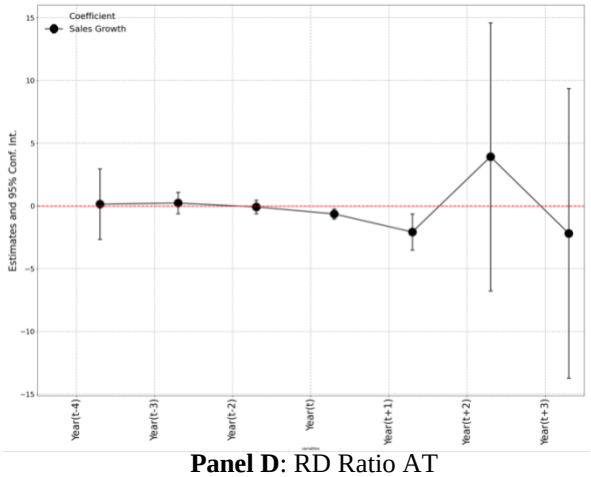
Figure 10. Coefficients plots of the Pretreatment Trends Analysis on Private Firm.

These figures present the coefficients plots (black dots) with 95% confidence interval (marked by the vertical lines) obtained from the DID-event study regression following Sun and Abraham (2020) methodology. The dependent variables of interests are), *ROA* (Panel A), *Sales Growth* (Panel B), *Cash Ratio AT* (Panel C), *RD Ratio AT* (Panel D), *Capex Ratio AT* (Panel E), *Capex Ratio PPENT* (Panel F). All coefficients whose confidence interval does not touch the zero line are significant.

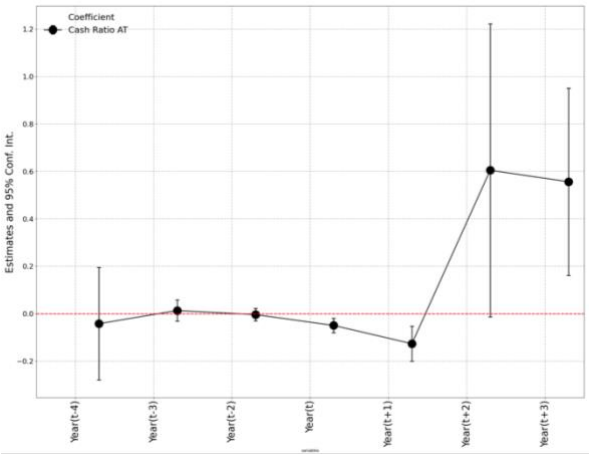
Panel A: ROA



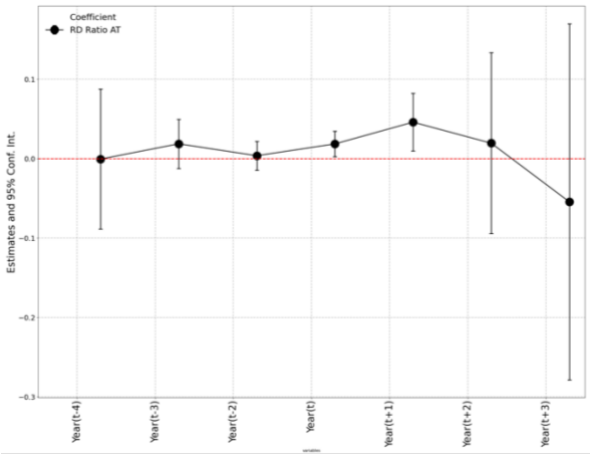
Panel B: Sales Growth



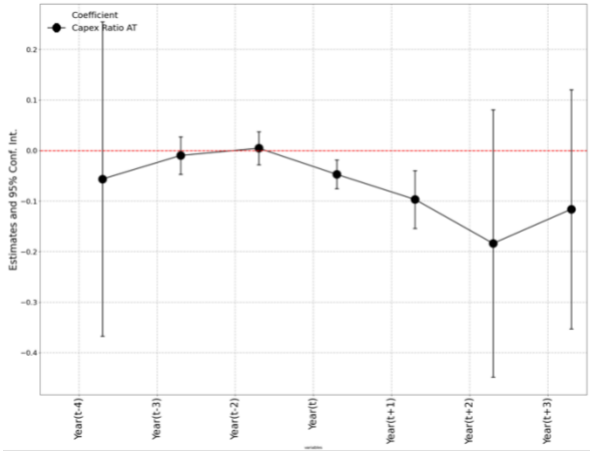
Panel C: Cash Ratio AT



Panel D: RD Ratio AT



Panel E: Capex Ratio AT



Panel F: Capex Ratio PPENT

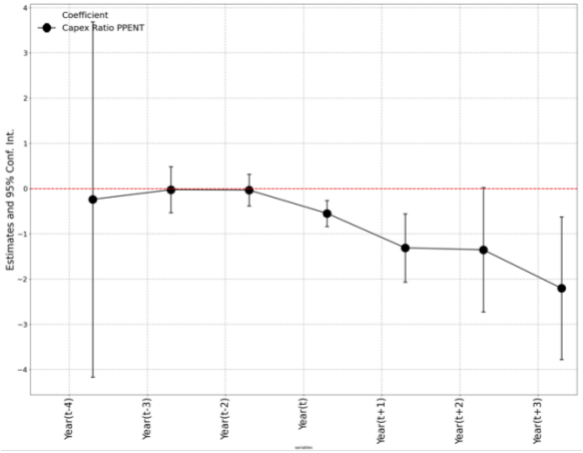


Table 1: Summary Statistics

Panel A - State & Province level

	(1) obs	(2) mean	(3) stdev	(4) 25%	(5) median	(6) 75%
Dependent						
log(Num Business Incorp)	157	8.79	2.72	6.25	9.31	10.97
log(Num Business Bankruptcy)	157	3.70	0.95	3.16	3.95	4.40
log(Num Car Accidents)	365	5.82	1.33	5.20	6.08	6.65
log(Num Drugs Arrest Marijuana)	169	6.97	2.66	5.65	7.45	9.16
log(Num Hard Drugs Arrest)	169	6.80	2.08	5.30	7.20	8.13
MarijuanaUse(12-17)	271	0.09	0.02	0.08	0.09	0.10
MarijuanaUse(18-25)	271	0.22	0.05	0.19	0.22	0.25
HighSchoolPerformance	136	70.42	15.21	58.43	73.88	82.26
log(House Price Index)	308	12.17	0.39	11.87	12.22	12.46
log(Tax Revenue)	443	4.05	0.46	3.75	4.02	4.37
Unemployment Rate (%)	359	6.75	2.48	4.90	6.24	8.10
log(Working Accident)	262	2.97	2.86	1.47	1.90	2.24
Independent						
1(LegRec)	833	0.16	0.37	0.00	0.00	0.00
Control						
log(GDP)	833	13.29	3.85	11.68	12.16	12.48
GDP Growth	833	0.04	0.03	0.02	0.04	0.05
log(Population)	833	6.54	0.54	6.12	6.65	6.91
log(Density)	833	2.75	3.69	1.15	1.48	1.96
log(Num Police Officers)	833	3.84	0.55	3.38	3.91	4.23

Panel B - City level

	(1) obs	(2) mean	(3) stdev	(4) 25%	(5) median	(6) 75%
Dependent						
log(House Price Index)	5052	12.33	0.72	11.79	12.23	12.74
Independent						
1(LegRec)	5052	0.32	0.47	0.00	0.00	1.00
Control						
log(GDP)	5052	15.39	5.91	12.14	12.43	13.12
GDP Growth	5052	0.04	0.04	0.02	0.04	0.06
log(Population)	5052	6.87	0.44	6.65	6.88	7.11
log(Density)	5052	4.06	0.49	3.78	4.04	4.37
log(Num Police Officers)	5052	59.63	79.60	15.81	39.63	85.02

Panel C - High-School level

	(1) obs	(2) mean	(3) stdev	(4) 25%	(5) median	(6) 75%
Dependent						
HighSchoolPerformance	13575	69.15	20.22	56.30	73.00	84.90
Independent						
1(LegRec)	13575	0.22	0.41	0.00	0.00	0.00
Control						
log(GDP)	13575	17.11	7.02	12.14	12.48	26.71
GDP Growth	13575	0.04	0.02	0.03	0.04	0.05
log(Population)	13575	6.80	0.42	6.48	6.92	7.11
log(Density)	13575	1.84	2.10	0.92	1.23	1.62
log(Num Police Officers)	13575	4.07	0.43	3.75	4.19	4.36

Panel D - Public Firm level

	(1) obs	(2) mean	(3) stdev	(4) 25%	(5) median	(6) 75%
Dependent						
TobinQ	7107	1.918	1.246	1.126	1.529	2.242
Stock Return (%)	7107	12.308	45.193	-17.349	7.749	34.779
ROA (%)	7107	1.630	11.430	-0.408	4.557	8.083
Sales Growth	7107	0.103	0.252	-0.016	0.075	0.186
Cash Ratio AT	7107	0.214	0.222	0.037	0.134	0.322
RD Ratio AT	15139	0.029	0.053	0.000	0.000	0.037
Capex Ratio AT	12769	0.044	0.053	0.010	0.026	0.057
Capex Ratio PPENT	12769	0.293	0.299	0.104	0.206	0.376
EW_S	1102	1.171	0.360	0.873	1.223	1.433
EW_S Health	1102	1.673	0.516	1.500	1.667	2.000
EW_S Training	1102	0.527	0.227	0.333	0.500	0.667
EW_S Diversity	1102	1.210	0.534	0.600	1.200	1.600
log(Employee)	11782	6.794	1.954	5.451	6.763	8.130
log(Patents)	355	2.406	1.500	1.386	2.079	2.996
log(Citations)	355	1.011	1.554	0.000	0.000	1.609
Independent						
1(LegRec)	22117	0.110	0.313	0.000	0.000	0.000
Control						
log(GDP)	22117	13.337	3.383	12.184	12.561	13.021
GDP Growth	22117	0.043	0.028	0.030	0.045	0.060
log(Population)	22117	7.075	0.395	6.758	7.109	7.538
log(Density)	22117	4.459	0.996	3.840	4.506	5.324
Size	22117	19.236	2.778	17.914	19.599	20.970
Ptbi	22117	0.001	0.150	-0.055	0.025	0.090
Ptbi Vol	22117	0.120	0.192	0.024	0.059	0.131
Levergae	22117	0.157	0.188	0.000	0.078	0.266
log(Firm Age)	22117	2.434	0.543	2.079	2.485	2.833

Panel E - Private Firm level

	(1) obs	(2) mean	(3) stdev	(4) 25%	(5) median	(6) 75%
Dependent						
Sales Growth	2948	0.27	2.26	-0.06	0.04	0.15
ROA (%)	2948	-3.46	18.92	-6.09	1.70	5.77
Cash Ratio AT	2948	0.17	0.26	0.02	0.07	0.21
RD Ratio AT	4174	0.05	0.18	0.00	0.00	0.02
Capex Ratio AT	3661	0.25	0.29	0.03	0.15	0.44
Capex Ratio PPENT	3661	0.37	1.71	0.53	0.80	0.91
Independent						
1(LegRec)	9093	0.10	0.30	0.00	0.00	0.00
Control						
log(GDP)	9093	11.54	4.63	11.99	12.42	12.69
Gdp Growth	9093	0.04	0.03	0.02	0.04	0.06
log(Population)	9093	7.00	0.36	6.76	7.02	7.30
log(Density)	9093	4.21	1.10	3.50	4.35	5.06
Size	9093	19.17	2.94	17.31	19.51	21.32
Leverage	9093	0.29	0.44	0.00	0.18	0.41
Ptbi	9093	-0.01	0.16	-0.12	0.01	0.08
Ptbi Vol	9093	5.00	36.30	0.03	0.07	0.19
log(Firm Age)	9093	1.98	0.16	1.79	1.95	2.08

Table 2: Timing of Recreational Marijuana Legalization: Weibull Hazard Model

This table estimates a Weibull hazard model in which the "failure event" is the year of recreational marijuana legalization in a given U.S states and Canadian Province, following ballot vote. The sample consists of 24 states and provinces during our sample period. The dependent variable is *Recreational Legalization Event*, which equals one the year the legalization of marijuana becomes effective and zero otherwise. The independent variables of interest are *Average Tobin's Q, Average Stock Return, Average ROA, Average Sales Growth, Average Cash Ratio AT, Average RD Ratio AT, Average Capex Ratio AT, Average Capex Ratio PPENT, Average EW_S,* Average EW_S *Health, Average EW_S Training, Average EW_S Diversity* which are the lagged average variables of all firms in a state- and province-year. All independent variables are at the state- and province-year level. We control for *log(GDP), GDPGrowth, log(Population) and log(Density), log(NumBusinessIncorp), log(NumBankruptcy), log(Tax Revenue) , Unemployment Rate , log(NumPoliceOfficers), log(NumCarAccidents), log(NumWorkingAccidents), log(Num Drugs Arrest Marijuana), log(Num Hard Drugs Arrest), MarijuanaUse(12-17), MarijuanaUse(18-25), HighSchoolPerformance, log(HousePriceIndex)* . Variables definitions are provided in Table1. The t-values clustered at the state (province) level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Dependent variables:	Recreational Legalization Event												
Average TobinQ	-0.005												
	(-0.21)												
Average Stock Return		2.00E-05											
		(0.06)											
Average ROA			-0.001										
			(-0.27)										
Average Sales Growth				-0.018									
				(-0.37)									
Average Cash Ratio AT					-0.006								
					(-0.06)								
Average RD Ratio AT						-0.338							
						(-0.46)							
Average Capex Ratio AT							0.625						
							(1.49)						
Average Capex Ratio PPENT								0.053					
								(0.44)					
Average log(Employee)									-0.005				
									(-0.24)				
Average EW_S										0.038			
										(0.43)			
Average EW_S Health											0.036		
											(0.37)		
Average EW_S Training												-0.017	
												(-0.09)	
Average EW_S Diversity													-0.009
													(-0.24)
log(GDP)	0.328	0.34	0.305	0.351	0.338	0.387	0.385	0.319	0.562	0.786	0.754	0.706	0.699
	(0.29)	(0.30)	(0.28)	(0.32)	(0.30)	(0.33)	(0.36)	(0.29)	(0.41)	(0.45)	(0.44)	(0.38)	(0.41)
GDP Growth	-0.037	-0.045	-0.044	-0.041	-0.043	-0.038	0.033	0.012	-0.027	-0.116	-0.157	-0.154	-0.171
	(-0.1)	(-0.12)	(-0.11)	(-0.11)	(-0.11)	(-0.1)	(0.08)	(0.03)	(-0.06)	(-0.11)	(-0.14)	(-0.14)	(-0.16)
log(Population)	1.613	1.297	1.381	1.541	1.346	0.642	-1.284	0.571	-1.053	0.396	0.027	0.224	0.113
	(0.13)	(0.11)	(0.12)	(0.13)	(0.12)	(0.05)	(-0.13)	(0.05)	(-0.12)	(0.03)	0.00	(0.02)	(0.01)
log(Density)	-0.635	-0.508	-0.546	-0.614	-0.528	-0.299	0.421	-0.212	0.281	-0.478	-0.38	-0.342	-0.305
	(-0.15)	(-0.12)	(-0.13)	(-0.15)	(-0.13)	(-0.07)	(0.12)	(-0.06)	(0.07)	(-0.11)	(-0.09)	(-0.08)	(-0.07)
log(Num Business Incorp)	0.029	0.031	0.029	0.03	0.031	0.033	0.027	0.027	-0.002	-0.045	-0.037	-0.038	-0.036
	(0.35)	(0.38)	(0.36)	(0.37)	(0.39)	(0.42)	(0.35)	(0.36)	(-0.02)	(-0.36)	(-0.31)	(-0.31)	(-0.29)
log(Num Business Bankruptcy)	0.051	0.048	0.051	0.05	0.048	0.046	0.035	0.05	0.087	0.065	0.056	0.059	0.057
	(0.20)	(0.19)	(0.21)	(0.20)	(0.19)	(0.19)	(0.14)	(0.20)	(0.37)	(0.25)	(0.23)	(0.23)	(0.22)

log(Num Police Officers)	0.27	0.306	0.321	0.281	0.302	0.472	0.852	0.424	0.901	-0.091	0.028	-0.111	-0.089
	(0.11)	(0.12)	(0.13)	(0.11)	(0.12)	(0.18)	(0.41)	(0.19)	(0.46)	(-0.09)	(0.02)	(-0.11)	(-0.1)
log(Num Car Accidents)	-0.103	-0.104	-0.098	-0.105	-0.105	-0.105	-0.116	-0.108	-0.082	-0.043	-0.043	-0.042	-0.042
	(-0.33)	(-0.34)	(-0.31)	(-0.34)	(-0.34)	(-0.34)	(-0.38)	(-0.35)	(-0.36)	(-0.08)	(-0.08)	(-0.08)	(-0.08)
log(Num Drugs Arrest Marijuana)	0.008	0.008	0.006	0.008	0.008	0.008	0.006	0.008	0.008	0.017	0.016	0.018	0.018
	(0.22)	(0.21)	(0.18)	(0.21)	(0.22)	(0.23)	(0.15)	(0.21)	(0.21)	(0.23)	(0.22)	(0.24)	(0.25)
log(Num Hard Drugs Arrest)	0.005	0.005	0.006	0.005	0.005	0.005	0.006	0.005	4.00E-04	0.007	0.007	0.006	0.006
	(0.18)	(0.17)	(0.22)	(0.18)	(0.17)	(0.18)	(0.23)	(0.19)	(0.01)	(0.14)	(0.15)	(0.13)	(0.12)
MarijuanaUse(12-17)	0.056	0.099	0.098	0.075	0.104	0.253	0.032	0.108	-0.614	0.182	0.314	0.288	0.349
	(0.05)	(0.08)	(0.08)	(0.06)	(0.08)	(0.21)	(0.03)	(0.09)	(-0.29)	(0.07)	(0.13)	(0.12)	(0.14)
MarijuanaUse(18-25)	-0.114	-0.119	-0.116	-0.103	-0.122	-0.162	-0.084	-0.111	-0.276	0.005	-0.019	-0.039	-0.042
	(-0.24)	(-0.26)	(-0.25)	(-0.22)	(-0.25)	(-0.34)	(-0.17)	(-0.23)	(-0.4)	0.00	(-0.02)	(-0.03)	(-0.04)
HighSchoolPerformance	-0.004	0.002	0.033	0.004	0.001	0.045	-0.089	-0.002	-0.099	-0.079	-0.075	-0.076	-0.076
	(-0.01)	0.00	(0.07)	(0.01)	0.00	(0.09)	(-0.19)	(-0.0)	(-0.45)	(-0.25)	(-0.23)	(-0.24)	(-0.24)
log(House Price Index)	-0.027	-0.027	-0.029	-0.026	-0.028	-0.034	-0.01	-0.022	0.048	0.004	0.003	0.003	0.002
	(-0.2)	(-0.21)	(-0.21)	(-0.2)	(-0.22)	(-0.24)	(-0.08)	(-0.16)	(0.30)	(0.01)	(0.01)	(0.01)	0.00
log(Tax Revenue)	-0.011	-0.013	-0.011	-0.012	-0.012	-0.01	0.002	-0.009	-0.051	-0.046	-0.05	-0.045	-0.045
	(-0.22)	(-0.26)	(-0.23)	(-0.24)	(-0.26)	(-0.21)	(0.05)	(-0.2)	(-0.34)	(-0.37)	(-0.39)	(-0.36)	(-0.36)
Unemployment Rate	-0.001	-0.001	-5.00E-04	-0.001	-0.001	-0.001	2.00E-04	-4.00E-04	0.003	-0.007	-0.006	-0.007	-0.007
	(-0.04)	(-0.05)	(-0.04)	(-0.07)	(-0.05)	(-0.06)	(0.02)	(-0.03)	(0.25)	(-0.38)	(-0.34)	(-0.39)	(-0.38)
log(Working Accident)	-0.004	-0.006	-0.006	-0.004	-0.005	-0.003	-0.01	-0.008	-0.01	0.016	0.018	0.018	0.018
	(-0.07)	(-0.08)	(-0.09)	(-0.06)	(-0.08)	(-0.05)	(-0.17)	(-0.12)	(-0.13)	(0.39)	(0.41)	(0.41)	(0.42)
Const	-12.947	-11.912	-13.903	-13.357	-12.068	-12.162	4.732	-8.171	1.406	-5.288	-3.519	-3.727	-3.099
	(-0.23)	(-0.21)	(-0.27)	(-0.24)	(-0.22)	(-0.23)	(0.10)	(-0.16)	(0.03)	(-0.1)	(-0.07)	(-0.07)	(-0.06)
Observations	230	230	230	230	230	230	230	230	214	143	143	143	143
R-squared	0.2737	0.2736	0.2739	0.2739	0.2736	0.2743	0.2827	0.2745	0.2335	0.2722	0.2723	0.2717	0.2718
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	State	State	State	State	State	State	State	State	State	State	State	State	State

Table 3: Impact of Recreational Marijuana Legalization on Cannabis Prevalence

This table presents the impact of the recreational marijuana legalization on Cannabis prevalence for two groups of people. The first group corresponds to people aged between 12 and 17 years old (*MarijuanaUse(12-17)*). The second group corresponds to people aged between 18 and 25 years old (*MarijuanaUse(18-25)).* The independent variable of interest is *1(LegRec)*, which equals one from and after the effectiveness year of recreational marijuana legalization, otherwise zero. We control for the state- and province-year variables *log(GDP), GDPGrowth, log(Population), log(Density), log(NumPoliceOfficers)* and for the one year-lagged dependent variables together with state (province) and year fixed effects. The t-values clustered at the state (province) level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Dependent variables:	MarijuanaUse(18-25)	MarijuanaUse(12-17)
1(LegRec)	0.0153**	-0.0025*
	(2.74)	(-1.93)
log(GDP)	-0.013	-0.021
	(-0.35)	(-1.13)
GDP Growth	-0.021	-0.013
	(-0.35)	(-0.52)
log(Population)	0.25**	0.062*
	(2.74)	(1.96)
log(Density)	-0.001*	3.00E-04
	(-1.96)	(1.57)
log(Num Police Officers)	-0.087***	-0.024***
	(-4.95)	(-3.09)
MarijuanaUse(12-17)	0.092	0.323***
	(0.43)	(3.61)
MarijuanaUse(18-25)	0.483***	0.07**
	(7.11)	(2.34)
Const	-0.991	-0.046
	(-1.66)	(-0.16)
Observations	271	271
R-squared	0.9261	0.8475
State FE	Yes	Yes
Year FE	Yes	Yes
Cluster	State	State

Table 4: Impact of Recreational Marijuana Legalization on Drug Trafficking

This table presents the impact of the recreational marijuana legalization on soft and hard drugs trafficking by focusing on the number of drugs arrests. The dependent variables of interest are *log(NumDrugsArrestMarijuana)* and *log(NumHardDrugdsArrest)*. The independent variable of interest is *1(LegRec)*, which equals one from and after the effectiveness year of recreational marijuana legalization, otherwise zero. We control for the state- and province-year variables *log(GDP)*, *GDPGrowth*, *log(Population)*, *log(Density)*, *log(NumPoliceOfficers)* and for the one year-lagged dependent variables together with state (province) and year fixed effects. The t-values clustered at the state (province) level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Dependent variables:	log(Num Drugs Arrest Marijuana)	log(Num Hard Drugs Arrest)
1(LegRec)	-1.973***	-0.382**
	(-5.32)	(-2.64)
log(GDP)	10.365	2.895
	(1.45)	(1.06)
GDP Growth	4.922	-4.515***
	(1.25)	(-3.79)
log(Population)	0.117	-2.389
	(0.03)	(-1.35)
log(Density)	-0.048	-0.017
	(-1.48)	(-0.81)
log(Num Police Officers)	-5.785**	-2.314
	(-2.61)	(-0.86)
Dep Var	0.03e-3**	-2.00E-07
	(2.47)	(-0.04)
Const	-130.992	-13.139
	(-1.36)	(-0.36)
Observations	169	169
R-squared	0.8862	0.9771
State FE	Yes	Yes
Year FE	Yes	Yes
Cluster	State	State

Table 5: Impact of Recreational Marijuana Legalization on Individuals' Security

This table presents the impact of the recreational marijuana legalization on people's security. The dependent variables of interest are *log(NumCarAccidents)* and *log(NumWorkingAccidents)*. The independent variable of interest is *1(LegRec)*, which equals one from and after the effectiveness year of recreational marijuana legalization, otherwise zero. We control for the state- and province-year variables *log(GDP), GDPGrowth, log(Population), log(Density), log(NumPoliceOfficers)* and for the one year-lagged dependent variables together with state (province) and year fixed effects. The t-values clustered at the state (province) level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Dependent variables:	log(Num Car Accidents)	log(Num Working Accident)
1(LegRec)	0.066**	0.018**
	(2.40)	(2.73)
log(GDP)	0.117	0.39***
	(0.28)	(5.17)
GDP Growth	0.815***	0.075
	(3.62)	(0.99)
log(Population)	0.642*	0.113
	(1.90)	(0.49)
log(Density)	0.001	-0.001
	(0.69)	(-0.95)
log(Num Police Officers)	0.108	0.049
	(0.97)	(1.13)
Dep Var	0.155**	0.333***
	(2.64)	(3.90)
Const	-1.363	-4.416**
	(-0.33)	(-2.3)
Observations	365	262
R-squared	0.9953	0.9999
State FE	Yes	Yes
Year FE	Yes	Yes
Cluster	State	State

Table 6: Impact of Recreational Marijuana Legalization on High-School Performance

This table presents the impact of the recreational marijuana legalization on High-School performance based on score related to languages, literacy and mathematics released by the respective state and province department of Education. The dependent variable of interest is *HighSchoolPerfromance*. The independent variable of interest is *1(LegRec)*, which equals one from and after the effectiveness year of recreational marijuana legalization, otherwise zero. We control for the state- and province-year variables *log(GDP), GDPGrowth, log(Population), log(Density), log(NumPoliceOfficers)* and for the one year-lagged dependent variables. Column 1 show results at state- and province-level, therefore we control for state (province) and year fixed effects. Column 2 show results at high-school level, therefore we control for school and year fixed effects. The t-value are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Dependent variables:	HighSchoolPerformance	HighSchoolPerformance
1(LegRec)	1.506***	2.379**
	(3.57)	(2.60)
log(GDP)	4.69	19.435*
	(1.28)	(2.02)
GDP Growth	14.788**	4.611
	(2.48)	(0.59)
log(Population)	23.1***	215.302***
	(4.19)	(3.75)
log(Density)	-0.034***	-0.078
	(-3.77)	(-1.12)
log(Num Police Officers)	7.747	-258.428***
	(1.52)	(-4.45)
High School Perf	0.043*	0.75***
	(1.84)	(7.32)
Const	-201.847***	-684.392***
	(-4.12)	(-3.26)
Observations	13575	136
R-squared	0.844	0.9695
StateFE	No	Yes
School FE	Yes	No
Year FE	Yes	Yes
Cluster	School	State

Table 7: Impact of Recreational Marijuana Legalization on Local Economics

This table presents the impact of the recreational marijuana legalization on local state and local province economics. The independent variable of interest is *1(LegRec)*, which equals one from and after the effectiveness year of recreational marijuana legalization, otherwise zero. We control for the state- and province-year variables *log(GDP)*, *GDPGrowth*, *log(Population)*, *log(Density)*, *log(NumPoliceOfficers)* and for the one year-lagged dependent variables. Panel A show results on *log(NumBusinessIncorp)*, *log(NumBusinessBankruptcy)*, *log(TaxRevenue)* and *UnemployementRate*. We control for state and year fixed effects and cluster at state level. Panel B show results on *log(HousePriceIndex)* at both city-level (column 1) and state- province-level (column 2). Therefore, at city-level we control for city and year fixed effects and cluster at city level. At state (province) level we control for and state (province) and year fixed effects and cluster at state level. The t-values are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A.

	(1)	(2)	(3)	(4)
Dependent variables:	log(Num Business Incorp)	Unemployment Rate	log(Tax Revenue)	log(Num Business Bankruptcy)
1(LegRec)	0.064**	-0.43**	0.033**	0.044**
	(2.46)	(-2.39)	(2.53)	(2.69)
log(GDP)	-0.648	1.14	0.464**	-0.436*
	(-1.23)	(0.20)	(2.28)	(-1.95)
GDP Growth	0.72**	-7.536***	0.324**	0.316*
	(2.23)	(-4.77)	(2.01)	(2.05)
log(Population)	0.644	8.493	2.819***	0.089
	(0.17)	(0.88)	(2.83)	(0.05)
log(Density)	-0.004	0.037**	0.02e-2*	-0.005**
	(-0.62)	(2.33)	(1.89)	(-2.19)
log(Num Police Officers)	1.258	-5.427	-1.95**	-0.442
	(0.32)	(-0.5)	(-2.19)	(-0.31)
Dep Var	0.169	0.794***	0.012	0.037
	(1.10)	(4.69)	(0.99)	(1.46)
Const	10.211	-52.937	-13.39***	12.624
	(0.61)	(-0.61)	(-3.22)	(1.70)
Observations	155	359	443	155
R-squared	0.9988	0.9331	0.9855	0.9975
City FE	No	No	No	No
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Cluster	State	State	State	State

Panel B.

Dependent variables:	(1) log(HousePriceIndex)	(2) log(HousePriceIndex)
1(LegRec)	0.0169**	0.0167**
	(2.45)	(2.52)
log(GDP)	1.174***	0.271**
	(6.48)	(2.16)
GDP Growth	0.497***	0.438
	(4.37)	(1.57)
log(Population)	-0.306	0.074
	(-1.11)	(1.16)
log(Density)	0.002	-3.00E-04
	(1.53)	(-0.71)
log(Num Police Officers)	0.494***	-0.009
	(5.63)	(-0.19)
Dep Var	0.407***	0.881***
	(11.33)	(45.07)
Const	-10.763***	-2.221*
	(-4.91)	(-1.78)
Observations	5052	308
R-squared	0.9734	0.9903
City FE	Yes	No
State FE	No	Yes
Year FE	Yes	Yes
Cluster	City	State

Table 8: Impact of Recreational Marijuana Legalization on Public Firm Fundamentals

This table presents the impact of recreational marijuana on public firms' fundamentals. The independent variable of interest is *1(LegRec)*. The dependent variables are *TobinQ, Stock Return*, Sales Growth, *ROA, Cash Ratio AT, RD Ratio AT, Capex Ratio AT, Capex Ratio PPENT*, and *log(NumEmployee)*. We control for the country year variables *log(GDP), GDPGrowth, log(Population), log(Density)* and for the firm-lagged year variables *Size, PTBI, PYTBI Vol, Leverage*, and *log(Firm Age)*, together with firm fixed effects and industry-year fixed effects. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variables:	RD Ratio AT	log(Num Employee)	Sales Growth	ROA	Cash Ratio AT	Capex Ratio AT	Capex Ratio PPENT	TobinQ	Stock Return
1(LegRec)	6.88e-3***	0.13***	-0.0407***	-1.97***	-0.037***	-0.052***	-0.0314**	-0.2034***	-6.38**
	(2.80)	(3.06)	(-2.59)	(-2.93)	(-3.15)	(-2.62)	(-2.01)	(-2.6)	(-2.51)
log(GDP)	-1.00E-03	0.01	-0.01	0.16	-0.01	-1.00E-03	-2.00E-03	0.03*	0.76
	(-1.27)	(0.35)	(-0.98)	(0.89)	(-1.25)	(-1.05)	(-0.58)	(1.69)	(1.23)
GDP Growth	-3.00E-03	0.13	0.22	-11.4*	-0.03	-0.01	0.06	0.79	42.44
	(-0.21)	(0.42)	(1.01)	(-1.8)	(-0.29)	(-0.61)	(0.33)	(1.16)	(1.23)
log(Population)	0.12	2.01	0.46	-19.62	-0.28	0.05	0.64	2.1	70.56
	(1.46)	(1.08)	(0.67)	(-1.02)	(-0.62)	(0.59)	(1.01)	(0.74)	(0.75)
log(Density)	-0.07	-1.52	-0.22	11.44	0.24	-0.02	-0.37	-1.78	-66.71
	(-1.24)	(-1.2)	(-0.47)	(0.90)	(0.82)	(-0.37)	(-0.85)	(-0.89)	(-1.13)
Size	0.03e-1**	0.55***	-0.04***	-0.42	-0.04***	-0.01***	-0.03***	-0.31***	-8.17***
	(2.11)	(22.62)	(-3.85)	(-1.12)	(-5.57)	(-5.08)	(-4.38)	(-5.42)	(-5.4)
PTBI	0.01	0.09	-0.19***	28.91***	0.11***	0.04***	0.37***	0.5**	-30.34***
	(1.27)	(1.04)	(-3.79)	(15.59)	(3.76)	(7.06)	(8.40)	(2.32)	(-4.14)
PTBI Vol	-5.00E-03	-0.1	0.02	-3.7*	0.05	0.01	0.07**	0.07	-13.94*
	(-0.95)	(-1.16)	(0.43)	(-1.69)	(1.28)	(1.16)	(2.06)	(0.27)	(-1.94)
Leverage	-0.01*	0.01	0.04	2.24*	-0.11***	-2.00E-03	-0.05	-0.17	6.29
	(-1.73)	(0.08)	(1.20)	(1.91)	(-5.36)	(-0.36)	(-1.44)	(-1.07)	(1.19)
log(Firm Age)	-0.01***	-0.45***	0.11***	1.24	0.05***	0.04e-1**	0.04*	0.29***	9.21**
	(-3.29)	(-11.11)	(4.17)	(1.55)	(3.00)	(2.00)	(1.93)	(2.93)	(2.46)
const	-0.56	-10.89	-1.54	92.48	1.9	-0.14	-1.96	0.09	-63.26
	(-1.54)	(-1.41)	(-0.55)	-1.12	-0.99	(-0.37)	(-0.75)	-0.01	(-0.15)
Observations	15139	11782	7107	7107	7107	12769	12769	7107	7107
R-squared	0.6823	0.9611	0.4302	0.7179	0.8004	0.7063	0.4749	0.7437	0.5002
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Table 9: Impact of Recreational Marijuana Legalization on Public Firm Innovation

This table presents the impact of recreational marijuana on public firms' innovation. The independent variable of interest is *1(LegRec)*. The dependent variables are *log(NumPatents)*, *log(NumCitations)*. We control for the country year variables *log(GDP)*, *GDP Growth*, *log(Population)*, *log(Density)* and for the firm-lagged year variables *Size*, *PTBI*, *PYTBI Vol*, *Leverage*, and *log(Firm Age)*, together with firm fixed effects and industry-year fixed effects. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Dependent variables	log(NumPatents)	log(NumCitations)
1(LegRec)	-0.43***	-1.51
	(-2.94)	(-1.43)
log(GDP)	3.56	1.26
	(0.59)	(0.07)
GDP Growth	-2.92	12.8
	(-0.68)	(1.20)
log(Population)	-19.78	-117.79
	(-0.42)	(-1.08)
log(Density)	3.3	18.24
	(0.14)	(0.49)
Size	0.06	-0.36*
	(0.71)	(-1.71)
PTBI	0.23	0.84
	(0.53)	(1.18)
PTBI Vol	-0.04	0.19
	(-0.25)	(0.64)
Leverage	0.33	1.9
	(0.11)	(0.74)
log(Firm Age)	-0.08	2.13**
	(-0.15)	(2.00)
const	85.47	753.61
	(0.34)	(1.29)
Observations	355	355
R-squared	0.9562	0.7779
Firm FE	Yes	Yes
Industry*Year FE	Yes	Yes
Cluster	Firm	Firm

Table 10: Impact of Recreational Marijuana Legalization on Public Firm Social Score

This table presents the impact of recreational marijuana on public firms' social policy performance. The independent variable of interest is *1(LegRec)*. The dependent variables are *EW_S*, *EW_S Health*, *EW_S Training* and *EW_S Diversity*. We control for the country year variables *log(GDP)*, *GDP Growth*, *log(Population)*, *log(Density)* and for the firm-lagged year variables *Size*, *PTBI*, *PYTBI Vol*, *Leverage*, and *log(Firm Age)*, together with firm fixed effects and industry-year fixed effects. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Dependent variables:	EW_S	EW_S Diversity	EW_S Training	EW_S Health
1(LegRec)	0.03**	0.04**	0.02**	0.02**
	(2.37)	(2.32)	(2.13)	(2.13)
log(GDP)	-0.57**	-0.79*	-0.59**	-0.59**
	(-2.0)	(-1.83)	(-2.12)	(-2.12)
GDP Growth	-0.08	0.06	-0.04	-0.04
	(-0.45)	(0.19)	(-0.35)	(-0.35)
log(Population)	-4.64	-6.59	-3.99	-3.99
	(-1.44)	(-1.36)	(-1.54)	(-1.54)
log(Density)	2.43	3.31	2.02*	2.02*
	(1.62)	(1.45)	(1.67)	(1.67)
Size	0.01	0.01	0.01	0.01
	(1.00)	(0.59)	(1.24)	(1.24)
PTBI	0.11	0.17	0.04	0.04
	(0.92)	(0.68)	(0.74)	(0.74)
PTBI Vol	-0.01	0.11	-0.16*	-0.16*
	(-0.1)	(0.57)	(-1.68)	(-1.68)
Leverage	-0.09*	-0.11	-0.04	-0.04
	(-1.87)	(-1.38)	(-1.53)	(-1.53)
log(Firm Age)	-0.01	-0.01	-0.03	-0.03
	(-0.45)	(-0.15)	(-1.53)	(-1.53)
const	32.62	46.09	29.26*	29.26*
	(1.61)	(1.52)	(1.76)	(1.76)
Observations	1102	1102	1102	1102
R-squared	0.9778	0.97	0.9729	0.9729
Firm FE	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm

Table 11: Impact of Recreational Marijuana Legalization on Private Firm

This table presents the impact of recreational marijuana on private firms' fundamentals. The independent variable of interest is *1(LegRec)*. The dependent variables are Sales Growth, *ROA*, *Cash Ratio AT*, *RD Ratio AT*, *Capex Ratio AT*, *Capex Ratio PPENT*, and *log(NumEmployee)*. We control for the country year variables *log(GDP)*, *GDPGrowth*, *log(Population)*, *log(Density)* and for the firm-lagged year variables *Size*, *PTBI*, *PYTBI Vol*, *Leverage*, and *log(Firm Age)*, together with firm fixed effects and industry-year fixed effects. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variables:	RD Ratio AT	log(Num Employee)	Sales Growth	ROA	Cash Ratio AT	Capex Ratio AT	Capex Ratio PPENT
1(LegRec)	0.02***	0.3***	-0.62***	-3.85***	-0.04***	-0.03***	-0.47***
	(3.53)	(3.08)	(-3.0)	(-3.33)	(-2.89)	(-2.87)	(-3.24)
log(GDP)	-1.00E-03	0.02	0.1	-2.73***	0.01	0.01	0.15**
	(-0.58)	-0.61	-0.6	(-3.41)	-0.57	-1.38	-2.19
GDP Growth	-0.03	4.94***	-9.38*	-34.28	-0.35	0.21	3.13
	(-0.35)	(2.64)	(-1.66)	(-1.18)	(-1.28)	(0.93)	(1.20)
log(Population)	0.05	-1.79	6.67	-76.65**	1.01*	0.43	1.93
	(0.44)	(-1.15)	(1.16)	(-2.27)	(1.85)	(1.29)	(0.65)
log(Density)	0.01	0.12	0.21	3.47	-0.01	-0.07	-0.33
	(0.44)	(0.48)	(0.37)	(1.01)	(-0.2)	(-1.29)	(-0.56)
Size (t-1)	-0.05***	0.06	-1.89***	0.06	-0.27***	0.01	0.03
	(-5.09)	(1.25)	(-3.26)	(0.04)	(-8.83)	(0.88)	(0.19)
PTBI (t-1)	0.01	-0.46*	-0.98	-1.49	0.04	0.02	0.02
	(1.48)	(-1.86)	(-1.23)	(-0.56)	(1.32)	(1.16)	(0.11)
PTBI Vol (t-1)	-0.03	-0.001	-2.23*	6.17	0.1	0.24***	2.0***
	(-1.0)	(-0.62)	(-1.86)	(1.17)	(1.24)	(4.13)	(4.19)
Leverage (t-1)	1.00E-04	0.06	-0.07	0.11	-4.00E-03	1.00E-04	-4.00E-03
	(0.66)	(0.69)	(-1.22)	(1.04)	(-1.42)	(0.11)	(-0.74)
log(Firm Age) (t-1)	0.02	0.73*	0.77	7.51	-0.13	-0.36***	-2.3**
	(0.38)	(1.71)	(0.32)	(0.84)	(-1.04)	(-3.9)	(-1.97)
const	0.55	14.22	-11.18	535.49**	-1.24	-2.05	-9.66
	(0.71)	(1.45)	(-0.3)	(2.37)	(-0.32)	(-0.96)	(-0.53)
Observations	4174	4353	2948	2948	2948	3661	3661
R-squared	0.8996	0.961	0.593	0.7933	0.8672	0.9109	0.7088
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Table 12: Firm Behaviors - Regression Discontinuity Design

This table presents the RDD regression results on the relationship between public and private firms' behaviors taken together and the pro-recreational marijuana votes. Panel A present the results using the following dependent variables of interest: *Sales Growth*, *ROA*, and *Cash Ratio AT*. Panel B present results using *RD Ratio AT* and *NumPatents* as variables of interests. Panel C present results on public firm's social score: *EW_S*, *EW_S Health* and *EW_S Diversity*. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Firm Performance

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables:	Sales Growth		ROA		Cash Ratio AT	
1(LegRec)	-0.139***	-0.154***	-4.17**	-5.667**	-0.21***	-0.267***
	(-4.1)	(-3.11)	(-2.47)	(-2.3)	(-5.90)	(-4.94)
Const	-0.408***	-0.185	-1.69	20.91	-0.68***	0.046
	(-3.3)	(-0.33)	(-0.28)	(0.75)	(-5.05)	(0.08)
Polynomial	linear	quadratic	linear	quadratic	linear	quadratic
Bandwith	0.139	0.139	0.139	0.139	0.139	0.139
Observations	942	942	942	942	942	942
R-squared	0.0211	0.0154	0.0211	0.0208	0.0461	0.0466

Panel B. Firm R&D and Innovation

	(1)	(2)	(3)	(4)
Dependent variables:	RD Ratio AT		log(NumPatents)	
1(LegRec)	0.019**	0.043***	-1.10**	-1.62***
	(2.27)	(4.35)	(-2.10)	(-2.59)
Const	-0.069*	-0.726***	-5.08**	6.25
	(1.94)	(-4.18)	(-2.30)	(0.74)
Polynomial	linear	quadratic	linear	quadratic
Bandwith	0.108	0.108	0.146	0.146
Observations	998	998	222	222
R-squared	0.0094	0.0298	0.0222	0.0197

Panel C. Firm Social Performance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variables:	EW_S		EW_S Health		EW_S Training		EW_S Diversity	
1(LegRec)	0.252***	0.202***	0.421**	-0.4***	0.069**	-0.048	0.366***	0.277***
	(4.10)	(3.02)	(5.39)	(4.69)	(2.26)	(1.45)	(3.79)	(2.65)
Const	1.82***	0.75***	-2.48***	2.03***	0.71***	0.26	2.18***	-0.285
	(10.38)	(1.26)	(-11.17)	(2.68)	(8.14)	(0.89)	(7.92)	(0.31)
Polynomial	linear	quadratic	linear	quadratic	linear	quadratic	linear	quadratic
Bandwith	0.224	0.224	0.224	0.224	0.224	0.224	0.224	0.224
Observations	422	422	422	422	422	422	422	422
R-squared	0.0403	0.0403	0.0635	0.0621	0.0111	0.0146	0.0295	0.0376

Table 13: Pretreatment Trends on Public Firm Fundamentals

This table examines whether there are any pretreatment trends in revenue, margin, profitability and investment for firms located in a U.S. state or Canadian Province where the recreational use of marijuana is legal (treated firms) since the pro-recreational vote passed The dependent variables are *TobinQ, Stock Return, ROA, Cash Ratio AT, Sales Growth, RD Ratio AT, Capex Ratio AT, Capex Ratio PPENT and log(NumEmployee)*. The independent variables of interest are Year (t+l) with $l \in [-8; 7]_{l \neq -1}$, where l = 0 indicate the year relative to the effectiveness of recreational marijuana use in a given state (province). For example, *l = 2* if it is two years after the legalization become effective and zero otherwise. To avoid perfect multicollinearity the time lag $\{l = -1\}$ is used as the dropped reference. We control for the country year variables *log(GDP), GDP Growth, log(Population), log(Density),* and for the firm-lagged year variables *Size, PTBI, PYTBI Vol, Leverage,* and *log(Firm Age)* , together with firm fixed effects and industry-year fixed effects. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variables:	RD Ratio AT	log(Num Employee)	Sales Growth	ROA	Cash Ratio AT	Capex Ratio AT	Capex Ratio PPENT	TobinQ	Stock Return
Year(t-8)	-1.00E-04	-0.01	0.01	-0.1	2.00E-03	-1.00E-03	-0.01	0.02	-0.57
	(-0.04)	(-0.17)	(0.32)	(-0.1)	(0.16)	(-0.18)	(-0.28)	-0.25	(-0.14)
Year(t-7)	1.00E-03	0.01	0.01	-0.03	1.00E-03	-4.00E-04	-0.01	-0.02	2.07
	(0.28)	(0.18)	(0.29)	(-0.03)	(0.04)	(-0.15)	(-0.43)	(-0.18)	-0.43
Year(t-6)	-1.00E-04	-0.02	3.00E-03	0.05	-2.00E-03	2.00E-04	-0.01	-0.01	-1.02
	(-0.03)	(-0.33)	(0.09)	-0.06	(-0.14)	(0.08)	(-0.37)	(-0.11)	(-0.23)
Year(t-5)	1.00E-03	0.01	-0.01	-0.12	-3.00E-03	1.00E-04	0.01	2.00E-03	-0.92
	(0.20)	(0.25)	(-0.26)	(-0.15)	(-0.18)	(0.05)	(0.23)	-0.02	(-0.26)
Year(t-4)	4.00E-04	0.02	-0.01	-0.29	-2.00E-03	-1.00E-03	4.00E-03	-0.03	-0.9
	(0.16)	(0.46)	(-0.3)	(-0.28)	(-0.13)	(-0.44)	(0.15)	(-0.3)	(-0.2)
Year(t-3)	-1.00E-03	0.02	-0.01	0.12	3.00E-03	-1.00E-03	0.01	-2.00E-03	-1.66
	(-0.26)	(0.40)	(-0.27)	-0.16	(0.21)	(-0.37)	(0.26)	(-0.03)	(-0.38)
Year(t-2)	-1.00E-03	0.02	-3.00E-03	-0.03	2.00E-03	-1.00E-03	-0.01	-0.01	-0.61
	(-0.28)	(0.44)	(-0.11)	(-0.04)	(0.18)	(-0.3)	(-0.43)	(-0.14)	(-0.15)
Year(t)	0.01***	0.13**	-0.08***	-2.18***	-0.04***	-0.01***	-0.06***	-0.29***	-9.02**
	(2.60)	(2.47)	(-2.69)	(-2.91)	(-2.79)	(-2.98)	(-2.62)	(-3.1)	(-2.47)
Year(t+1)	0.01***	0.17***	-0.07***	-2.57***	-0.05***	-0.01**	-0.06**	-0.26**	-11.86***
	(2.85)	(2.89)	(-2.92)	(-3.12)	(-3.12)	(-2.56)	(-2.57)	(-2.56)	(-2.94)
Year(t+2)	0.01**	0.24***	-0.06**	-2.77***	-0.06***	-0.01***	-0.03	-0.29*	-12.25**
	(2.47)	(2.98)	(-2.0)	(-2.7)	(-2.88)	(-2.6)	(-0.98)	(-1.94)	(-2.51)
Year(t+3)	0.01**	0.2**	-0.07**	-1.91*	-0.05***	-0.01	-0.06**	-0.12	0.18
	(2.33)	(2.27)	(-2.41)	(-1.75)	(-2.66)	(-1.18)	(-1.98)	(-0.77)	-0.03
Year(t+4)	0.01	0.11	-0.06	-4.38*	-0.05*	-0.01*	-0.06	-0.38	-13.72
	(0.75)	(0.96)	(-1.05)	(-1.68)	(-1.84)	(-1.86)	(-1.12)	(-1.49)	(-1.59)
Year(t+5)	0.01	0.13	-0.09	-4.83**	-0.08**	-2.00E-03	0.04	0.11	-11.25
	(0.84)	(0.90)	(-1.58)	(-2.53)	(-1.98)	(-0.36)	(0.78)	-0.4	(-1.28)
Year(t+6)	0.01	0.03	0.03	-8.58***	-0.12**	-3.00E-03	0.09	-0.22	-24.69**
	(1.08)	(0.14)	(0.43)	(-2.7)	(-2.44)	(-0.28)	(1.26)	(-0.56)	(-2.23)
Year(t+7)	4.00E-03	0.18	-0.07	-3.47	-0.05	-3.00E-03	0.02	-0.29	-16.51
	(0.40)	(0.86)	(-1.05)	(-1.45)	(-1.16)	(-0.3)	(0.38)	(-0.65)	(-1.18)
Observations	15139	11782	7107	7107	7107	12769	12769	7107	7107
R-squared	0.6834	0.9614	0.4351	0.7206	0.8025	0.7074	0.4775	0.7458	0.506
State-Year Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Year Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Const	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Table 14: Pretreatment Trends on Public Firm Innovation

This table examines whether there are any pretreatment trends in patents disclosure and citations on patents disclosed for firms located in a U.S. state or Canadian Province where the recreational use of marijuana is legal (treated firms) since the pro-recreational vote passed The dependent variables are *log(NumPatents)* and *log(NumCitations)*. The independent variables of interest are Year (t+l) with l ∈ $[-2; 1]_{l\neq -1}$, where l = 0 indicate the year relative to the effectiveness of recreational marijuana use in a given state (province). For example, *l = 2* if it is two years after the legalization become effective and zero otherwise. To avoid perfect multicollinearity the time lag $\{l = -1\}$ is used as the dropped reference. We control for the country year variables *log(GDP)*, *GDP Growth*, *log(Population)*, *log(Density)*, and for the firm-lagged year variables *Size*, *PTBI*, *PYTBI Vol*, *Leverage*, and *log(Firm Age)* , together with firm fixed effects and industry-year fixed effects. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Dependent variables:	log(NumPatents)	log(NumCitations)
Year(t-2)	-0.09	0.37
	(-0.26)	(1.26)
Yeat (t)	-0.57*	-1.59*
	(-1.87)	(-1.94)
Yeat (t+1)	-0.54**	-3.52***
	(-2.44)	(-4.52)
Observations	355	355
R-squared	0.9576	0.7881
State-Year Control	Yes	Yes
Firm-Year Control	Yes	Yes
Firm FE	Yes	Yes
Industry*Year FE	Yes	Yes
Cluster	Firm	Firm

Table 15: Pretreatment Trends on Public Firm Social Score

This table examines whether there are any pretreatment trends in the implementation of social policies for firms located in a U.S. state or Canadian Province where the recreational use of marijuana is legal (treated firms) since the pro-recreational vote passed The dependent variables are *EW_S*, *EW_S Health* and *EW_S Diversity*. The independent variables of interest are Year (t+l) with $l \in [-8; 7]_{l \neq -1}$, where l = 0 indicate the year relative to the effectiveness of recreational marijuana use in a given state (province). For example, *l = 2* if it is two years after the legalization become effective and zero otherwise. To avoid perfect multicollinearity the time lag $\{l = -1\}$ is used as the dropped reference. We control for the country year variables *log(GDP), GDP Growth, log(Population), log(Density),* and for the firm-lagged year variables *Size, PTBI, PYTBI Vol, Leverage,* and *log(Firm Age)* , together with firm fixed effects and industry-year fixed effects. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Dependent variables:	EW_S	EW_S Diversity	EW_S Training	EW_S Health
Year(t-8)	2.00E-03	-0.01	5.00E-03	5.00E-03
	(0.20)	(-0.37)	(0.64)	(0.64)
Year(t-7)	5.00E-03	0.01	2.00E-03	2.00E-03
	(0.39)	(0.40)	(0.20)	(0.20)
Year(t-6)	-0.01	-0.03	-5.00E-03	-5.00E-03
	(-0.76)	(-0.86)	(-0.47)	(-0.47)
Year(t-5)	1.00E-03	-0.01	0.01	0.01
	(0.07)	(-0.47)	(0.68)	(0.68)
Year(t-4)	3.00E-03	-3.00E-04	-3.00E-03	-3.00E-03
	(0.15)	(-0.01)	(-0.21)	(-0.21)
Year(t-3)	0.01	-0.01	4.00E-03	4.00E-03
	(0.33)	(-0.19)	(0.24)	(0.24)
Year(t-2)	0.01	-0.01	0.02	0.02
	(0.46)	(-0.45)	(1.03)	(1.03)
Year(t)	0.05***	0.06***	0.04**	0.04**
	(3.06)	(2.67)	(2.57)	(2.57)
Year(t+1)	0.1***	0.12***	0.06**	0.06**
	(3.17)	(2.75)	(2.59)	(2.59)
Year(t+2)	0.03*	0.04	0.02*	0.02*
	(1.74)	(1.61)	(1.87)	(1.87)
Year(t+3)	0.05**	0.06	0.04*	0.04*
	(2.06)	(1.62)	(1.82)	(1.82)
Year(t+4)	0.02	0.06	0.05	0.05
	(0.89)	(1.22)	(1.46)	(1.46)
Year(t+5)	-0.03	3.00E-03	-0.01	-0.01
	(-1.27)	(0.05)	(-0.23)	(-0.23)
Year(t+6)	-0.01	0.06	0.02	0.02
	(-0.3)	(0.62)	(0.44)	(0.44)
Year(t+7)	0.13***	0.24**	0.11**	0.11**
	(2.91)	(2.20)	(2.58)	(2.58)
Observations	1102	1102	1102	1102
R-squared	0.9783	0.9705	0.9738	0.9738
State-Year Control	Yes	Yes	Yes	Yes
Firm-Year Control	Yes	Yes	Yes	Yes
Const	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm

Table 16: Pretreatment Trends on Private Firm

This table examines whether there are any pretreatment trends in revenue, margin, profitability and investment for private firms located in a U.S. state or Canadian Province where the recreational use of marijuana is legal (treated firms) since the pro-recreational vote passed The dependent variables are *ROA*, *Cash Ratio AT*, *Sales Growth*, *RD Ratio AT*, *Capex Ratio AT*, *Capex Ratio PPENT and log(NumEmployee)*. The independent variables of interest are Year (t+l) with $l \in [-8; 7]_{l \neq -1}$, where l = 0 indicate the year relative to the effectiveness of recreational marijuana use in a given state (province). For example, *l = 2* if it is two years after the legalization become effective and zero otherwise. To avoid perfect multicollinearity the time lag $\{l = -1\}$ is used as the dropped reference. We control for the country year variables *log(GDP)*, *GDP Growth*, *log(Population)*, *log(Density)*, and for the firm-lagged year variables *Size*, *PTBI*, *PYTBI Vol*, *Leverage*, and *log(Firm Age)* , together with firm fixed effects and industry-year fixed effects. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variables:	RD Ratio AT	log(Num Employee)	Sales Growth	ROA	Cash Ratio AT	Capex Ratio AT	Capex Ratio PPENT
Year(t-4)	-5.00E-04	0.02	0.14	-2.98	-0.04	-0.06	-0.24
	(-0.01)	(0.02)	(0.10)	(-0.37)	(-0.35)	(-0.35)	(-0.12)
Year(t-3)	0.02	0.00003	0.23	0.38	0.01	-0.01	-0.03
	(1.19)	0.00	(0.53)	(0.18)	(0.57)	(-0.51)	(-0.1)
Year(t-2)	4.00E-03	-0.02	-0.08	-0.18	-4.00E-03	5.00E-03	-0.03
	(0.41)	(-0.17)	(-0.28)	(-0.14)	(-0.3)	(0.28)	(-0.18)
Year(t)	0.02**	0.33***	-0.64***	-4.52***	-0.05***	-0.05***	-0.55***
	(2.29)	(3.34)	(-3.09)	(-3.06)	(-3.22)	(-3.24)	(-3.75)
Year(t+1)	0.05**	0.54***	-2.08***	-11.15***	-0.13***	-0.1***	-1.31***
	(2.49)	(2.98)	(-2.82)	(-3.05)	(-3.38)	(-3.32)	(-3.41)
Year(t+2)	0.02	0.43	3.92	-21.28	0.6*	-0.18	-1.35*
	(0.34)	(0.28)	(0.72)	(-0.77)	(1.92)	(-1.36)	(-1.93)
Year(t+3)	-0.05	0.08	-2.18	10.01	0.56***	-0.12	-2.2***
	(-0.48)	(0.18)	(-0.37)	(0.52)	(2.77)	(-0.96)	(-2.74)
Observations	4174	4353	2948	2948	2948	3661	3661
R-squared	0.9014	0.9617	0.6276	0.7991	0.876	0.9132	0.7159
Firm-Year Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Const	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Table 17: Placebo Test on Marijuana Prevalence, Drug Trafficking and People Cognition

This table presents the impact of the medical marijuana legalization on Marijuana Prevalence, Drugs Trafficking, and People Cognition. In Panel A, the dependent variables are *MarijuanaUse(12-17)* and *MarijuanaUse(18-25)*. In Panel B, the dependent variables are *log(NumDrugsArrestMarijuana)*, *log(NumHardDrugdsArrest)*. In Panel C, the dependent variable is *HighSchoolPerformance*, *log(NumCarAccidents)* and *log(NumWorkingAccidents)*. The independent variable of interest is *1(LegMed)*, which equals one from and after the effectiveness year of medical marijuana legalization, otherwise zero. At state level, we control for state-year variables with state and year fixed effects. At High School level, we control for High-School-year variables with High School and year fixed effects. At both state and high-school level, we control for the one year-lagged dependent variables. The t-values clustered at the state level and at school level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Marijuana Prevalence

	(1)	(2)
Dependent variables:	MarijuanaUse(12-17)	MarijuanaUse(18-25)
1(LegMed)	0.146	-0.932
	(0.18)	(-0.42)
log(GDP)	-0.02	-0.041**
	(-1.65)	(-2.52)
GDP Growth	-0.01	0.034
	(-1.02)	(1.42)
log(Population)	0.07**	0.139*
	(2.62)	(1.95)
log(Density)	-1.00E-06	-0.01e-3***
	(-0.69)	(-3.45)
log(Num Police Officers)	-0.003	-0.022
	(-0.23)	(-1.4)
MarijuanaUse(12-17)	0.376***	0.093
	(10.23)	(1.24)
MarijuanaUse(18-25)	0.064***	0.583***
	(3.16)	(17.31)
Const	-0.176	-0.247
	(-1.16)	(-0.57)
Observations	851	851
R-squared	0.8478	0.9302
State FE	Yes	Yes
Year FE	Yes	Yes
Cluster	State	State

Panel B. Drug Trafficking Public

	(1)	(2)
Dependent variables:	log(NumDrugsArrestMarijuana)	log(NumHardDrugsArrest)
1(LegMed)	0.31	-0.62
	(0.26)	(-0.56)
log(GDP)	0.854	1.747
	(0.19)	(0.70)
GDP Growth	7.193**	-2.943***
	(2.67)	(-2.92)
log(Population)	7.583	-1.023
	(1.50)	(-0.48)
log(Density)	-0.001	-2.00E-04
	(-0.87)	(-0.68)
log(Num Police Officers)	-6.969*	-2.368
	(-1.82)	(-0.99)
Dep Var	0.184**	-5.00E-06
	(2.46)	(-0.88)
Const	-26.969	-1.139
	(-0.51)	(-0.03)
Observations	332	332
R-squared	0.8609	0.9581
State FE	Yes	Yes
Year FE	Yes	Yes
Cluster	State	State

Panel C. People Cognition

Dependent variables:	(1) HighSchoolPerformance	(2) HighSchoolPerformance	(3) log(NumCarAccidents)	(4) log(WorkingAccident)
1(LegMed)	-4.46	1.88	-0.019	0.0054
	(-0.37)	(0.47)	(-0.15)	(0.13)
log(GDP)	3.454	6.723**	0.282	0.379***
	(0.56)	(1.97)	(1.00)	(5.93)
GDP Growth	-1.888	4.667	0.482***	0.014
	(-0.26)	(0.95)	(4.42)	(0.34)
log(Population)	160.132*	20.185***	0.408	0.085
	(1.77)	(3.88)	(1.43)	(0.44)
log(Density)	0.194	-0.012	1.00E-06	4.00E-04
	(1.31)	(-1.08)	(0.16)	(0.92)
log(Num Police Officers)	-163.094**	3.066	0.094	0.118***
	(-2.61)	(0.69)	(1.03)	(3.93)
HighSchoolPerformance	0.586***	0.083***	0.367***	0.411***
	(12.07)	(3.91)	(5.06)	(7.26)
Const	-4.55	-1.96***	-2.718	-4.654***
	(-1.12)	(-4.51)	(-0.97)	(-3.75)
Observations	184	15842	1221	744
R-squared	0.934	0.8506	0.9936	0.9998
StateFE	Yes	No	Yes	Yes
High School FE	No	Yes	No	No
Year FE	Yes	Yes	Yes	Yes
Cluster	State	High School	State	State

Table 18: Placebo Test on Local Economics

This table presents the impact of the medical marijuana legalization on local state and local province economics. The independent variable of interest is *1(LegMed)*, which equals one from and after the effectiveness year of medical marijuana legalization, otherwise zero. We control for the state- and province-year variables *log(GDP), GDPGrowth, log(Population), log(Density), log(NumPoliceOfficers)* and for the one year-lagged dependent variables. Panel A show results on *log(NumBusinessIncorp), log(NumBusinessBankruptcy), log(TaxRevenue)* and *UnemployementRate*. We control for state and year fixed effects. Panel B show results on *log(HousePriceIndex)* at both city-level (column 1) and state- province-level (column 2). Therefore, at city-level we control for city and year fixed effects and cluster at city level. At state (province) level we control for and state (province) and year fixed effects and cluster at state level. The t-values are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A.

	(1)	(2)	(3)	(4)
Dependent variables:	log(Num Business Incorp)	log(Num Business Bankruptcy)	log(Tax Revenue)	Unemployment Rate
1(LegMed)	-0.0028	0.037	-0.0182	0.4022
	(-0.02)	(0.29)	(-0.15)	(0.45)
log(GDP)	-0.28	-0.536***	0.869***	-1.472
	(-0.65)	(-3.16)	(5.49)	(-0.88)
GDP Growth	0.637*	0.206*	0.182	-3.592***
	(1.76)	(1.84)	(1.37)	(-3.96)
log(Population)	-1.139	-1.801	1.107**	1.954
	(-0.44)	(-1.21)	(2.03)	(0.44)
log(Density)	2.00E-04	-0.03e-2**	1.00E-04	0.01e-2***
	(1.47)	(-2.58)	(1.61)	(4.03)
log(Num Police Officers)	2.676	0.629	-0.614	1.296
	(1.35)	(0.63)	(-1.35)	(0.29)
Dep Var	0.242***	0.148***	0.014	0.763***
	(2.89)	(3.62)	(1.36)	(10.08)
Const	8.981	20.502***	-12.873***	2.346
	(0.81)	(2.92)	(-4.27)	(0.09)
Observations	268	268	463	1136
R-squared	0.999	0.997	0.9903	0.9301
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Cluster	State	State	State	State

Panel B.

	(1)	(2)
Dependent variables:	log(House Price Index)	log(House Price Index)
1(LegMed)	-0.0171	-0.0291
	(-0.43)	(-0.43)
log(GDP)	1.385***	0.584***
	(17.55)	(6.20)
GDP Growth	-0.194***	0.071
	(-4.62)	(0.86)
log(Population)	-0.179	-0.085
	(-1.4)	(-0.85)
log(Density)	0.04e-3***	0.02e-3***
	(4.35)	(6.88)
log(Num Police Officers)	0.125*	-0.012
	(1.70)	(-0.5)
Dep Var	0.379***	0.841***
	(21.50)	(37.40)
Const	-10.061***	-4.466***
	(-10.86)	(-6.63)
Observations	18046	1147
R-squared	0.9803	0.9913
City FE	Yes	No
State FE	No	Yes
Year FE	Yes	Yes
Cluster	City	State

Table19: Placebo Test on Public Firms

This table presents the impact of medical marijuana on public firms' fundamentals, social performance and innovation. The independent variable of interest is *1(LegMed)*. In Panel A, the dependent variables are *TobinQ*, *Stock Return*, Sales Growth, *ROA*, *Cash Ratio AT*, *RD Ratio AT*, *Capex Ratio AT*, *Capex Ratio PPENT*, and *log(NumEmployee)*. In Panel B, the dependent variables are *EW_S*, *EW_S Health*, *EW_S Training* and *EW_S Diversity*. In Panel C, the dependent variables are *log(NumPatents)*, *log(NumCitations)*. We control for the country year variables *log(GDP)*, *GDPGrowth*, *log(Population)*, *log(Density)* and for the firm-lagged year variables *Size*, *PTBI*, *PYTBI Vol*, *Leverage*, and *log(Firm Age)*, together with firm fixed effects and industry-year fixed effects. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Public Firm's Fundamentals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variables:	TobinQ	Stock Return	Sales Growth	ROA	Cash Ratio AT	RD Ratio AT	Capex Ratio AT	Capex Ratio PPENT	log(Num Employee)
1(LegMed)	-0.01	-0.16	0.17	-4.00E-03	-1.00E-03	-5.00E-04	-2.00E-04	-4.00E-03	0.01
	(-0.1)	(-0.07)	(0.32)	(-0.29)	(-0.16)	(-0.4)	(-0.11)	(-0.39)	(0.29)
log(GDP)	-0.65	-33.22	0.71	-0.16	-0.02	-0.04	0.01	0.32	0.82
	(-0.52)	(-0.9)	(0.08)	(-0.64)	(-0.1)	(-1.44)	(0.32)	(1.47)	(1.14)
GDP Growth	0.25	-9.23	-1.92	0.18	-0.12	-0.01	-1.00E-03	0.05	0.26
	(0.39)	(-0.31)	(-0.28)	(0.95)	(-1.27)	(-0.77)	(-0.03)	(0.36)	(0.70)
log(Population)	-48.76	613.25	-101.52	-6.36	-11.95**	-0.04	-2.22*	2.55	31.8
	(-1.23)	(0.48)	(-0.3)	(-0.62)	(-2.16)	(-0.04)	(-1.84)	(0.39)	(1.21)
log(Density)	21.47	-280.38	43.12	2.71	5.38**	0.04	0.97*	-1.34	-14.66
	(1.22)	(-0.5)	(0.29)	(0.59)	(2.19)	(0.12)	(1.81)	(-0.46)	(-1.26)
Size	-0.32***	-10.7***	-0.98***	-0.05***	-0.04***	1.00E-03	-0.01***	-0.04***	0.55***
	(-7.27)	(-8.17)	(-2.86)	(-5.63)	(-5.61)	(1.34)	(-6.27)	(-4.79)	(20.77)
PTBI	0.28	-22.66***	28.76***	-0.14***	0.08***	0.01***	0.03***	0.2***	0.29***
	(1.40)	(-3.56)	(14.71)	(-2.74)	(2.87)	(3.03)	(8.05)	(6.30)	(2.97)
PTBI Vol	0.08	-3.56	-1.18	0.09	0.07*	-1.00E-03	0.01	0.04	-0.12
	(0.34)	(-0.49)	(-0.54)	(1.59)	(1.96)	(-0.23)	(1.41)	(1.14)	(-1.46)
Leverage	0.06	10.07**	1.76	0.06	-0.1***	-4.00E-03	2.00E-03	-0.05**	-0.06
	(0.39)	(1.97)	(1.45)	(1.56)	(-5.49)	(-1.2)	(0.37)	(-2.09)	(-0.82)
log(Firm Age)	0.17*	10.24***	0.54	0.02	0.03**	-2.00E-03	2.00E-03	0.02	-0.43***
	(1.74)	(2.61)	(0.56)	(0.71)	(2.05)	(-1.4)	(1.03)	(0.93)	(-9.83)
const	258.86	-2400.18	523.24	35.22	60.08**	0.52	11.12*	-14.71	-168.44
	(1.33)	(-0.38)	(0.31)	(0.70)	(2.21)	(0.12)	(1.89)	(-0.46)	(-1.31)
Observations	12509	12509	12509	12509	12509	23744	19841	19841	20298
R-squared	0.7622	0.6212	0.7167	0.5414	0.8262	0.7265	0.7473	0.5342	0.9634
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel B. Public Firm's Innovation

Dependent variables	(1) log(NumPatents)	(2) log(NumCitations)
1(LegMed)	-1.07	13.2
	(-0.04)	(0.16)
log(GDP)	-393.43	122.25
	(-0.64)	(0.04)
GDP Growth	239.6	548.13
	(1.23)	(0.46)
log(Population)	-1631.14	-25593.73
	(-0.42)	(-1.07)
log(Density)	944.64	9753.62
	(0.62)	(1.13)
Size	7.27	-174.65
	(0.44)	(-1.18)
PTBI	6.29	349.39
	(0.14)	(0.92)
PTBI Vol	14.93	-328.67
	(0.63)	(-1.12)
Leverage	155.99	1488.68
	(0.66)	(0.80)
log(Firm Age)	-21.4	391.23
	(-0.33)	(0.80)
const	12188.2	134211.86
	(0.56)	(0.92)
Observations	402	402
R-squared	0.9535	0.5667
Firm FE	Yes	Yes
Industry*Year FE	Yes	Yes
Cluster	Firm	Firm

Panel C. Public Firm's Social Performance

Dependent variables:	(1) EW_S	(2) EW_S Diversity	(3) EW_S Training	(4) EW_S Health
1(LegMed)	-3.00E-04	3.00E-03	-3.00E-03	0.01
	(-0.02)	(0.16)	(-0.25)	(0.28)
log(GDP)	0.04	0.59	-0.13	0.25
	(0.10)	(0.86)	(-0.47)	(0.58)
GDP Growth	-0.07	-0.13	-0.02	0.22
	(-0.4)	(-0.36)	(-0.23)	(0.73)
log(Population)	13.16	12.38	1.88	5.33
	(0.63)	(0.35)	(0.15)	(0.21)
log(Density)	-6.22	-6.02	-1.06	-2.68
	(-0.66)	(-0.38)	(-0.18)	(-0.24)
Size	0.01	0.01	0.02*	-0.01
	(0.32)	(0.43)	(1.80)	(-0.29)
PTBI	0.06	0.18	0.01	-3.00E-03
	(0.63)	(0.75)	(0.19)	(-0.03)
PTBI Vol	0.14	0.29	0.02	0.21
	(1.15)	(1.04)	(0.49)	(1.29)
Leverage	0.05	0.04	-5.00E-03	0.06
	(0.77)	(0.45)	(-0.16)	(0.85)
log(Firm Age)	3.00E-03	0.06	0.01	1.00E-03
	(0.05)	(0.35)	(0.34)	(0.01)
const	-63.63	-66.09	-6.77	-26.57
	(-0.61)	(-0.37)	(-0.11)	(-0.21)
Observations	2456	2456	2456	2456
R-squared	0.9854	0.9778	0.9865	0.9882
Firm FE	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm

Table20: Placebo Test on Private Firms

This table presents the impact of medical marijuana on private firms. The independent variable of interest is *1(LegMed)*. The dependent variables are Sales Growth, *ROA*, *Cash Ratio AT*, *RD Ratio AT*, *Capex Ratio AT*, *Capex Ratio PPENT*, and *log(NumEmployee)*. We control for the country year variables *log(GDP)*, *GDPGrowth*, *log(Population)*, *log(Density)* and for the firm-lagged year variables *Size*, *PTBI*, *PYTBI Vol*, *Leverage*, and *log(Firm Age)*, together with firm fixed effects and industry-year fixed effects. The t-values clustered at the firm level are in parentheses, ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variables:	Sales Growth	ROA	Cash Ratio AT	RD Ratio AT	Capex Ratio AT	Capex Ratio PPENT	log(Num Employee)
1(LegMed)	0.19	-1.53	0.02	-0.01	0.01	0.03	4.00E-03
	(0.27)	(-0.36)	(0.44)	(-0.39)	(0.19)	(0.11)	(0.07)
log(GDP)	0.84	0.72	-0.07	-0.02	0.12	0.07	-0.07
	(0.66)	(0.09)	(-0.59)	(-0.49)	(0.96)	(0.16)	(-0.18)
GDP Growth	3.3	35.03	0.11	-0.25	0.89	9.19	-0.45
	(0.22)	(0.43)	(0.14)	(-0.97)	(1.30)	(1.53)	(-0.49)
log(Population)	-103.54	316	-11.25	-8.02	5.81	-41.09	36.37
	(-0.85)	(0.27)	(-1.35)	(-0.65)	(0.29)	(-0.26)	(1.31)
log(Density)	40.98	-144.89	4.21	3.39	-1.63	36.71	-10
	(0.79)	(-0.33)	(1.20)	(0.62)	(-0.18)	(0.48)	(-0.84)
Size	-2.8*	-2.07	-0.26***	-0.07***	-0.01	-0.26	0.12
	(-1.81)	(-0.48)	(-6.0)	(-3.64)	(-0.33)	(-0.53)	(1.46)
PTBI	0.11	0.56	-0.01	-0.01	-0.01	0.13	-0.01
	(0.10)	(0.10)	(-0.12)	(-0.33)	(-0.18)	(0.25)	(-0.11)
PTBI Vol	-2.3	20.52	0.08	-0.04	0.3*	3.42**	0.19
	(-0.83)	(1.60)	(0.33)	(-1.27)	(1.75)	(2.04)	(1.08)
Leverage	-0.19	0.42	-0.02	0.01e-1*	0.02e-1**	0.04***	-3.00E-04
	(-0.79)	(0.56)	(-1.07)	(1.79)	(2.18)	(9.20)	(-0.13)
log(Firm Age)	13.49	-12.08	0.72	0.01	0.22	-0.37	1.11
	(1.34)	(-0.39)	(1.63)	(0.10)	(0.75)	(-0.12)	(1.50)
const	552.73	-1488.12	63.69	41.99	-34.15	125.45	-202.5
	(0.87)	(-0.24)	(1.47)	(0.68)	(-0.35)	(0.17)	(-1.44)
Observations	1738	1738	1738	2837	2104	2104	1638
R-squared	0.8897	0.895	0.952	0.9282	0.9454	0.8566	0.9978
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Appendix Table A1: Variable Definitions

Panel A: State, City, and High-School-year level variables

Variable Name		*Definition*	*Source*
Dependent Variables			
HighSchoolPerformance	State-Year Average High-School Performance	Hichool performance based on CAST Science, Smarter Balanced Assessments Language Arts/Literacy, Smarter Balanced Assessments Mathematics test scores released by the State Department of Education.	*SchoolDigger & Fraser Institute*
log(House Price)	State-Year House Price Index	Seasonally adjusted measure of the typical home value and market changes across a given region and housing type.	*Zillow*
log(Num Car Accidents)	State-Year Number of Car Accidents	log(1 + Total number of car accidents). Captured by a variety of entities, such as the US and Canada state departments of transportation, law enforcement agencies, traffic cameras, and traffic sensors within the road-networks	*U.S. & Canada gvt*
log(Num Working Accident)	State-Year Number of Working-related Injuries	log(1 + Number of Nonfatal Injuries & Illnesses work-related)	*NHTSA / CDC API / Canadian Statistics Data website*
log(Num Drugs Arrest Marijuana)	State-Year Number of Marijuana Law Offences	log(1 + Number of arrests for Marijuana Possession and Drug Sales Offenses)	*FBI API & Canada gvt*
log(Num Hard Drugs Arrest)	State-Year Number of Hard Drugs Law Offences	log(1 + Number of arrests for Hard Drugs (Opoium, Cocaine and their derivatives, Synthetic Narcotic) Possession Offenses and traficking)	*FBI API & Canada gvt*
log(Num Business Incorp)	State-Year Number of Business Formation	log(1 + Number federally incorporated businesses and not-for profits)	*U.S. Census Bureau & ISDE*
log(Num Business Bankruptcy)	State-Year Number of Business Bankruptcy	log(1 + Number of businesses bankruptcy)	*American Bankruptcy Institute & Canada gvt*
log(Tax Revenue)	State-Year local tax	Local government tax revenue defined as the revenues collected from taxes on income and profits, social security contributions, taxes levied on goods ans services, payroll taxes, taxes on the ownership and transfer of property, and other taxes.	*U.S. FTA &l Canadian Statistics Data website*
Unemployment Rate	State-Year unemployement rate	Percentage of the total labor force that is unemployed but actively seeking employement and willing to work.	*U.S. Labor's Bureau of Labor Statistics & Canadian labor force statistics*
log(HousePriceIndex)	State-Year Average City House Price Index	Broad measure of the movement of house prices in the United Sates and Canada using monthly and quaterly data.	*Zillow & Housepricehub*
MarijuanaUse(12-17)	State-Year Marijuana Prevalence	Proportion of population aged between 12 and 17 years old who have used marijuana during the last month.	*KIDS COUNT Data Center & Governmental Canadian Cannabis Survey*
MarijuanaUse(18-25)	State-Year Marijuana Prevalence	Proportion of population aged between 18 and 25 years old who have used marijuana during the last month.	*KIDS COUNT Data Center & Governmental Canadian Cannabis Survey*
	Independent Variables		
1(LegRec)	State-Year Recreational Marijuana Legalization	Dummy variable equal one during and after year of recretaional Marijuana legalization, otherwise equal 0	*Hand Collected*
	Control Variables		
log(GDP)	State-Year Growth Domestic Product (logarithm)	Reflects the total value of all goods and services produced less the value of goods and services used for intermediate consumption in their production (USD)	*OECD*
GDP Growth	State-Year Change in Growth Domestic Product	Annual average rate of change of the gross domestic product (GDP) at market prices based on constant local currency	*OECD*
log(Population)	Country-year Population	log(1 + number of poupulation all ages in a given country)	*World Population Review API & ISO*
log(Density)	Country-Year Density	log(1 + Population density in a given country (inhabitants per km2))	*World Population Review API & ISO*
log(Num Police Officers)	Country-Year number of police officers	log(1 + number of police officers in a given country)	*OECD*

Panel B: Firm-year level variables

Variable Name		*Definition*	*Source*
	Dependent Variables		
TobinQ	Firm-Year Tobin's Q	Tobin's Q, calculated as (Total Assets (ITEM2999) + Market Capitalization (ITEM7210) - Stockholders Equity (ITEM3501)) / Total Assets (ITEM2999).	*Worldscope*
Stock Return	Firm-Year Stock Return	The buy-and-hold return in percentage (with dividends) of a firm in one year (ITEM8801).	*Worldscope*
Sales Growth	Firm-Year Sales Growth	Net Sales Growth (ITEM8631).	*Worldscope & Orbis*
ROA	Firm-Year Return on Assets	Earnings before Interest, Taxes, Depreciation & Amortization (EBITDA) (ITEM18198) / / lagged Total Assets (ITEM2999).	*Worldscope & Orbis*
Cash Ratio AT	Firm-Year Cash / Assets	Cash and Short-Term Investment (ITEM2001) / lagged Total Assets (ITEM2999).	*Worldscope & Orbis*
RD Ratio AT	Firm-Year RD / Assets	Research & Development Expense (ITEM1201) / lagged Total Assets (ITEM2999).	*Worldscope & Orbis*
Capex Ratio AT	Firm-Year Capex / Assets	Capital Expenditures (ITEM4601) / lagged Total Assets (ITEM2999).	*Worldscope & Orbis*
Capex Ratio PPENT	Firm-Year Capex / PPENT	Capital Expenditures (ITEM4601) / lagged Net Plant Properties and Equipment (ITEM2501).	*Worldscope & Orbis*
log(Num Patents)	Firm-Year Number of Patents	log(1 + Number of Patents)	*USPTO*
log(Num Citations)	Firm-Year Number of Citations	log(1 + Number of Citations)	*USPTO*
log(Employee)	Firm-Year Number of Emplyees	log(1 + Number of Employees)	*Worldscope & Orbis*
EW_S	Firm-Year Social	Reflects the company's reputation and the health of its license to operate, which are key factors in determining its ability to generate long term shareholder value.	*Asset4*
EW_S Diversity	Firm-Year Workforce / Diversity & Opportunity	Reflects a company's capacity to increase its workforce loyalty and productivity by promoting an effective life-work balance, a family friendly environment and equal opportunities regardless of gender, age, ethnicity, religion or sexual orientation.	*Asset4*
EW_S Training	Firm-Year Workforce / Training & Development	Reflects a company's capacity to increase its intellectual capital, workforce loyalty and productivity by developing the workforce's skills, competences, employability and careers in an entrepreneurial environment.	*Asset4*
EW_S Health	Firm-Year Workforce / Health & Safety	Reflects a company's capacity to increase its workforce loyalty and productivity by integrating into its day-to-day operations a concern for the physical and mental health, well-being and stress level of all employees.	*Asset4*
	Independent Variables		
1(LegRec)	State-Year Recreational Marijuana Legalization	Dummy variable equal one during and after year of recretaional Marijuana legalization, otherwise equal 0	*Hand Collected*
	Control Variables		
Size	Firm-Year Year Size	Natural logarithm of Total Assets (ITEM7230) in USD.	*Worldscope & Orbis*
PTBI	Firm-Year PI / Assets	Pretax Income (ITEM1401) / lagged Total Assets (ITEM2999).	*Worldscope & Orbis*
PTBI Vol	Firm-Year Std (PI / Assets)	Standard deviation of (Pretax Income (ITEM1401) / lagged Total Assets (ITEM2999)) over the last five years.	*Worldscope & Orbis*
Leverage	Firm-Year Leverage	Long-Term Debt (ITEM3251) / lagged Total Assets (ITEM2999).	*Worldscope & Orbis*
log(Firm Age)	Firm-Year Firm Age	log(1 + Current year - Firm incorporation year)	*Worldscope & Orbis*

Appendix Table A2: Detailed on Recreational Marijuana Vote and Legalization

Country Code	State Code	State Name	Voting Year	Legalization Type	Yes	No
US	CA	California	1972	recreational	33.50%	66.50%
US	CA	California	1996	medical	55.58%	44.42%
US	CA	California	2010	recreational	46.54%	53.46%
US	CA	California	2016	recreational	57.13%	42.87%
US	OR	Oregon	1986	recreational	26.33%	73.67%
US	OR	Oregon	1998	medical	54.60%	45.40%
US	OR	Oregon	2014	recreational	56.11%	43.89%
US	AK	Alaska	1998	medical	58.67%	41.33%
US	AK	Alaska	2004	recreational	44.25%	55.75%
US	AK	Alaska	2014	recreational	53.23%	46.77%
US	AZ	Arizona	1998	medical	36.10%	63.90%
US	AZ	Arizona	2002	medical	42.70%	57.30%
US	AZ	Arizona	2010	medical	50.10%	49.90%
US	AZ	Arizona	2016	recreational	48.68%	51.32%
US	AZ	Arizona	2020	recreational	60.03%	39.97%
US	WA	Washington	1998	medical	58.97%	41.03%
US	WA	Washington	2012	recreational	55.70%	44.30%
US	NV	Nevada	1998	medical	58.70%	41.30%
US	NV	Nevada	2000	medical	65.38%	34.62%
US	NV	Nevada	2006	recreational	44.08%	55.92%
US	NV	Nevada	2016	recreational	54.47%	45.53%
US	CO	Colorado	2000	medical	53.53%	46.47%
US	CO	Colorado	2006	recreational	41.08%	58.92%
US	CO	Colorado	2012	recreational	55.32%	44.68%
US	SD	South Dakota	2000	recreational	39.97%	62.03%
US	SD	South Dakota	2006	medical	47.70%	52.30%
US	SD	South Dakota	2020	recreational	69.92%	30.08%
US	ND	North Dakota	2016	medical	63.79%	36.21%
US	ND	North Dakota	2018	recreational	40.55%	59.45%
US	ND	North Dakota	2018	medical	69.92%	30.08%
US	MT	Montana	2004	medical	61.81%	38.19%
US	MT	Montana	2012	medical	57.25%	42.75%
US	MT	Montana	2020	recreational	57.84%	42.16%
US	MI	Michigan	2008	medical	63%	37%
US	MI	Michigan	2018	recreational	55.89%	44.11%
US	MA	Massachusetts	2012	medical	63.30%	36.70%
US	MA	Massachusetts	2016	recreational	53.66%	46.34%
US	AR	Arkansas	2012	medical	48.56%	51.44%
US	AR	Arkansas	2016	medical	53.11%	46.89%
US	FL	Florida	2014	medical	42.38%	57.62%
US	FL	Florida	2016	medical	71.32%	28.68%
US	OH	Ohio	2015	recreational	36.35%	63.65%
US	ME	Maine	1999	medical	61.41%	38.59%
US	ME	Maine	2016	recreational	50.26%	49.74%
US	MO	Missouri	2018	medical	65.59%	34.41%
US	OK	Oklahoma	2018	medical	56.86%	43.14%
US	UT	Utah	2018	medical	52.75%	47.25%
US	NJ	New Jersey	2020	recreational	67.08%	32.92%
US	MS	Mississippi	2020	recreational	68.52%	31.58%
CA	AB	Alberta	2017	recreational	13.79%	86.21%
CA	BC	British Columbia	2017	recreational	84.85%	15.15%
CA	MB	Manitoba	2017	recreational	72.73%	27.27%
CA	ON	Ontario	2017	recreational	77.55%	22.45%
CA	QC	Quebec	2017	recreational	71.83%	28.17%
CA	SK	Saskatchewan	2017	recreational	36.36%	63.64%