Thesis Title: THE EFFECT OF THE LEGALIZATION OF CANNABIS ON ARREST RATES IN WASHINGTON, D.C.

Sabrina E. Rizk, Master of Arts, 2024

Thesis directed by: Assistant Professor Greg Midgette,
Department of Criminology and Criminal Justice

ABSTRACT

Prior research has found that the legalization of medical and recreational cannabis can contribute to shifts in crime. Very few studies have examined the impact of legalization on racial disparities in arrests. Furthermore, extant findings may be influenced by the characteristics of state and local policies, institutional histories, and the demographics of the areas. This study uses publicly available administrative data on adult arrest rates in Washington, D.C. to measure the change in arrest disparities after legalization. Washington is unique from areas previously studied in its history of racialized policing and residential segregation, as well as a unique form of commercial cannabis legalization that allows cannabis possession but prohibits sales. Using the Theory of Planned Behavior as a theoretical framework, I argue that police use of discretion is influenced by policy change but is subject to personal attitudes on crime and societal norms that are slower to change than policy. The net effect of these forces is a shift in arrest rates and racial disparities following the legalization of cannabis. The findings show that increases in public disorder arrests and public cannabis consumption partially replace possession arrests that no longer occur following the legalization of cannabis. Prior to legalization, arrests of white civilians were relatively rare. After legalization, racial disparities in drug-related offenses fell, but the rate of Black arrests remained higher than non-Black arrests. The shift in arresting patterns is consistent with hypotheses that police may shift focus to both offenses that are related to cannabis consumption and to other forms of crime when cannabis possession is legalized. Among these substitute activities, differences in arrest rates by race persist.

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Sabrina E. Rizk

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Advisory Committee:

Assistant Professor Greg Midgette

Associate Professor Lauren Porter

Professor Peter Reuter

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Introduction

Over the last ten years, the United States has seen a push towards the legalization of recreational cannabis. In 2012, Colorado and Washington State became the first two states to legalize recreational cannabis. They were soon followed by 21 other states, the District of Columbia, Guam, and the Northern Mariana Islands (Avery, 2023). Each state has passed its own laws and regulations regarding the use and sale of cannabis, as well as the resulting sanctions. Today, around 60% of the American public support legalization (Green, 2022).

Historically, in the public and policing eye, cannabis has been linked to Black individuals, and policies were passed that contributed to a significant increase in racial disparities within the criminal legal system (Hurwitz & Peffley, 1997; Mitchell & Caudy, 2013; Welch, 2007). Researchers have conducted many studies that have found that Black individuals are arrested for cannabis drug crimes at a significantly higher rate than White individuals despite similar rates of use (Mitchell & Caudy, 2013; Moore & Elkavitch, 2008). By legalizing cannabis possession, many progressive politicians hope that racial disparities will decrease as the law is applied to everyone, mitigating the risk of disproportional enforcement due to the discretion of police officers (Forman, 2017).

While some research conducted on the impact of the legalization and decriminalization of cannabis has been found to have many benefits, including as a treatment for some medical conditions, a new avenue for financial gain, and a means of reducing racial disparities in criminal legal system contact and economic opportunity (Todd, 2018), other research has found that there is a minimal effect of legalization on reducing incarceration rates and racial disparities in arrests (Vitiello, 2019). For instance, a report by the Drug Policy Alliance found that after the legalization of cannabis in Colorado, cannabis arrests dropped by about 90%. Still, racial

disparities remained, and Black individuals were more likely to be arrested and penalized (Lopez, 2015). Similar results were found in Washington State (Ingraham, 2016; Jenkins, 2016). John Pfaff (2017) argues that while the legalization of cannabis can lead to a decrease in racial disparities due to a shift in police-community dynamics, the systemic issues remain, and legalization could backfire and result in more racial disparities depending on the laws and the redistribution of resources both on the police and the individual. If cannabis is legalized, but there remain very few resources for people with an addiction to receive treatment, it could result in the use of more drugs and the committing of more crimes as a result. Pfaff also argues that even if legalization leads to a decrease in racial disparities in cannabis offenses, the effect on incarceration rates will be very minimal (Pfaff, 2017).

Amid the mixed results of studies conducted on the impact of legalization on racial disparities, criminological studies of legalization tend to focus solely on crime rates (Dragone et al., 2019; Harper & Jorgensen, 2022; Lu et al., 2021; Maier et al., 2017), instead of arrest rates, and are unique to the specific state or border being studied (Lu et al., 2021; Wu et al., 2020, 2021). This study will focus on arrest rates to understand how police responses to cannabis cases may shift toward other types of crime and how that will influence racial disparities in arrests.

Throughout much of the discussion on drug arrests, some have argued that racial disparities in drug arrests exist due to differential involvement and not differential enforcement. The differential involvement argument is that Black individuals are arrested more for crimes because they are more likely to commit them (Hindelang, 1978; Kirk, 2008; Unnever et al., 2019), whereas the differential enforcement argument is that Black and White individuals commit similar crimes, but the difference is that police will arrest Black people more often (Gaston, 2019a). By using crime reports, the differential involvement argument is often

supported because those records indicate that Black individuals are disproportionately represented in crime data (see, e.g., Gelman et al., 2007). However, data on race from official police reports often is based on crimes that result in an arrest, which leaves out crimes and areas that remain uncleared, unnoticed, or unreported, leading to skewed arrest data (Moore & Elkavich, 2008). Recent research has found support for the differential enforcement argument, specifically in drug and traffic cases, therefore making it important to examine arrests and police behavior (Higgins et al., 2012; Lundman & Kaufman, 2003; Mitchell & Caudy, 2013; Moore & Elkavich, 2008). To truly measure the effect of the legalization policy, arrest rates need to be measured so that the trends speak to changes in policing tactics following the legalization and not whether crime itself may have decreased or increased after cannabis legalization. It is essential to recognize the difference between crime and arrest rates when studying the effect of the legalization of cannabis.

Arrest Disparities and Recreational Cannabis Legalization in Washington, D.C.

There are many intricacies in the recently enacted cannabis laws in the United States that make cross-state comparisons of the effect of legalization on crime and arrest statistics difficult. Therefore, individual states and districts must be studied to better understand how different aspects of the law can affect crime and arrests.

In February 2015, Washington D.C. legalized the possession of 2 ounces or less of cannabis but stated that public consumption and distribution was to remain illegal, creating a quasi-legal market. Historically, Washington, D.C., has exhibited among the highest racial disparities in arrests for cannabis possession in the U.S. (Edwards et al., 2013), so legalization of recreational cannabis possession could have a drastic effect on the community. By focusing this study on Washington, D.C., the analysis will contribute to the overall understanding of the effect

of legalization on police decision-making. It also can reveal how a jurisdiction's historical treatment of cannabis can influence the way police use their discretion and impact how policy changes are implemented across racial groups and types of crime.

Cannabis has been highly stigmatized and racialized in Washington, D.C (Forman, 2017). During the cannabis decriminalization movement in the 1970s, Washington, D.C., saw political debates on whether or not cannabis should be decriminalized. Studies showed that while there was a shift in perceptions about cannabis, the police continued to target minority populations disproportionately (Forman, 2017; Washington Star-News, December 6, 1974). Members of the criminal legal system stated that police targeted Black individuals and that they were more likely to be searched for cannabis than White individuals, further hinting at the disproportionate enforcement of cannabis possession laws. Proponents of decriminalization used these statistics to argue that by decriminalizing cannabis, there would be a reduction in racial disparities in arrests and discrimination by the police. The first decriminalization law proposed by David Clarke was in 1975, where possession of cannabis would only be punished with a $100 fine instead of prison, and individuals would only be given a citation instead of being arrested (Forman, 2017).

Despite the argument for potential reductions in racial disparities, Washington D.C.'s Black leaders opposed the decriminalization of cannabis, arguing that by decriminalizing cannabis, Black poor communities would remain at a disadvantage and would continue to suffer from drug use and drug dealing (Forman, 2017; Mock, 2018). Affected by the visible harms of surging heroin use in the community, Black leaders argued that softer penalties would increase cannabis use, and the potential deleterious effects on educational and employment attainment would outweigh the benefits of fewer arrests of Black individuals. Support for the argument

against the decriminalization of cannabis won out, and the proposal by Clarke was not passed (Forman, 2017).

The debates against decriminalization in 1975 set the tone for cannabis laws in Washington, D.C., for the next 30 years. In 1998, there was an attempt to legalize cannabis for medical use through the "Legalization of Marijuana for Medical Treatment Initiative of 1998." Despite 70% of voters supporting the measure, the Barr Amendment blocked its implementation (*Democracy Held Hostage,* 2000). Finally, in 2010, Washington D.C. legislators passed the *Legalization of Marijuana for Medical Treatment Amendment Act of 2010,* which permitted qualified individuals to be prescribed, possess, purchase, and consume cannabis to treat medical conditions (*D.C. Act 18-429 (Medical Legalization)*, 2010).

Cannabis was eventually decriminalized when the Simple Possession of Small Quantities of Cannabis Decriminalization Amendment Act of 2013 was passed and enacted on July 17, 2014. This act stated that possessing more than 1 ounce of cannabis would be considered a civil offense and punishable by confiscation and a $25 fine for individuals 18 or older (*D.C. Act 20-305 (Decriminalization Act)*, n.d.). Before the passing of this act, individuals would have faced up to 30 days of imprisonment with or without fines (*Washington DC Marijuana Laws*, 2022). This rich history of opposition towards the legalization of cannabis has not only led to hesitancy to pass any form of decriminalization or legalization laws but has also contributed to significant racialization and stigmatization of drug use that has led to high rates of arrests and, subsequently, more stigmatization.

Racial Disparities in Drug Arrests in Washington D.C.

A study conducted by the ACLU on cannabis possession arrests across the U.S. found that in 2010, Washington D.C. was the jurisdiction with the highest cannabis possession arrest

rates at 846 per 100,000. Moreover, it was one of the states/districts with the highest percentage increase in possession arrests from 2001 to 2010, with rates going from 524 to 846 per 100,000. Within these cannabis possession arrest rates, Washington, D.C. also has a history of racial disparities. For example, Black individuals were about eight times more likely to be arrested than White individuals in the District of Columbia, making it the state (for the purpose of this study, D.C. was considered a state) with the second largest racial disparities. 1,489 Black individuals were arrested for cannabis possession in 2010 versus 185 white individuals (Edwards et al., 2013).

In 2010, Black individuals made up 51.6% of the population in Washington, D.C., yet they made up 90.9% of cannabis possession arrests. As a result, the study also examined the demographics of the counties identified for the study to examine if residential segregation also played a role. Researchers found that the arrest rate was only higher for White individuals in areas where Black individuals made up less than 2% of the population. Findings like this reaffirm the need to also examine the demographics of the district where the offender was arrested when studying racial disparities in arrests to understand the impact of location. This study highlights the history of racial inequality and drug arrests in Washington, D.C., and emphasizes the importance of examining shifts following cannabis legalization. When possession is no longer illegal, police officers may begin to focus more on other drugs or the distribution/trafficking of cannabis.

This study seeks to answer two main research questions: Did the recreational legalization of cannabis affect arrest rates in Washington, D.C., and did it change racial disparities in arrests? Using regression discontinuity in time and difference-in-differences models, the analysis examines the trends of drug, property, and public disorder arrests before and after the legalization

of recreational cannabis throughout the different districts that make up Washington, D.C. To understand the potential findings, this thesis also employs a theoretical framework composed of the Theory of Planned Behavior to understand police discretion and the subsequent shifts in police decisions. This perspective provides an understanding of how police decision-making is influenced by policy change and how this will result in changes in arrest rates following the legalization of cannabis, including potential shifts in racial disparities.

Review of the Academic Literature on Drug Arrests Disparities, and the Impact of Cannabis Legalization Thereon

Police Discretion in Drug Arrests

The argument for differential enforcement comes from the concept of police discretion, meaning that the reason we might see significant differences between how certain crimes or people are enforced or policed is that police officers have a substantial amount of discretion. Discretion is used when there is an absence of specific rules or regulations that guide how an individual should act (Brooks et al., 2015). There are several reasons that police officers employ discretion in their decision-making. Officers often must make quick decisions without all the information provided, leaving room for ambiguity regarding how to react (Goldstein, 1963; Engel et al., 2019). They have to make judgment calls related to an individual's behavior and the evidence available or the seriousness of the offense. Police use discretion at every level, including whether to conduct a stop, to search or frisk, to use force, or to arrest (Miller, 2015). When offenses are minor, police officers can give warnings or citations versus arresting an individual for a non-serious offense. This is especially true for offenses not considered a concern for the community or not seen as immoral by all (Finckenauer, 1976; Goldstein, 1963). As the seriousness of the offense increases, the officer's discretion decreases as the laws and regulations are more definite for violent crimes and felonies.

Another factor that plays a role in exercising discretion is the availability of staffing and resources. Police officers utilize discretion because they do not have the manpower to patrol and control all the crime occurring; therefore, they must decide what is more critical (Goldstein, 1963; Miller, 2015). The seriousness of the offense comes into play here as well because officers will prioritize felonies and violent crimes over victimless crimes. Furthermore, an officer's assignment will influence their decision-making. For instance, an officer assigned to narcotics is going to focus on drug-related offenses more heavily. Finally, police can decide not to arrest an individual for the betterment of the social good and can choose instead to help them learn from their mistakes, get treatment, etc. (Goldstein, 1963; Finckenauer, 1976).

While discretion is meant to be used in ambiguous scenarios and when there are no standard laws to follow, officers will use discretion even when set standards exist. This is due to very little direct supervision, and even when supervisors review police incidents, they often refer back to the officer's judgment (Wachtel, 1992). This lack of supervision or reliance on judgment contributes to the use of discretion in most policing cases, resulting in disparities in enforcement as it allows for bias and prejudice to dictate decision-making (Bodenhausen, 1988; Pryor et al., 2020).

Recent policing scholarship has focused more on the impact of organizational factors on the use of discretion by police officers (Brooks et al., 2015; Nowacki, 2015). The use of discretion depending on the level of supervision or the style of policing within the department has found support in the latest research. The nature of the department and the attitudes of surrounding officers will impact decision-making. If a community policing philosophy is adopted in the department, officers will change their decisions to align with the set standards. A study by Nowacki (2015) found that there was a statistically significant impact of administrative

policy and police department size on the use of lethal force and that it had a significant effect on Black individuals. Findings like these highlight how not just officer characteristics influence police discretion and, therefore, policing outcomes.

Several studies examined police discretion and the non-legal factors influencing the decision to arrest (Gaston, 2019; Huff, 2021; Roach et al., 2020). Huff (2021) examined the impact of situational, neighborhood, and officer characteristics on the decision to arrest. She found that arrests were more likely to occur when the officer initiated the contact and were 27% more likely to occur in predominantly Hispanic communities and 71% more likely to occur in Black communities despite there being no significant relationship between arrest and neighborhood disadvantage or crime. In addition, the likelihood of an arrest was influenced by individual officers.

Gaston (2019) also found that neighborhood characteristics and race played a role in the discretion used to conduct drug arrests. Specifically, based on officers' self-reported practices, the researcher found that officers used more discretion to conduct stops and surveillance of Black individuals and in predominantly Black neighborhoods than they did for White citizens and communities. They used a lower legal basis when justifying such searches, citing ambiguous behavior and the area's crime problems. Given the context of the area, officers also employed Terry "stop-and-frisk" laws disproportionately on Black individuals. Under the pretense of a search for weapons, most stops where contraband was found resulted in finding drugs, not weapons. Throughout the study, it was apparent that there was a higher level of cause built into using discretion to stop White individuals than Black individuals, which highlights how race plays a role in how discretion is exercised. Roach et al. (2020) focused their analysis on the use of police discretion to conduct stops and investigatory searches; they found that police officers

were more likely to use their discretion to conduct a search on a Black driver than a White driver despite these searches not being justified by contraband hit rates. Understanding the context behind the use of police discretion allows us to approach studies regarding racial disparities in arrests with a better understanding of underlying mechanisms.

Racial Disparities in Arrests

Historically, when examining trends of racial disparities, studies have found that Black individuals are arrested at higher rates than White individuals (Edwards et al., 2013; Higgins et al., 2012; Mitchell & Caudy, 2013). Following the War on Drugs, police departments began implementing specific practices that would target drug crimes or that systematically target minority individuals (Roh & Robinson, 2009). One practice is hot-spot policing, where police departments decide to send more resources or patrol officers to communities that are labeled high-crime. Typically, crime clusters are in disadvantaged places. Studies have found that violence is more likely to occur in areas with lower socioeconomic status, higher residential instability, and lower collective efficacy (Baumer, 2002; Sampson et al., 1997). Minority communities are more likely to face structural disadvantages than white communities, specifically in the city (Sampson & Wilson, 2013; Jones-Webb & Wall, 2008). Therefore, crime may cluster more in those areas, resulting in a focus on policing resources. As a result of hot-spot policing and its focus on higher crime and more disadvantaged communities, suburban White communities go unpoliced, and predominantly minority and urban areas are supervised more (Fagan et al., 2010; Omori, 2017; Roh & Robinson, 2009). This is an important distinction because urban areas are more populated, and crimes are more likely to occur out in the open where police can conduct searches and drug sweeps, whereas crime in suburban areas happens in more private areas (Coker, 1973; Mitchell, 2009; Mitchell & Caudy, 2013).

In addition to disparities generated by place-based targeted policing, police also began to conduct more traffic stops and stop-and-frisk searches. For instance, in Oakland, police officers faced complaints of racial profiling in the early 2000s, with statistics showing that 56% of drivers stopped were Black when only 35% of the population was Black (Oakland Police Department, 2004). Similar trends were seen across the United States. These findings led to researchers conducting studies using the veil of darkness hypothesis, which states that if police officers are racial profiling, then their stops in the day should differ from the night as it is harder to identify race from a distance at night (Grogger & Ridgeway, 2006). Multiple studies have been conducted in various locations as different locations and driving populations need to be considered. Grogger and Ridgeway (2006) and Ridgeway (2009) both found that in Oakland and Cincinnati, respectively, there was no evidence of racial profiling as there was a higher number of stops of Black individuals at night than there was during the day. Using a similar method, Ritter and Bael (2009) found that in Minneapolis there were statistically significant differences in the probability of Black and Latino drivers being pulled over, consistent with racially biased policing. The mix of findings indicates the importance of controlling for several factors, such as the demographics of the area and police resources or policies.

Specifically in terms of drug searches, researchers have found that there are significant racial disparities, with Black drivers being stopped at higher rates than White individuals despite being less likely to be found in possession of drugs (Higgins et al., 2012). As previously mentioned, research has also found that police use lower levels of reasonable suspicion or probable cause to stop Black individuals compared to White individuals (Goel et al., 2016; Pierson et al., 2020). While these studies analyzed racial disparities in all drug arrests, researchers found a similar relationship when solely examining cannabis arrests (Edwards et al.,

2013; Gaston, 2019b). The findings of these studies and many others, as well as the observed relationship between race and drug arrests, are what have prompted the legalization movement in recent years.

Distinctions in the Legal Status of Cannabis

Despite cannabis having been around for many years, it did not become legal for recreational use until 2012 (Dragone et al., 2019). This is due to a long history of negative public and police perceptions towards drug use, including the racial stereotyping of Black and Hispanic individuals (Hurwitz & Peffley, 1997; Mitchell & Caudy, 2013; Welch, 2007). In the modern era, there has been a more accepting outlook on drug use as many states have passed their form of cannabis reform (Saad, 2023). There are three main forms of reform: decriminalization, medical legalization, and recreational legalization (Pacula & Smart, 2017). Decriminalization is the process in which the possession of cannabis is still illegal, but it will not be punished with criminal sanctions. Instead, an individual can be given a citation, a fine, or mandated treatment. The legalization of cannabis varies for medical and recreational use. Medical cannabis legalization allows individuals to possess cannabis for medical purposes. States set their own standards and requirements regarding the possession and distribution of medical cannabis. Finally, recreational legalization permits the possession of specified amounts of cannabis for recreational use. Similarly, the specific guidelines and restrictions depend on the state (Pacula & Smart, 2017; Svrakic et al., 2012).

The Impact of Medical Cannabis Legalization on Crime

While this study's focus is on recreational cannabis, the impact of medical legalization needs to be examined as patterns may emerge that can shed light on the relationship between laxer drug prohibition and crime. Medical legalization has been legal in California since 1996, and since then, 38 states, as well as Washington D.C., have also legalized medical cannabis. A

study by Morris et al. (2014) on the effect of medical cannabis laws on crime using state panel data found that the legalization of medical cannabis did not lead to an increase in crime and instead found that these laws could be related to reductions in rates of assault and homicide. They also note there was no change in robbery and burglary rates following the passing of the medical cannabis legislation. Similarly, Shepard & Blackley (2007) conducted a study on the impact of medical cannabis laws on crime, and they concluded that there was not a positive relationship between medical cannabis laws and crime but rather a negative relationship for assault and homicide. Other studies have found that in addition to the impact of medical cannabis laws on violent and property crime rates, medical cannabis laws have also led to a decrease in alcohol consumption and traffic fatalities (Anderson et al., 2013; Santaella-Tenorio et al., 2017). Given the arguments that the legalization of cannabis will lead to an increase in crime, these findings indicate that there is data that argues the opposite.

While Chu & Townsend (2019) also found that there was no positive relationship between medical cannabis laws and crime, they also did not find a negative relationship between the laws and violent and property crime when controlling for city-specific time trends. The researchers discuss how this might be the result of the illegal cannabis market and that medical cannabis laws will not affect the market, and therefore, crime may still occur. This pattern may be found in Washington, D.C., where even though possession is legal, the market is still a gray area due to the sale of cannabis being illegal. However, distribution is “allowed” if done through donations and using i71-compliant stores. The complexity of how cannabis can be purchased leaves room for the black market to exist as prices will remain high and there remains a level of risk for all parties, thus a gray area of distribution (Houser & Rosacker, 2014; Vitiello, 2019).

Impact of Recreational Legalization on Crime and Arrests

In terms of the impact of the legalization of recreational cannabis on crime and arrest rates, the few studies that have been conducted have found unique relationships. For instance, Dragone et al. (2019) conducted a study on the border between Washington State and Oregon before and after the recreational legalization of cannabis in Washington. They found that on the Washington side of the border, property, and rape crimes saw a significant decrease by 10%-20% and 15%-30%, respectively. Other researchers also conducted studies on the spillover effects of the legalization of cannabis on crime rates of bordering states, and they found similar results regarding the reduction in property crime (Wu et al., 2020). Gunadi and Shi (2022) conducted a study on the effect of recreational cannabis legalization on possession arrest rates in states that have already decriminalized cannabis compared to states that went straight to recreational cannabis legalization. They found that there was a 76.3% decrease in arrest rates in states that went straight to legalization and 40% for states that had already decriminalized cannabis. This same study found that while decriminalization had reduced racial disparities by about 17%, legalization did not additionally decrease racial disparities.

Maier et al. (2017) conducted a study on all 50 states using data from the UCR to identify the impact of decriminalization, medical, and recreational laws on crime in the United States. They found that there was no statistically significant effect. Lu et al. (2021) focused on UCR crime rates in Washington and Colorado. Similarly, they observed no statistically significant long-term effects of recreational legalization on violent or property crime rates. Another study analyzed Washington and Colorado, using a synthetic control model for 2000-2019. The study found that cannabis legalization had no general associations with changes in index crime rates (Harper & Jorgensen, 2022).

In one study conducted on the effects of recreational cannabis legalization on crime in Oregon, crime rates were compared across 19 states that had not legalized cannabis yet. Wu et al. (2021) found that the legalization of recreational cannabis led to an increase in property and violent crimes. Another study conducted in Oregon found that following the legalization of recreational cannabis, in counties in Oregon, simple assault cases increased relative to the 19 states where cannabis is not legalized (Wu & Willits, 2022). Legalization of recreational cannabis might not affect crime the way it has been expected to, which further supports the need for continued research as the mixed results can be attributed to the difference in state demographics, characteristics, availability of resources, and enforcement of crimes.

The Impact of Dispensaries on Crimes

With the passing of medical and recreational legalization laws came the introduction of cannabis dispensaries. Using the logic of routine activities theory (Felson & Cohen, 1980), opponents of legalization laws argue that an increase in cannabis accessibility will lead to increased crime, concentrated among retail outlets. These arguments are often extended to the development of dispensaries due to the fear of creating targets of crime (California Police Chiefs Association, 2009). Many studies have been conducted to examine this relationship. Hunt et al. (2018) conducted a study on the effect of cannabis dispensary laws on crime in California and found that there was no effect on violent crime. When accounting for county-specific ordinances, they found a decrease in property crime. In addition, a study conducted in Denver on the impact of dispensaries on crime found that the addition of a dispensary to a neighborhood led to a 19 percent decline in the average crime rate, and there was a lack of spillover effects in neighboring tracts (Brinkman & Mok-Lamme, 2019).

However, Hughes et al. (2020) found that in Denver, Colorado, medical/recreational dispensaries were associated with increases in all types of crime except for murder and auto theft, controlling for neighborhood characteristics. Freisthler et al. (2017) found that the presence of dispensaries did not affect violent and property crime. However, there was an increase in property crime in the adjacent areas, indicating a spillover effect. Chang and Jacobson (2017) added to the growing research by examining crime rates in areas after a crackdown forced the mass closure of unlicensed medical marijuana dispensaries in Los Angeles. They found that relative to areas where dispensaries remained open, there was an increase in crime near closed dispensaries. Part of this finding was attributed to walkability and eyes on the street as forms of informal control that would deter crime from happening if the dispensaries were open. The mix of findings on the impact of dispensaries on crime speaks to the necessity of additional research and the effect that the nuances of each state law regarding cannabis use and the sale through dispensaries may have on crime.

The Present Study

Washington, D.C., is divided into seven police districts, which are further broken into 57 police service areas (PSAs). Each PSA's demographics and history provide context for this research. This study identifies the demographic characteristics of each police service area as police officers are more likely to patrol low-income minority populations as well as conduct stops and arrests (Fagan et al., 2010; Omori, 2017; Roh & Robinson, 2009). Regarding race, according to the United States Census Bureau (2023), 46.2% of the population in Washington D.C. is White and 45.0% is Black. Compared to other metropolitan areas, Washington, D.C., has one of the largest Black populations. While White and Black individuals make up around the same percentage of the population in D.C., they are typically segregated in their own neighborhoods or police districts. In 2001, a study found that only one-third of the Black

population in Washington, D.C., lived in areas that were not 60% Black (Squires et al., 2002). This remains the case in modern-day D.C[1].

A study conducted by Fielding-Miller et al. (2016) found that when examining arrests that occurred in the 57 different police service areas in Washington D.C., Black individuals were disproportionately arrested more than White individuals and that these disproportionate arrests were higher in areas with higher percentages of White residents. However, a similar relationship was not found for White individuals in predominantly Black individuals. This relationship highlights the impact that segregation of neighborhoods may have on racial disparities in arrests.

Medical Marijuana Legalization in Washington D.C.

In 1998, Washington D.C. approved Initiative 59, a voter-approved ballot initiative to legalize medical cannabis (D.C. Voter's Guide, 1998). Despite being passed with 69% of approval, the ballot was blocked by the passage of the Barr Amendment. This amendment prohibited D.C. from using funds to support the medical cannabis program. It was eventually overturned in 2009, and then in May 2010, the D.C. Council passed a bill legalizing medical marijuana. As a result, starting January 1, 2011, medical cannabis became legal for individuals with certain chronic illnesses such as cancer, glaucoma, and other long-lasting diseases (Southall, 2010; *Washington DC Marijuana Laws*, 2022). Under medical cannabis laws, individuals are allowed to have a maximum amount of 8 ounces of dried medical cannabis (§ 7–1671.03 Restrictions on Use of Medical Cannabis., n.d.).

[1] For example, the Second District includes neighborhoods such as Chevy Chase, Foggy Bottom, Georgetown, Cleveland Park, Palisade and Spring Valley, all of which are, on average, 70% White. In comparison, the Fourth District houses neighborhoods such as Fort Totten, Lamond Riggs, Carter Baron, 16th Street Heights and Shephard Park, all of which are, on average 50% Black (Places to Live in the Washington, D.C. Area, 2023).

In 2022, D.C. had more than 22,000 registered cannabis patients, an almost 90% increase from 2021, which can be tied to the temporary self-certification policy passed in July of 2022 (Jaeger, 2022). This temporary policy became the Medical Cannabis Amendment Act, passed in January 2023, allowing any patient 21 and older to self-certify that they require cannabis as a medical treatment for a qualifying medical or dental illness (Hahn, 2023). Prior to the passing of this amendment, Washington D.C. was categorized as one of the stricter states in terms of who could access medical marijuana, particularly in terms of how expensive obtaining the medical cannabis was and there only being four qualifying conditions (Long Beach Press-Telegram, 2013). Importantly, the infrastructure to deliver medical cannabis within the district provided a springboard for recreational cannabis delivery in lieu of traditional dispensaries.

Decriminalization of Cannabis in Washington D.C.

Decriminalization has been around in the United States since 1973, when Oregon became the first state to decriminalize cannabis by reducing the penalty for possession of up to one ounce to a $100 fine (Crombie, 2014). Since then, 19 other states and the District of Columbia have passed decriminalization policies (Lozier et al., 2023). In March 2014, Washington, D.C. adopted a decriminalization bill that made the possession of one ounce or less punishable by a $25 fine. However, the criminal penalties for public consumption remained. The bill was enacted in July after a review waiting period. Following the passing of this bill, police officers were no longer able to conduct a stop or other action based on the smell of cannabis, and they could not demand the identification of an individual found in possession of up to one ounce. However, police officers could continue to use the odor as a possible indication for stopping a driver suspected of driving while under the influence (DeBonis & Hermann, 2014).

Recreational Cannabis Legalization in Washington D.C.

The first recreational cannabis laws in the United States was passed by voter initiatives in 2012 in Colorado and Washington. Since then, 24 states and Washington, D.C. have legalized the recreational possession of cannabis (Marijuana Legality by State, 2024). While cannabis possession, sale, and distribution are illegal under federal law, the Cole memo (2013) guided to federal law enforcement to not intervene in states with legal cannabis markets; this has been interpreted to protect both medical and recreational markets sanctioned by states (Houser & Rosacker, 2014). Each state has implemented guidelines and restrictions regarding the possession and sale of cannabis. The National Institute on Alcohol Abuse and Alcoholism's Alcohol Policy Information System (2022) has documented a list of the states that have legalized cannabis and what the individual policies permit or prohibit. When examining the different state policies, it is evident how states across the country vary in possession, distribution, home delivery, and public consumption laws (See Appendix Table 6). The trend of passing different policies continued with the recreational legalization of cannabis in Washington, D.C.

In 2015, Washington, D.C. voters passed Initiative 71 (hereinafter I-71), legalizing possession of two ounces or less of cannabis for residents 21 and older. I-71 also allowed the private growing of up to six cannabis plants, and only three of which may be mature at a time. Individuals are allowed to transfer up to one ounce of cannabis to another adult 21+ if there is no money exchanged. Washington D.C.'s recreational cannabis laws are especially complex because while simple possession has become legal, the sale of cannabis is still illegal (See Appendix Table 7 for more details on penalties).

These laws and regulations, however, have not prevented dispensaries from opening throughout the district. I-71 compliant shops have opened where individuals can go and buy a

piece of art or clothing and receive a "gift" of cannabis. If the transaction is considered a "donation," it is considered legal.[2] Not only does the nature of I-71 compliant stores create unique qualities within the drug market, but also, due to Washington, D.C.'s lack of statehood, there are restrictions in terms of how cannabis is governed. The district is blocked from being able to tax and regulate the sale of cannabis (Efrati, 2022). Any passed bill that could regulate or add taxation has to receive Congressional approval, and to date, Congress has shut down any such attempts (Auxier, 2014). Consumers are required to pay a 5.75% sales tax on all purchases of cannabis for personal use (*District of Columbia: Marijuana Tax Handbook*, 2023).

Cannabis is expensive in Washington, D.C., due to a multitude of factors, including location costs, taxes, and overall legal risk faced by "gift shops." The average price for an ounce was around $346 in Washington D.C. in 2015, reaching $597.88 at its peak in 2019 (Kaplan, 2019; Swanson, 2015). Comparatively, other legalized states have prices around $230 an ounce (*The Average Cost of Marijuana by State, 2023)*. Due to relatively high costs in the district, the decrease in property and drug crime that researchers found in other states due to decreased economic burdens may not be found here, but rather, we could see an increase in theft and distribution arrests. The prevalence of delivery services might counter the increase in distribution and theft arrests.[3]

In 2019, there was a widespread increase in cannabis delivery services that operate like Uber Eats and Instacart (*DC Weed Delivery FAQ and Best Weed Delivery DC Services*, 2022).

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[2] There are an estimated 100 I-71 compliant stores throughout Washington D.C. (Cirruzzo, 2022). Most, if not all, I-71 compliant stores in Washington D.C. limit the amount of cannabis gifted to 1 ounce for a 24-hour period

[3] Many places have a minimum required purchase value in order to qualify for delivery, but if individuals are buying up to 2 ounces, they very easily meet the minimum. For example, the Gift Givers is a I-71 compliant store that offers delivery for a $50 minimum and a donation for one sticker (3.5 grams) is $60, as well as a donation for 4 stickers (28 grams) is around $250 dollars. Other stores have higher delivery rates depending on where the individual is located.

Opponents of cannabis delivery have claimed that it will lead to increases in violent and property crime due to delivery trucks carrying a lot of product and money, making them targets for robberies (California Police Chiefs Association, 2009; Hughes et al., 2020). However, studies have found that deliveries occur just as food delivery, in non-distinguishable vehicles, and only a few deliveries at a time, reducing the amount of cash on hand at any one time (McGreevy, 2018). A study conducted in California on cannabis delivery found that property and violent crime rates were decreasing at the same time legalization was implemented, and there was not a spike following the use of delivery services (Purnell, 2019). The availability of these delivery services adds to the informal structure as it makes it hard for police to patrol areas where drug crime may occur. It can contribute to less regulation of sale and distribution, as it is more secluded when individuals can have cannabis delivered to their houses.

Theoretical Framework

While previous studies have been done on the effect of the recreational legalization of cannabis in other states across the United States, the findings cannot be entirely generalized. Cannabis is illegal federally, and each state or district implements its own laws that can affect crime and arrest rates differently. This is especially salient to the study of cannabis legalization in Washington, D.C., due to its complex unique quasi-legal regulations and market structure. To gain an understanding of how the legalization of cannabis will affect arrest rates in Washington, D.C., this analysis applies a theoretical framework that focuses on explaining police discretion and how police practices might shift methods of enforcement.

The first research question is: **Does the legalization of recreational cannabis affect arrest rates**? To understand how arrest rates will be affected, we should consider why and how

policing may change. To the extent that arrests are a function of underlying crime, when crime decrease, there should be a commensurate a decrease in arrests. However, with the legalization of cannabis possession, will enforcement shift to other possession-related offenses? More fundamentally, what motivates police to continue enforcement by proxy offense when cannabis possession is legalized? This question is often thought of in terms of police discretion and the fact that not all crimes result in an arrest. If police specifically used the possession of cannabis to control other crimes, then legalization would result in a need to shift to other arrests. This is the relationship that needs to be examined. Therefore, this analysis applies the Theory of Planned Behavior (Ajzen, 1991) through consideration of police perceptions and motivations which I posit to be informed by Goldstein's Tripartite Framework of the Drug/Violent Crime Nexus (Goldstein, 1985).

The second research question is: **Do racial disparities in arrests change following the legalization of cannabis**? This question applies the Theory of Planned Behavior as it is concerned with police decision-making to understand how attitudes toward an offense, the subjective norms regarding enforcement, and the change in control over certain crimes will lead to changes in racial disparities. Before illustrating how each theory is applied to the research questions in the analysis, I provide a brief overview.

Goldstein's Tripartite Framework

Goldstein's Tripartite Framework connects drugs and violence via three hypothesized models: psychopharmacological violence, economic compulsive violence, and systemic violence. This theoretical framework has often been used in criminological literature to explain the relationship between illegal drugs and violent crime (Weiner et al., 2005; Bennett & Holloway, 2009). The psychopharmacological violence model posits that crime occurs because

of individual short- or long-term drug use, which can lead to irritation and violent behavior. This model has historically been applied to alcohol, opiates, and stimulants. However, for the purpose of this research, this model has weak empirical support when applied to cannabis use; violent behavior has not been attributed to the use of cannabis and other substances (Goldstein, 1985; Greenberg & Adler, 1974; Moore & Stuart, 2005).

The economic compulsive model states that drug users will engage in property crime or acquisitive violent crime, such as robbery or theft, in order to support their drug use. The primary motivation is that individuals need money to sustain their drug habits. Research has found that the most common crimes individuals commit under the economic compulsive model are non-violent, such as shoplifting (Bennett & Holloway, 2009; Goldstein, 1985; Simpson, 2003).

Finally, the systemic violence model posits that violence is associated with the nature of the drug market and refers explicitly to the aggressive nature of drug distribution. Examples of systemic violence include robberies of drug dealers, disputes over illicit drugs or over territory between rival drug dealers, "robbery violence related to the social ecology of copping areas," etc. (Goldstein, 1985). This violence is not concentrated on one single party in the drug market. Depending on the situation, sellers, buyers, and users can all be perpetrators and victims in this model (Maier et al., 2017). When drugs are illegal, and there is law enforcement crackdown on distribution and use, those involved in the illegal market tend to settle their disputes on their own, and they do not go to law enforcement, which can lead to an increase in violent crime (Anderson, 2000; Goldstein, 1985; Miron & Zwiebel, 1995; Werb et al., 2011).

While both systemic violence and economic compulsive models are often utilized in research regarding drugs and crime, they are better suited to explain the relationship for illegal, more expensive, and lower prevalence drugs than they are for cannabis. The markets for these

harder drugs typically have higher risks and higher expenses at all stages, whereas cannabis carries less risk and expense (Reuter & Kleiman, 1986; Caulkins & Pacula, 2006). Nonetheless, police express serious concerns about the effect of cannabis legalization on public safety (Stanton et al., 2022).

The Theory of Planned Behavior

The Theory of Planned Behavior (TPB) was developed by Icek Ajzen as an extension of the theory of reasoned action to try to predict human behavior (Ajzen, 1991). A central tenant of TPB is the concept of the individual's intention to perform a behavior. The stronger the intention to engage in a behavior, the more likely the action will occur. These behavioral intentions are formed by three variables: attitude toward the behavior, subjective norm, and perceived behavioral control. The three variables interplay and form an individual's behavioral intention, influencing their behavior (Ajzen, 1991). It attempts to account for non-volitional behaviors by including a variable for the perception of control (Ajzen, 1991; Conner & Armitage, 1998). Attitudes toward the behavior are based on personal beliefs. Subjective norms are expressed as how the expectations and pressures of society regulate behavior (Del Pozo et al., 2021). Finally, perceived behavior control is defined as a person's belief that they can carry out an action, and this belief is based on access to resources and the opportunity to perform the behavior successfully (Ajzen, 1991; Conner & Armitage, 1998).

Theory of Planned Behavior Applied to Policing

The use of discretion in policing results in various outcomes across the different stages of policing and often leads to questions regarding how and why decisions are made. Police discretion literature has found that an officer's beliefs, attitudes, and perception of how their

actions will be perceived play a role in predicting police behavior when examined with other factors (Alpert et al., 2004; Smith et al., 2005). Since these findings are consistent with the main variables of the theory of planned behavior, researchers have applied the theory to try to predict and understand policing behavior.

Ishoy (2016) employed a qualitative analysis to examine police decision-making in the context of the ideas from the theory of planned behavior. The study focused on everyday decision-making, such as whom to stop and when to arrest vs. give a warning or citation. The analysis found that, aside from legal factors, the individual officer's belief about the seriousness of the offense and whether the officer personally had a vendetta against the offense had a significant impact. These personal opinions about severity influenced decisions across offenses, including cannabis possession. As for subjective norms, they did not appear to influence decision-making. This was because officers were rarely questioned, and their judgment was often trusted. The one exception was the norm to always conduct arrests for felonies and to use discretion for misdemeanors. Perceived behavioral control was operationalized as the level of discretion the officer believes they had. Just as the seriousness of an offense influenced an individual's attitude, it also influenced how much discretion an officer believed they had. The higher the severity, the less perceived discretion.

Cubitt et al. (2020) conducted a study on serious police misconduct in Australia in which they utilized the theory of planned behavior to propose a prediction model of policing behavior. The subjective norm and attitude variables were based on the policing environment, including structure, accountability measures, and fellow policing behavior. If misconduct or certain behaviors are seen as positive or encouraged among the police force, regardless of societal norms, police officers might be more likely to commit them. Finally, perceived behavioral

control was measured regarding how the misconduct was dealt with. If it was remediated, the action was less likely to occur because police officers would perceive that they had less control over the behavior occurring successfully. When examining the predictive nature, the researchers found that only perceived behavior control was a good predictor of serious misconduct.

Racial disparities in police decision-making are particularly prevalent in drug arrests (Edwards et al., 2013; Higgins et al., 2012). Therefore, it is crucial to understand what influences police behavior regarding the enforcement of drug offenses to highlight what is driving these disparities. Del Pozo et al. (2021) applied the theory of planned behavior to police discretion in their encounters with people who use drugs. Researchers found that a majority of the officers felt like they at least had some control over the decision to arrest an individual or confiscate their drug-related contraband. As for the impact of subjective norms, similar to previous studies, a majority of the officers reported that the seriousness of the offense had the most substantial influence on decisions to arrest, and supervisors had more of an influence on decision-making compared to peers and colleagues. Finally, the study found that the attitude of the suspect and an officer's personal sense of right and wrong heavily influenced decisions. In this study, attitudes were influenced by the officers' views on addiction and the stigma towards opioid users. For instance, 80% of the officers agreed that people who use drugs would not hesitate to lie when it benefits their addiction. This belief can heavily construe perceptions of an individual's attitude and, therefore, influence police behavior (Del Pozo et al., 2021).

Theoretical Framework for Research Question One: Does Legalization of Recreational Cannabis Affect Arrest Rates?

As defined above, the three variables of the Theory of Planned Behavior work together to explain what drives an individual's intention and the resulting behavior. Previous research has

illustrated how policing tactics may or may not shift following changes to policy. An example comes from New York, where stop and frisk was found to be unconstitutional. When stop and frisk was initially developed, there was much room for discretion as the rules of enforcement were vague, and officers were not always required to report the reason for stops (Gelman et al., 2007). Therefore, officers had more discretion in their decision-making, allowing for other factors such as attitude and subjective norms to play a role in the officer's intentions and resulting actions. When the policy that more heavily restricted searches was implemented, as discussed in White et al. (2016), there was a drop in stops. However, racial disparities persisted, hinting at police officers relying on subjective norms and attitudes in their enforcement decisions. Similarly, a study conducted on the deadly use of force by Philadelphia police officers found that while there were multiple state and judicial laws and policies passed that would restrict the use of force, the external force of discretion did not affect the use of deadly force. Instead, the main factors found to have an effect were the organizational and departmental norms and whether those changed or led to new guidelines (White, 2003).

Police officers may use drug possession as a means of pretextual stop to get more information or target more serious offenses. For instance, if an individual is arrested for a minor crime, officers can interrogate them about other potential crimes, track them, and take someone they deem a criminal off the streets (Jain, 2015). Police departments have historically used the targeting of minor offenses or public disorder crimes as proxies for enforcing other forms of crime tactically under the broken windows theory and zero-tolerance policing (Kelling & Wilson, 1982; McCabe, 2008), as was seen throughout the zero-tolerance policing movement (Kamalu & Onyeozili, 2018). The legacy of these practices may still inform police norms today.

In the context of this study, following the legalization of cannabis, police officers are no longer able to arrest an individual for possessing less than 2 ounces of cannabis or for growing 6 plants within a private residence. This policy influences the perceived behavioral control variable as officers will believe their discretion is limited in enforcing cannabis possession. However, as mentioned, officers can still stop an individual for public consumption or distribution. There then remains a sense of control for officers to stop an individual under the suspicion of other cannabis-related offenses.

Another aspect of perceived behavioral control that police consider is the availability of resources. Research on this aspect of perceived behavioral control has found mixed results, with some studies finding a connection between arrests and organizational and personal factors such as availability of resources, number of officers, overtime or work schedules (Caulkins & Kilmer, 2016; Ishoy & Dabney, 2018; Makin et al., 2019; Moskos, 2008) and other studies finding that officers ranked personal factors last as a consideration when making arrests (Del Pozo et al., 2021). The results from Makin et al. (2019) suggested that following the legalization of recreational cannabis in Oregon and Washington, there was a reallocation of resources as clearance rates in both states increased for a majority of violent and property crimes. With no longer needing to dedicate time to cannabis possession offenses, officers were able to focus more time and resources on other offenses.

It is also important to note that in many departments, when police conduct an arrest for multiple offenses, only the highest offense is recorded in the system (Federal Bureau of Investigation, 2004; Kaplan, 2023). Therefore, following departmental policy (subjective norms), arrests may have occurred for more minor offenses, but only higher offenses were being recorded.

In addition to perceived behavior control and subjective norms, the attitude variable also informs shifts in arrests. Police officers have certain beliefs and attitudes towards prohibited activities, so these perspectives can often influence their actions. A study that assessed policing attitudes toward drugs and drug enforcement found that even though officers recognized cannabis is the least harmful drug, 58.7% of the officers thought that cannabis laws were not strict enough, and 67.4% and 74%, respectively, disagreed with the decriminalization and legalization of cannabis (Petrocelli et al., 2014). Furthermore, Del Pozo et al. (2021) found that 65% of officers believed that people who are addicted to opioids are to be "blamed for their own condition." Findings like this help provide insight into the possible attitudes police officers might have towards drug offenses and, as a result, how this might inform their decision-making.

Despite the legal status of cannabis, police officers might be more motivated to continue policing drug use as they believe legalization could pose a threat to public safety. These attitudes towards legalization can be formed by ideas of how the drug market will be affected and how crime will respond, as discussed in Goldstein's tripartite framework. While Goldstein's tripartite model is better applied to the relationship between violent crime and expensive low-prevalence substances (Goldstein, 1985; Greenberg & Adler, 1974; Moore & Stuart, 2005), its tenets could explain police perceptions of what is expected to occur following legalization of cannabis. For instance, there is a public perception that cannabis use can lead to violent behavior and result in other crimes (McGinty et al., 2016).

With the notions outlined in the economic compulsive and systemic violence models, officers may patrol areas with known drug use and drug trade-related violence more aggressively. Moreover, the public nature of the use of I-71 stores might make certain areas higher targets for robbery and searches. This can lead to higher rates of arrest if officers conduct

more searches on individuals found in that area. However, what may mitigate this is that Washington D.C. does have several delivery options (*DC Weed Delivery FAQ and Best Weed Delivery DC Services*, 2022), where individuals do not have to go to I-71 stores to purchase cannabis, resulting in fewer targets for robbery and searches.

Hypotheses for RQ1:

The Theory of Planned Behavior posits that an individual's behavior is driven by their intentions and that the interplay of attitudes, subjective norms, and perceived behavioral control forms their intentions. In the context of the police in Washington D.C., their discretion will be limited in terms of arresting for possession, but it remains for other offenses. Their perceived behavioral control will shift depending on the situation. In addition, the complexity of the history of cannabis legalization and enforcement in Washington D.C. leads there to be a potential for both increases and decreases in the different categories of arrest rates as the typical mechanisms that we would expect to impact the rates differ in this environment. While it would be expected for drug-related arrests to decrease following the legalization of possession, the subjective norms and attitudes towards drugs in the community can contribute to an increase in arrests as a method of deterrence and protection, whether it is by strongly enforcing other cannabis offenses or by using evidence of other drug use to conduct searches. These same factors can also influence how non-drug-related arrests occur. Therefore, when considering the three variables of the theory of planned behavior in conjunction with the nature and history of cannabis in Washington, D.C., I make the following hypotheses:

1. Drug-related arrest rates will increase or decrease following the legalization of cannabis.
    a. Overall cannabis arrest rates may increase or decrease following cannabis legalization.

   b. Cannabis consumption arrest rates may increase or decrease following cannabis legalization.
   c. Cannabis distribution arrest rates may increase or decrease following cannabis legalization.
   d. Controlled substance-related arrest rates may increase or decrease following cannabis legalization.
2. Property arrest rates may decrease or increase following cannabis legalization.
3. Public disorder arrest rates may increase following cannabis legalization.
4. Violent crime arrest rates will not be affected by cannabis legalization.

Theoretical Framework for Research Question Two: Do Racial Disparities in Arrests Change Following the Legalization of Cannabis?

Following the legalization of cannabis, arrests for drug possession are limited, so police discretion is constrained. Assuming police discretion yields higher rates of arrests of Black individuals, racial disparities should decrease. However, other related factors can contribute to increases in racial disparities. The location of the arrest can influence attitudes towards a crime due to previous crime and arrest records marking an area "high crime" (Roh & Robinson, 2009). Suspicion levels are higher if a person seems to be out-of-place (Ishoy, 2015). Within the context of Washington, D.C., the concept of attitudes for police officers is most likely constructed by the historical policing of Black individuals for drug arrests. In 2010, Washington, D.C., was the jurisdiction with the most cannabis arrests. It was also the second highest in terms of racial disparities, with Black individuals making up the majority of the arrests made (American Civil Liberties Union, 2013). The number of individuals that were committing drug offenses in 2010

indicates a “big drug community” that needs to be addressed. Moreover, drug dealers were seen as a danger to the community and known “drug areas” were policed more heavily.

If police officers patrol areas labeled as high-crime or where drug deals occur, they are more likely to witness crime occurring and, therefore, conduct arrests. As mentioned, the areas focused on are typically racially segregated. Therefore, if more arrests are occurring in this area, it is more likely that minority communities and individuals are being policed and arrested. Furthermore, the development of I-71 compliant stores marks where drug sales are occurring, which can increase police presence if they are trying to deter other crimes from occurring. Similarly, due to residential segregation in D.C., this can contribute to racial disparities in arrests that occur in these areas.

In the context of Washington, D.C., societal expectations make up the subjective norm concept because drug use has been an issue discussed by politicians and the public for years. There is a long history of negative stereotypes surrounding drug use among the public, with politicians and the Black community opposing recreational cannabis as they felt it would be detrimental to the communities and society as a whole. There was also a specific worry about adolescents in the community and how they would become addicted at a young age and ruin their futures. These perceptions and notions regarding drug use colored individual perspectives and delayed policies from being implemented (Forman, 2017). Police officers may feel pressure from their community to properly enforce other crimes to mitigate any effect the legalization of possession would have on society, such as an increase in public disorder offenses or other drug use. This can contribute to a shift in racial disparities because, once again, minority communities are policed more heavily than others, and the notion of drug use has been centered on Black individuals, making them the focus of policing tactics (Fagan et al., 2010; Forman, 2017; Roh &

Robinson, 2009). These same factors will impact the attitudes of the officers because the history and fear of legalization will contribute to their perception of the severity of the offense and suspicion of Black individuals, resulting in racial disparities in the individuals stopped, searched, and arrested.

Hypotheses for RQ2:

Similar to the reasoning behind the hypotheses for research question one, the expected trends for racial disparities related to drug arrests can either increase or decrease. As was discussed in the literature review, even in instances where police officers changed their tactics in arrests, racial disparities remained and increased in some instances. Contrarily, some studies saw decreases in racial disparities. However, there was not a complete elimination. The mix of these findings leads to uncertainty about the context of Washington, D.C. As for non-drug-related arrests, the use of police enforcement to crack down on crime to still enforce cannabis use may lead to an increase in the policing of minority communities for other offenses. Using the components of the theory of planned behavior, as well as the history of cannabis stigmatization in D.C., I make the following hypotheses:

1. Racial disparities in overall drug arrest rates will increase or decrease following the legalization of cannabis.
    a. Racial disparities in cannabis consumption and distribution arrest rates will increase or decrease following cannabis legalization.
    b. Racial disparities in controlled substances-related arrest rates will increase or decrease following cannabis legalization.
2. Racial disparities in property arrest rates will increase following cannabis legalization.

3. Racial disparities in public disorder arrest rates will increase following cannabis legalization.
4. Racial disparities in violent arrest rates will not change following cannabis legalization.

Data and Methods

Open Data D.C.

The data examined in this project was downloaded from Open Data DC. The sample includes information on 241,661 adult arrests made by the Metropolitan Police Department (MPD) from 2013 to 2021. The data collected is based on arrests inputted into the MPD Record system. Only the most severe charge was recorded following the FBI Hierarchy Rule. The dataset includes information on race, sex, date, offense district, police service area (PSA) where the arrest occurred, and the category and description of crime for every adult arrest.

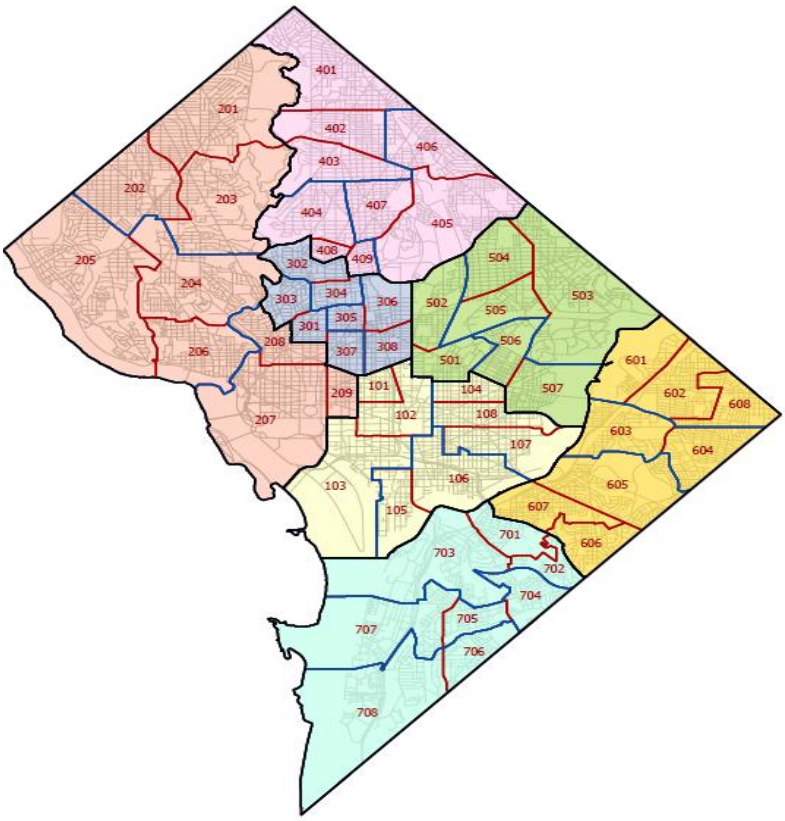
The original data had information on all arrests, and each offense was assigned a category and a specific description. To examine the general trend of all drug offenses before and after the legalization of cannabis, I created a variable for Drug arrests, with 1 for drug-related and 0 for non-drug-related arrests. However, to understand the relationship between the legalization of cannabis on cannabis arrests and other substance charges, a variable was created to capture cannabis offenses exclusively. All other substances were grouped together as other controlled substances based on specific text in the arrest records. To determine a potential shift between cannabis offenses, cannabis arrests were examined in total and as separately by specific offense. Categories were created for possession, possession with intent to distribute, public consumption, and distribution. For cannabis legalization, a binary variable was created, with 0 being pre-legalization and 1 being post-legalization.

In terms of violent, property, and public disorder arrests, each has its own variable that accounts for all crimes that fall under those categories (See Appendix Table 8 for classifications). The property and public disorder variables are examined alongside the drug offense variables to identify if the legalization of cannabis contributed to an increase in these arrests due to police officers shifting their attention away from drug crimes and towards other offenses.

For race, a Black or non-Black variable and a White or non-White variable were created to examine the difference in arrest rates based on race. The focus on Black individuals is due to previous literature on racial disparities that has found that Black individuals are more likely to have disparate outcomes in arrest rates, as well as stereotypes regarding drug use. Hispanics are also marginalized and heavily disproportionately arrested for drug offenses (Mitchell & Caudy, 2013). However, the sample size for Hispanic individuals had many unknown observations. Gender and age are also controlled for in this study.

The data were then collapsed into monthly rates by police service area to examine where the arrests occurred by month. The map in Figure 1 displays the Washington D.C. Metro Police Department units spatially. The 7 district boundaries are outlined in black, the 21 sector boundaries in blue, and the 57 police service areas in red. According to 2010 Census Data, an average of 10,627 people resided in each police service area in Washington, D.C. The data is examined in terms of arrest rates occurring in the police service area by month over the 2010 population of each police service area.

Figure 1: Metropolitan Police Department Citywide Map



Census Data

Supplementary data was utilized to measure the total population of Washington, D.C., and the divide between Black and White populations across all of D.C. and the individual police service areas. The US Census does not include population data broken out by police districts. However, researcher John Keefe created a data set using 2010 census data according to the 2020 police service area boundaries (Keefe, 2020). This dataset includes information on the total population, White population, Black population, Hispanic population, and the remaining race categories included in the census. Due to Open Data D.C. only having reliable information on White and Black arrests, only the Black, White, and Total population variables are used in the

analysis. Using this census data, arrest rates for each category were calculated, and race arrest rates were proportionate to their respective population.

Descriptive Statistics

Table 1 displays arrest rates by crime type observed from 2013-2021. About 77% of the individuals arrested were Male, and 86% were Black. The average age of arrestees was 35 years old. The breakdown of the type of arrest was as follows: 10% were drug-related arrests, 16% were property arrests, 30% were violent crime arrests, 11% were public disorder arrests, and the remaining 33% arrests were categorized as other because they involved traffic, probation or parole violations, family-related cases, or other crimes that are not being examined in this analysis. Within drug-related arrests, 28% of the cases were for cannabis offenses, and 72% were for controlled substances, which highlights that while the legalization of cannabis may lead to a decrease in cannabis arrests, there is still a significant number of controlled substances-related arrests occurring. Among cannabis offenses, possession made up the highest percentage of arrests, and that is what has been legalized, so there should be an expected decrease in the percentage of arrests that cannabis arrests account for following February 2015.

Table 1: Descriptive Statistics (2013-2021) (n=241,661)

Variable Name	Observation	Mean	Std. Dev.	Min	Max
Police Service Area of Arrest	**241,661**			**1**	**57**
Male	**241,661**	**77.38%**	**.42**	**0**	**1**
Black	**241,661**	**86.19%**	**.35**	**0**	**1**
Age	**241,661**	**35**	**12.53**	**18**	**87**
Drug Arrest	**23,478**	**9.72%**	**.296**	**0**	**1**
Cannabis	**6,661**	**28.37%**	**.451**	**0**	**1**
Consumption	**963**	**14.46%**	**.352**	**0**	**1**
Possession	**2,695**	**40.46%**	**.491**	**0**	**1**
Possession with intent to distribute	**1,751**	**26.29%**	**.440**	**0**	**1**
Distribution	**1,252**	**18.80%**	**.391**	**0**	**1**
Controlled Substances	**16,817**	**71.63%**	**.451**	**0**	**1**
Property Arrests	**38,380**	**15.90%**	**.366**	**0**	**1**
Violent Arrests	**72,685**	**30.08%**	**.459**	**0**	**1**
Public Disorder Arrests	**27,206**	**11.26%**	**.316**	**0**	**1**
Other Arrests	**79,912**	**33.07%**	**.470**	**0**	**1**

Note: Arrest rates are calculated as the monthly arrest rates per 100,000 persons residing in each PSA.

Table 2 illustrates the descriptive statistics of the total arrest rate per month across the police service areas for months prior to the legalization of cannabis, for months after, and the total average from March 2014 to March 2016. At first look, it is shown that the drug arrest rate fell from 3533.24 to 2099.70 total arrests a month per 100,000 people, resulting in an overall

average of 2790.73. A similar trend was identified with cannabis arrest rates, seeing a drop from 1,228.20 arrests to 194.19 arrests per 100,000 people, which is an important drop to highlight since only cannabis possession was legalized, but there is still an overall drop. All the specific cannabis arrests also decreased, although not as quite drastically. As for other crime rates, every category saw a decrease following the legalization of cannabis. Several factors can explain the shift in arrest rates, including the legalization of cannabis, a decrease in crime, sociodemographic factors, and policing.

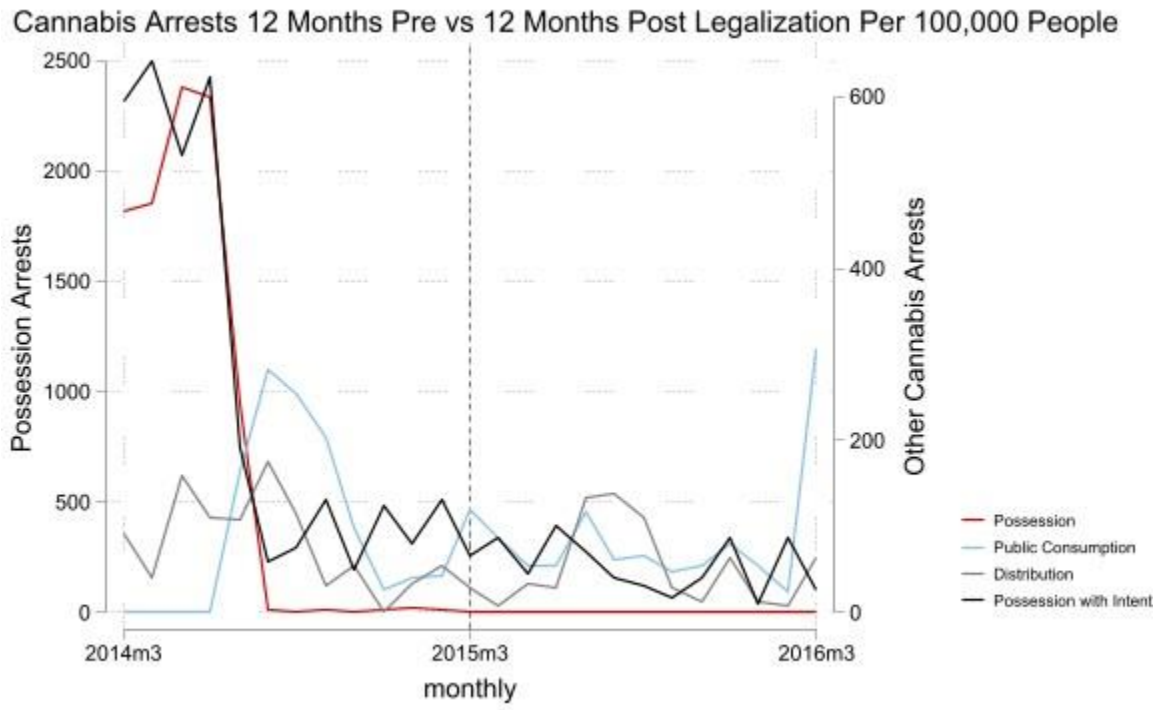
Table 2: Arrest Rate per 100,000 People per 12 Months Pre vs. 12 Months Post-Legalization (N=6,075)

Variable	Pre-Legalization	Post-Legalization	Total
Drug Arrest Rate	**3533.24**	**2099.70**	**2790.73**
Violent Arrest Rate	**8729.73**	**8306.43**	**8510.48**
Property Arrest Rate	**4331.56**	**4228.20**	**4278.02**
Public Disorder Arrest Rate	**3836.90**	**3033.23**	**3420.63**
Cannabis Arrest Rate	**1,228.20**	**194.19**	**692.62**
Consumption Arrest Rate	**92.99**	**87.27**	**90.03**
Possession Arrest Rate	**784.84**	**0**	**378.32**
Possession with Intent to Distribute Arrest Rate	**269.44**	**54.59**	**158.16**
Distribution Arrest Rate	**80.93**	**51.62**	**65.75**
Controlled Substance Arrest Rate	**2305.04**	**1905.51**	**2098.10**
Other Arrest Rate	**9273.48**	**8345.49**	**8792.82**

Figure 2 visualizes how the arrest rates for the different types of cannabis offenses shifted following the recreational legalization policy. The dotted line in Figures 2,3 and 4 represents when the policy was implemented (March 2015). Due to cannabis possession arrests occurring at significantly higher rates than other cannabis arrests, Figure 2 has a separate y-axis for possession vs. other cannabis arrests to visualize potential shifts after legalization properly. It

illustrates that arrest rates for the possession of cannabis decreased even before legalization, which is due to a decriminalization policy being passed, and it remains at zero arrests after March 2015. Similarly, possession with intent to distribute also decreased before legalization during the period of decriminalization, but it did begin to increase again closer to the legalization period. There were spikes for the rest of the identified period. As for public consumption, there were no arrests before 2014, and there was an increase following decriminalization and about a year after legalization. Finally, there were multiple periods of decrease and increasing rates for distribution arrests.

Figure 2: Cannabis Arrests 12 Months Pre vs 12 Months Post-Legalization (per 100,000 people)



Not only does the analysis examine shifts in the various cannabis offenses, but also how arrest rates for controlled substance arrests may have changed. Figure 3 illustrates how the cannabis arrest rates outnumbered or were on equal levels with the controlled substances arrest

rates prior to decriminalization and legalization. There was then an increase in controlled substances in the months after. Cannabis arrest rates, in general, decreased in the direct time after the implementation of the legalization of cannabis before seeing slight increases and decreases. The decrease highlights the immediate impact legalization could have had on cannabis offenses in general, and the fluctuations illustrate possible shifts to policing of distribution and consumption offenses. In comparison, arrest rates for controlled substances, for the most part, remained at an increased level.

Figure 3: Drug Arrests 12 Months Pre vs 12 Months Post-Legalization (per 100,000 people)

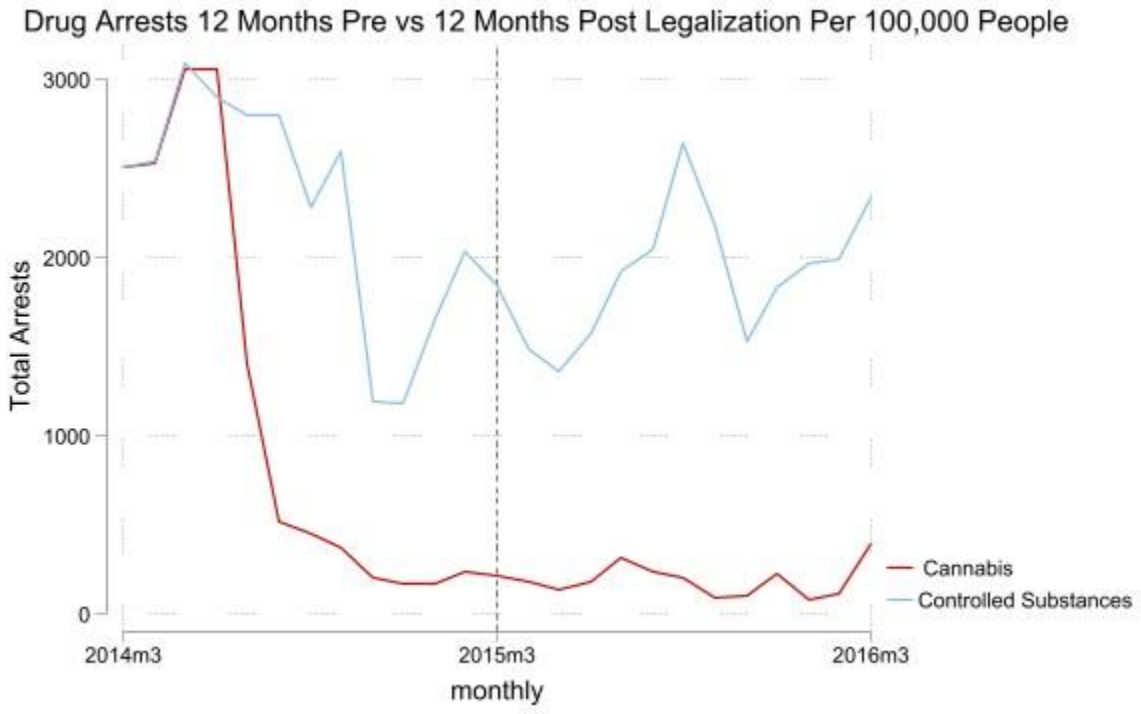
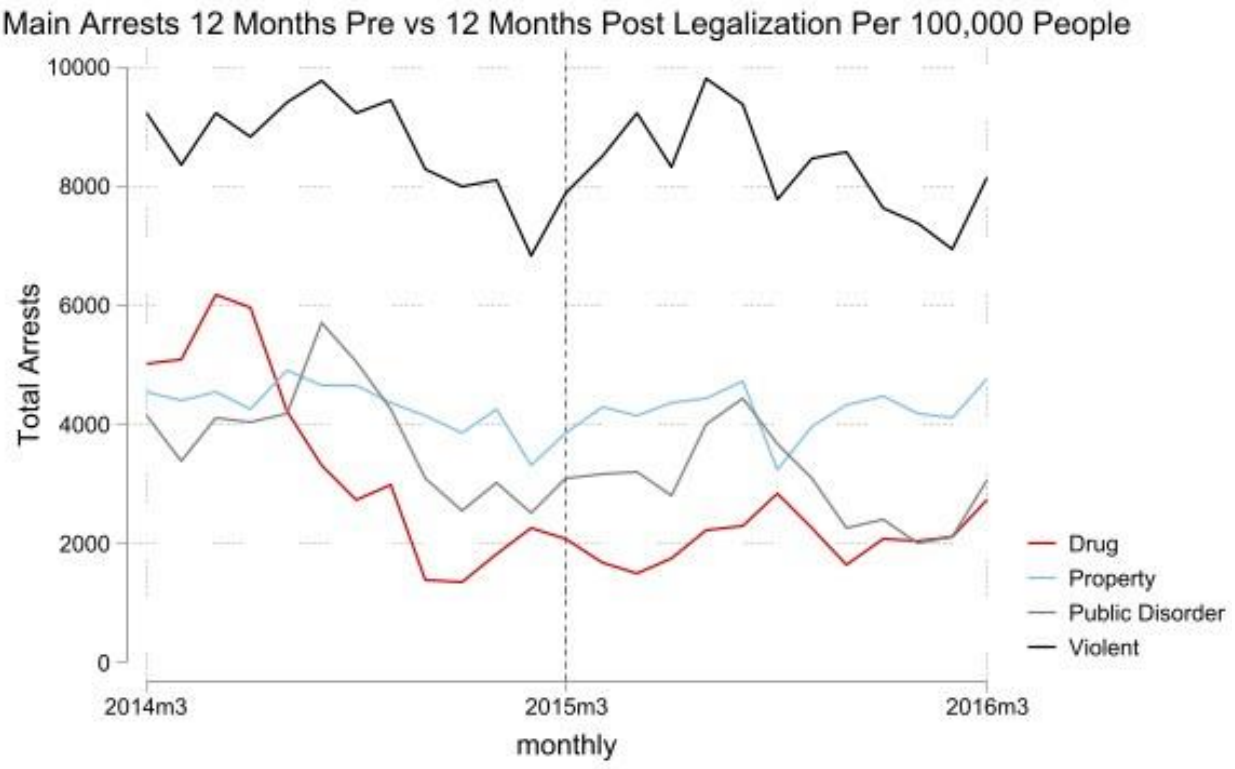


Figure 4 illustrates that while the general trend of property arrests stayed the same, there were increases, particularly in the months following legalization, but there were also periods of decrease. These net to no change in aggregate, as is seen in Table 2. As for the public disorder arrests, it is visible that there was an increase in 2014 (following decriminalization) and in 2015

(following legalization). Aside from those increases, public disorder arrest rates appear to have stayed relatively equal and even decreased in the immediate months after legalization. In Figure 4, drug arrest rates include both cannabis-related and controlled substance-related offenses. Drug arrests decreased following the decriminalization of cannabis and continued decreasing in the immediate months after legalization, but there was a slight increase after the first few months. As seen in Figure 3, this can be due to controlled substance arrests increasing. Finally, as shown, violent arrests saw very little change from before and after the legalization of cannabis.

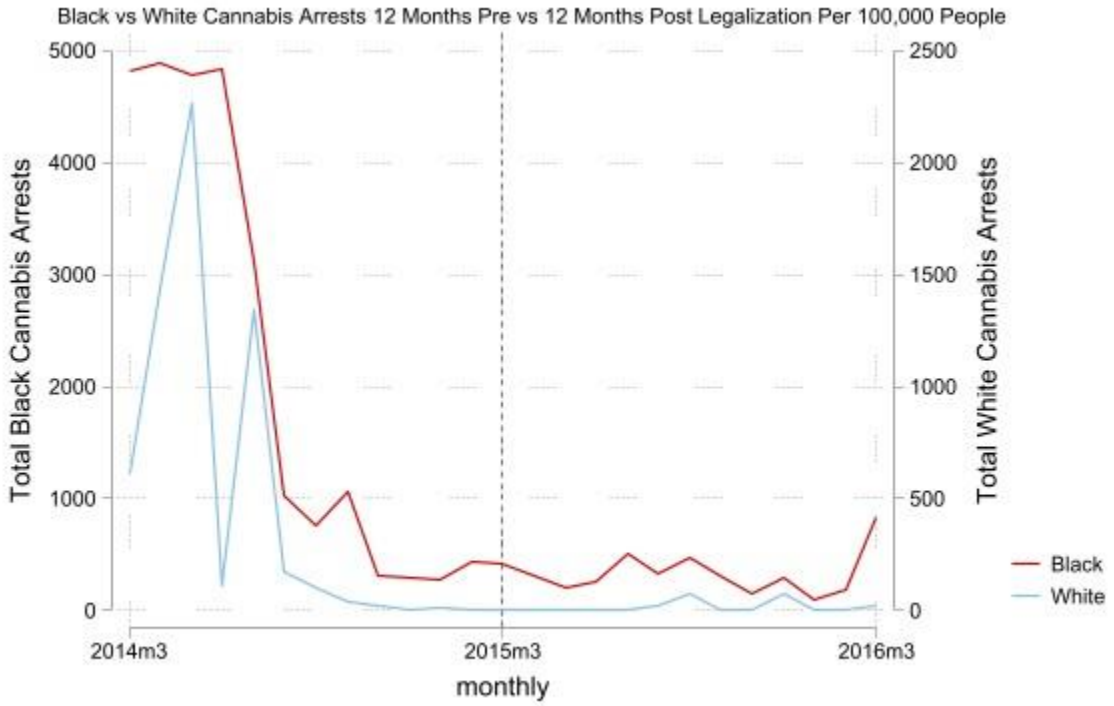
Figure 4: Main Arrests 12 Months Pre vs. 12 Months Post-Legalization (per 100,000 people)



The analysis focuses not only on shifts in arrest rates following the legalization of cannabis but also on changes in racial disparities. Figure 5 illustrates the trends of Black and White cannabis-related arrest rates over time. Due to such differing trends, the arrest rates were

indexed to see the rates after legalization relative to before, with the left y-axis representing Black arrest rates and the right y-axis representing White arrest rates. As is shown, Black cannabis arrests occurred at much higher rates than White cannabis arrests. In 2014, there was a decrease in arrest rates for both groups, attributed to the decriminalization of cannabis possession. However, rates began to increase again in 2016. A significant trend to note is that while both groups saw decreases in arrest rates, Black arrest rates were still higher than White arrest rates, even with policy shifts.

Figure 5: Comparison of Black and White Cannabis Arrest Rates (per 100,000 people)



Analytical Strategy

Regression Discontinuity in Time Model

The analysis entails two complementary quasi-experimental regression methods: regression discontinuity in time (RDiT) and difference-in-differences (DiD). Given this study's time aspect and the impact of policy, this introduces the use of a regression discontinuity in time

model. Regression discontinuity is a way of estimating the effects of a policy or treatment in a nonexperimental setting by exploiting instances when treatment only occurs on one side of a designated threshold, *c*, of a "running variable" (Lee & Lemieux, 2010; Imbens & Lemiuex, 2008). The method treats observations within a fixed bandwidth, i.e., the period immediately on either side of the threshold, i.e., as equivalent, thereby approximating an experimental condition. In an RDiT framework, the date of the policy change being studied is the threshold, *c*,. Compared with the regression discontinuity framework, the RDiT is based less on local randomization and more on the running variable of time since the discontinuity occurs at a specific moment (Hausman & Rapson, 2017).

In the context of this study, RDiT is used to evaluate the outcomes for drug, property, public disorder, violent crime, controlled substances, cannabis-related arrests, and the separate types of cannabis arrests such as possession, distribution, and consumption. The running variable is expressed in months, from 2014 to 2016, with a threshold, *c*, of March in 2015, the first full month when recreational legalization was implemented in Washington, D.C. The maximum bandwidth is limited by data availability in the pre-legalization period.

When analyzing the impact of a policy, there is a fixed number of geographical units impacted, so to analyze more data, the analysis must consider a wider bandwidth. However, while this increases statistical power, it increases the risk of confounding by omitted variables. In addition, the limited data before the legalization restricts how the bandwidth's width (Hausman & Rapson, 2017). RDiT estimates are sensitive to bandwidth choice (see Appendix Figure 9). In this analysis, decriminalization took place in July 2014, meaning that there was an impact on arrest rates before legalization that must be accounted for. As a result, the bandwidth utilized in this analysis is the symmetric 8-month periods before and after legalization to avoid confounding

from decriminalization on arrests before legalization while still examining legalization's impact on the months following the policy implementation.

Addressing the fixed sample size and timeframe, all models include police service area by month for a 16-month period covering July 2014 to November 2015. By focusing on only the period included in the bandwidth, any bias or unobserved factors that could influence a shift in arrests that cannot be attributed to the policy change will be mitigated. For all models, standard errors are calculated to account for the nature of the data. Conclusions are drawn regarding the effectiveness of the policy based on observed changes in arrest rates. The findings of the RDiT model inform the differences-in-differences model conducted at the police service area level.

The equation for the regression discontinuity model is as follows:

$$Y_{it} = \beta_0 + \beta_1(t > T) + \boldsymbol{\gamma X_{it}} + \delta_i + \varepsilon_{it}$$

In this equation, Y_{it} represents the outcome variable (the arrest rate), which changes based on the type of arrest being examined for a specific police area at a specific time (month). β_0 is the intercept, which represents the arrest rate that occurred prior to the legalization of cannabis. As for $\beta_1(t > T)$, when t>T = 1, it means that recreational cannabis was made legal in Washington D.C., and 0 otherwise. β_1 is estimated using a triangle distribution that gives relatively more weight to periods nearest to the month of legalization. The γ in $\boldsymbol{\gamma X_{it}}$ represents the coefficient vector associated with the control variables, and X_{it} is the vector of control variables. Finally, δ_i is used to measure PSA-specific effects, and ε_{it} is the error term.

Differences-in-Differences Model

A differences-in-differences (DiD) design is a quasi-experimental method that can be used with repeated cross-sectional data to compare change before and after legalization between

“treated” units and “untreated” units. The sample is broken down into four groups: the treatment group before and after the change and the control group before and after the change (Wooldridge, 2019). This model allows researchers to identify a treatment effect by estimating the difference between the specified outcome measures at two points in time for the treatment and control groups and then comparing the differences. By including PSA fixed effects, it also controls for unobserved variables that remain constant over time and are correlated to the outcome variable to ensure that they do not bias the estimates (Buckley & Shang, 2002).

In this analysis, the two time periods are one year before the legalization of cannabis (March 2014 to March 2015) and one year after the legalization of cannabis (March 2015 to March 2016). These two time periods are symmetric measurements of the potential effect of the legalization to avoid potential bias due to seasonality, while also taking into consideration the impact of decriminalization. To understand the impact of the policy on racial disparities, race is measured as the control and treatment groups. The Theory of Planned Behavior suggests that police officers will consider policy changes when utilizing their discretion as it affects their perceived behavioral control. However, it also posits that personal attitudes and subjective norms can influence decision-making. Therefore, police discretion will vary, and individuals will be impacted differently (Cubitt et al., 2020; Ishoy, 2016). Also, theory and research have argued that minority individuals are more likely to be arrested for drug-related crimes regardless of policy (Lopez, 2015; Ingraham, 2016). Figure 5 illustrates how the trends of arrest rates for cannabis vary based on race and that even though there was an overall decrease, disparities remained, lending support to previous research. When policy is enacted, police, specifically patrol officers, may shift their attention towards drug trafficking, distribution or consumption, and other serious

crimes now that their resources are not focused on enforcing cannabis possession laws, which can continue to result in disparities.

This study uses difference-in-difference models to test for disproportionate changes in arrest rates by considering the White sample of arrests as the "control" group and the Black sample of arrests as the "treatment" group. While the conventional difference-in-difference models assume that the quasi-experiment affects the arrested population, this analysis tests policing behaviors and assumes that the changes in the arrest rates are comparable across the two groups. Our four groups will then be Black individuals arrested before the legalization of cannabis, Black individuals arrested after the legalization of cannabis, White individuals arrested before the legalization of cannabis, and White individuals arrested after the legalization of cannabis. The groups are measured in terms of the police service area where the arrest occurred and the month when it occurred. The outcome variable represents the arrest rates for the different arrest categories, including property crime, violent crime, public disorder crime, drug crime, cannabis possession, cannabis consumption, cannabis possession with intent to distribute, cannabis distribution, and controlled substances crime. Finally, dummy variables for when the legalization and decriminalization of cannabis took place are also included in the model. The difference-in-differences equation is as follows:

$$Y_{it} = \beta_0 + \beta_1 Black_i + \beta_2 Post_t + \beta_3 (Black_i * Post_t) + \beta_4 Decriminalization + \delta_i + \epsilon_{it}$$

In this equation, Y_{it} represents the outcome variable (the arrest rate), which changes based on the type of arrest being examined for a specific police area at a specific time (month). β_0 is the intercept, which represents the White arrest rates that occurred prior to the legalization of cannabis. β_1 is the coefficient for the Black arrest rates, which represents the difference in rates between White and Black arrests prior to the legalization of cannabis. Similarly, β_2 is the

coefficient for post-legalization arrest rates, which measures the overall change in arrest rates before and after cannabis legalization, regardless of race. β_3 is the coefficient for the interaction between an arrest being a Black arrest and happening after the legalization of cannabis, which measures the differential change between Black and White arrest rates after the legalization of marijuana, the main point of analysis examined in the study. Finally, β_4 is the dummy variable for decriminalization. δ_i represents individual-specific effects, and ϵ_{it} represents the error term.

Results

Regression Discontinuity in Time Model

For the regression discontinuity in time models, the threshold was set at March 2015 with a bandwidth of 8 months pre- and post-legalization. In Table 3, on average, in terms of drug offenses, there was an increase of 1.23 (p=0.88) in overall drug arrest rates, an increase of 1.36 (p=0.11) for cannabis-related arrest rates, and a decrease of -0.12 (p=0.99) for controlled substances-related arrest rates. Under cannabis-related offenses, there was an increase of 2.40 (p=0.00) in consumption arrest rates but a decrease of -0.28 (p=0.19) in possession arrest rates, a decrease of 0.77 (p=0.35) in possession with intent to distribute arrest rates and a decrease of 0.08 in distribution arrest rates. However, only the relationship between legalization and cannabis consumption was statistically significant. Outside of drug-related offenses, there was a 21.65 (p=0.04) increase in the public disorder arrest rate, 13.69 (p=0.20) increase in property arrest rate, 31.04 increase in the violent arrest rate (p=0.06), and a 41.31 (p=0.06) increase in the other crime arrest rate. Public disorder, violent, and other crime arrest rates were statistically significant.

Table 3: Regression Discontinuity in Time Results

Outcome Variable	Coefficient	Std. Error.	P > |z|	[95% Confidence Interval]	
Drug Arrest Rate	**1.23**	**8.44**	**0.88**	**-15.30**	**17.77**
Property Arrest Rate	**13.69**	**10.68**	**0.20**	**-7.24**	**34.61**
Public Disorder Arrest Rate	**21.65****	**10.76**	**0.04**	**0.56**	**42.73**
Violent Arrest Rate	**31.04****	**16.39**	**0.06**	**-1.09**	**63.17**
Cannabis Arrest Rate	**1.36**	**1.22**	**0.27**	**-1.04**	**3.76**
Consumption Arrest Rate	**2.40*****	**0.77**	**0.00**	**0.89**	**3.90**
Possession Arrest Rate	**-0.28**	**0.21**	**0.19**	**-0.70**	**0.14**
Possession with Intent to Distribute Arrest Rate	**-0.77**	**0.83**	**0.35**	**-2.38**	**0.85**
Distribution Arrest Rate	**-0.08**	**0.49**	**0.87**	**-1.04**	**0.88**
Controlled Arrest Rate	**-0.12**	**8.04**	**0.99**	**-15.88**	**15.64**
Other Arrest Rate	**41.31****	**22.03**	**0.06**	**-1.86**	**84.48**

***p<0.01, **p<0.05

Estimates based on symmetric 8-month bandwidth

Difference-in-Differences Results

All ten models were analyzed using 12 months before and after legalization being measured. Models were conducted with the race-specific arrest rates for the specified crime as the dependent variables and the Black arrest rates as the treatment variable. An interaction variable of Black arrest rates and the legalization of cannabis was created to measure the full effect of legalization on racial disparities. Finally, decriminalization was controlled for, and the arrest police service areas were included in fixed effects.

Table 4: Difference-in-Differences Results for Main Crime Categories

	(1) Drug	(2) Property	(3) Public Disorder	(4) Violent
Black	52.20***	149.37***	94.38***	219.06***
	(20.50)	(31.23)	(28.19)	(28.41)
Legalization	-1.72	5.41	-8.23	24.07***
	(8.60)	(6.47)	(10.51)	(8.35)
Black×Legalization	-22.92**	-15.15	-17.42	-32.42***
	(10.11)	(11.26)	(15.20)	(11.57)
Decriminalization	-62.64***	10.13	2.38	-15.36
	(18.08)	(8.01)	(9.46)	(8.25)
Constant	106.89***	30.67**	48.12***	66.06***
	(19.79)	(15.70)	(13.65)	(16.16)

***p<0.01, **p<0.05
Robust standard errors in parentheses
All estimates include Arrest PSA fixed effects

When examining the main crime categories, only the relationship between Black arrest rates and Drug and Violent crime arrest rates after the legalization of cannabis were statistically significant. Following the legalization of cannabis, Black overall drug arrest rates saw a 22.92 decrease (p=0.03), and Black violent arrest rates decreased by 32.42 (p=0.01). For drug arrest rates, there was also a 62.64 (p=0.001) statistically significant decrease in arrest rate following decriminalization. Although not statistically significant, there were decreases in Black arrest rates following cannabis legalization for property and public disorder as well. When examining legalization alone, property and violent arrest rates increased in the year after March 2015. Only

violent arrest rates were statistically significant. Figure 6 illustrates the decrease in Black Drug arrest rates depicted in Table 4. The ratio for Black vs. Non-Black Drug arrest rates decreased from 110 to 50 to 80 to 50, which shows a significant decrease in racial disparities. However, there is still a difference not addressed by the legalization of cannabis (see appendix for the graphs on all other main categories).

Figure 6: Black vs. Non-Black Drug Arrests Pre vs. Post-Legalization

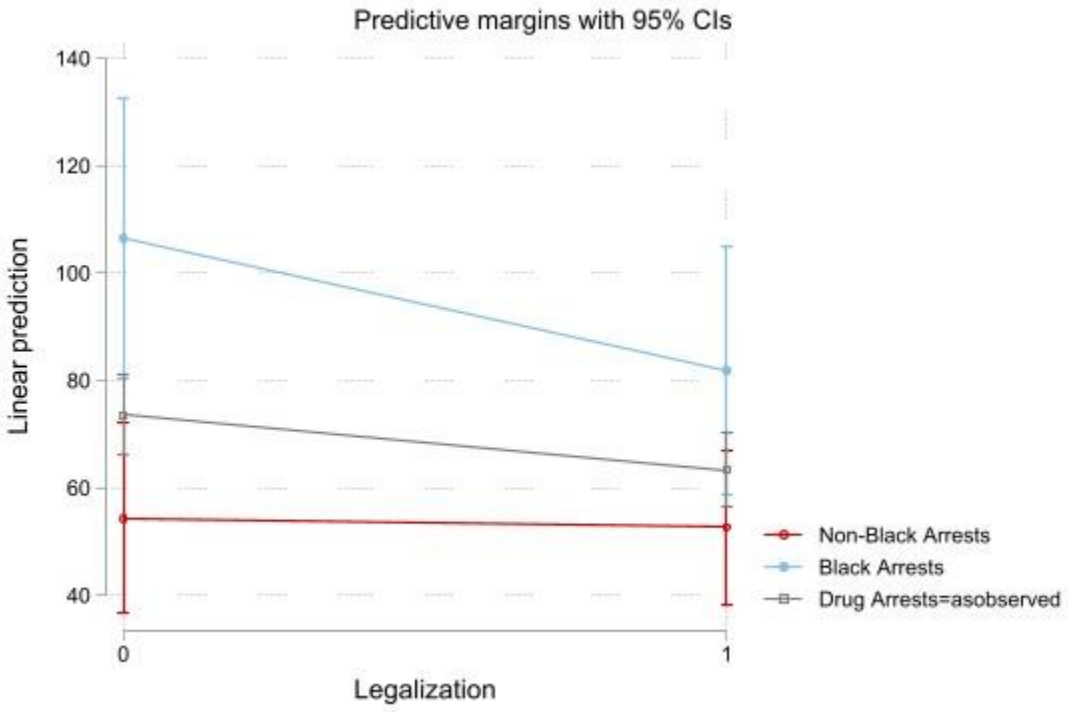


Table 5: Difference-in-Differences Results for Drug-Related Arrests

Variables	(1) Controlled Substances	(2) Cannabis-Related	(3) Cannabis Possession	(4) Cannabis Consumption	(5) Cannabis Possession with Intent to Distribute	(6) Cannabis Distribution
Black	21.34	69.50***	77.27***	42.94***	32.34***	27.55***
	(18.36)	(11.90)	(16.71)	(5.92)	(4.03)	(5.67)
Legalization	-4.75	1.20	-0.14	-0.31	-0.81	-0.19
	(7.14)	(1.56)	(0.73)	(0.17)	(1.28)	(0.16)
Black×Legalization	4.28	-37.51***	-19.71	-8.39	-13.25***	2.05
	(8.02)	(9.95)	(15.46)	(6.46)	(3.59)	(5.60)
Decriminalization	-23.30	-27.23***	-13.60**	0.38**	-0.22	-1.47
	(12.88)	(7.03)	(6.60)	(0.17)	(1.36)	(1.65)
Constant	69.19***	26.27***	13.73**	0.00	1.13	1.68
	(15.67)	(6.10)	(6.09)	(0.19)	(0.73)	(1.48)

***p<0.01, **p<0.05
Robust standard errors in parentheses
All estimates include Arrest PSA fixed effects

In terms of drug-related arrest rates, arrests were more likely to occur for Black individuals compared to non-Black individuals across all cannabis offenses. For instance, on average, the cannabis arrest rate increased by 69 for Black arrests compared to non-Black arrests, all else equal. The impact of legalization led to a decrease in controlled substances arrest rates but an increase in overall cannabis-related arrest rates. However, when examining the different types of cannabis arrest rates, there are decreases across all types. While none of the results for legalization were statistically significant, that is not the case when examining the relationship with decriminalization. Following the decriminalization of cannabis possession, there were decreases in arrest rates for controlled substances and almost all cannabis-related arrests. The one exception was public consumption of cannabis, which saw a slight increase. Finally, when examining the interaction between Black arrests and arrests that occurred following the legalization of recreational cannabis, cannabis-related arrest rates saw a statistically significant 37 arrest per month decrease, all else equal. Specifically, while there were decreases across all cannabis arrest rates, cannabis possession with intent to distribute was the only one found to be

statistically significant. Interestingly, controlled substances saw a 4.28 increase in arrest rate in Black arrests following legalization, although it was not statistically significant.

Figure 7 illustrates the shift in Black vs non-Black cannabis arrest rates following the legalization of cannabis. It shows that prior to the legalization of cannabis, the ratio of Black to Non-Black arrests went from about 15 to 1 to a ratio of 8 to 1. While the difference decreased, the ratio is still significantly difference. As possession with the intent to distribute was statistically significant, it is particularly important to explain the decrease exhibited. It can be seen in Figure 8 that the rate for non-Black possession with intent to distribute arrests centered very close to zero before and after legalization. In contrast, Black arrests saw a decrease from about 35 times more than non-Black arrests to about 20 times more. These two graphs provide a visual context for the difference-in-difference results. We can see a decrease in racial disparities by just looking at the coefficients. The graphs add to the context by highlighting how the decreases exhibited did not close the gaps (see Appendix for other drug-related result graphs).

Figure 7: Black vs. Non-Black Cannabis Arrests Pre vs. Post-Legalization

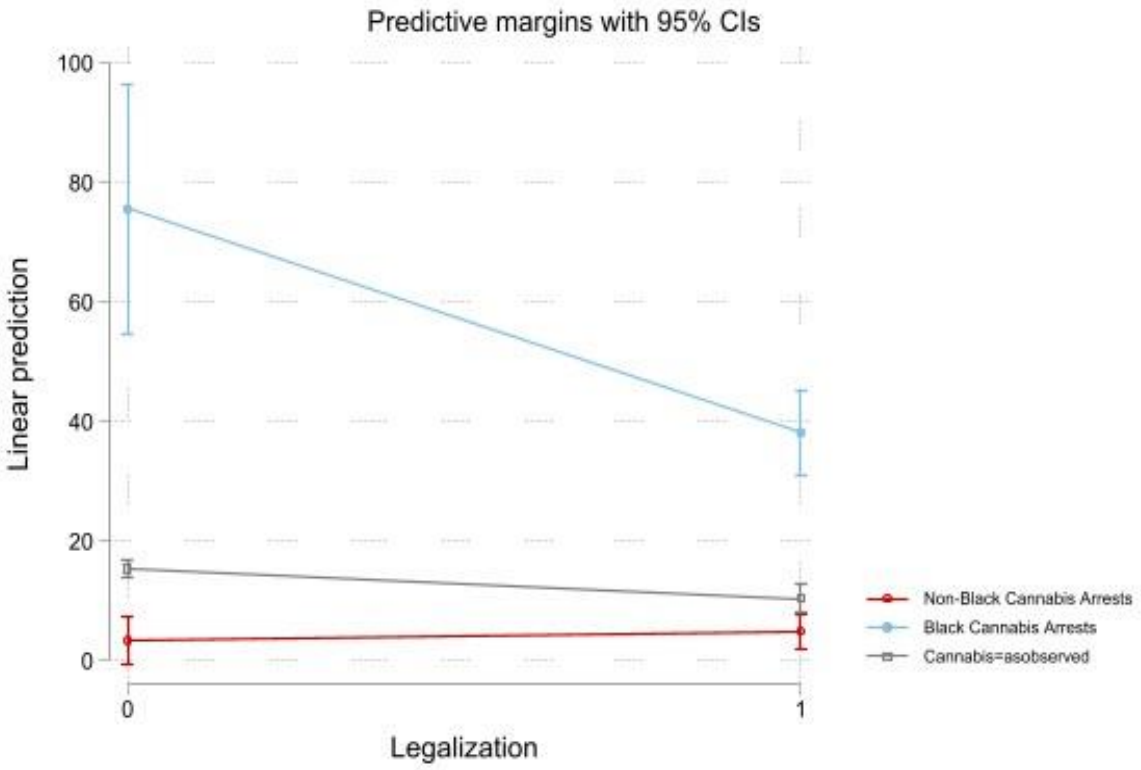
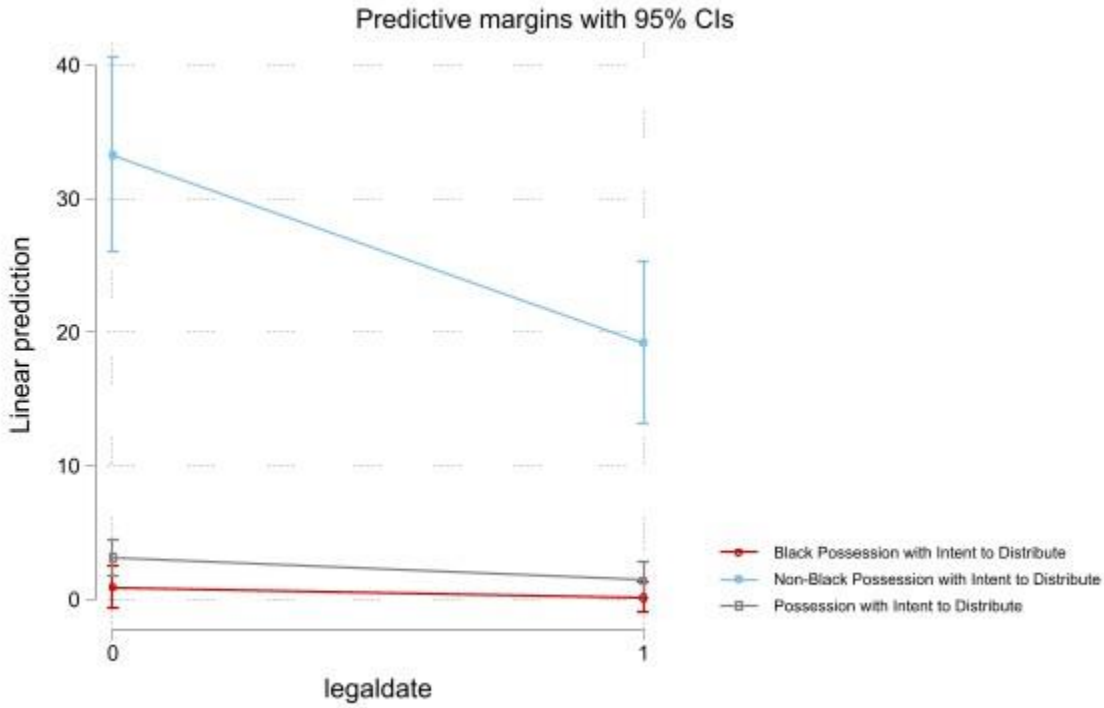


Figure 8: Black vs. Non-Black Arrests Cannabis Possession with Intent to Distribute Pre vs. Post-Legalization



Discussion

Amid extant ambiguous research findings but consistent with Goldstein, police concerns that increased cannabis consumption is crime generating persist (Stanton et al., 2022). The National Survey on Drug Use and Health found that when comparing the years 2014-2015 and 2015-2016, the percentage of reported cannabis consumption per month in Washington, D.C., increased from 26.2 to 32.4 for the 18-25 age group and 9.1 to 10.7 for 26+ (NSDUH, 2017). This finding is consistent with the belief that legalization of cannabis will lead to an increase in use. With this context, two of the findings in the regression discontinuity in time models are particularly important, and they are the public disorder and public consumption of cannabis results. Both public disorder and consumption arrests increased statistically following the

legalization of cannabis. Police discretion was limited in terms of arresting for possession, so enforcement appears to have shifted to consumption arrests which are more visible offenses. However, the increase in arrests could be due to police shift of attention, to increased public consumption, or to both.

Following the broken windows ideology and the belief that drug and public disorder offenses go hand in hand, the increase in public disorder arrests hints at police officers shifting their attention to other low-level offenses to continue policing individuals and "prevent" future crime. These findings are important for policy changes because they show how cannabis legalization will not necessarily decrease arrests but could shift individuals' priorities. Furthermore, it highlights the need for policymakers to examine the possible collateral effects of only legalizing possession, not consumption or sale.

While there have not been studies conducted on the amount of time saved in terms of police resources following the legalization of cannabis, theoretically, police forces may dedicate more resources to serious offenses absent minor offenses that were previously more frequent and visible. As previously mentioned, Makin et al. (2019) found that clearance rates for other crimes increased following the legalization of cannabis. These results can speak to officers shifting their attention to other crimes while freed from enforcing minor cannabis offenses. In this analysis, we potentially see a similar relationship, with officers using more of their time enforcing other drug crimes and public disorder offenses as they no longer enforce possession.

Regarding research question two on shifts in racial disparities, both overall drug and cannabis-related arrests saw statistically significant decreases in arrest rates among Black individuals. This finding supports the notion that legalization of cannabis can contribute to a decrease in racial disparities in arrests. However, while disparities decreased when comparing the

rates between Black and non-Black arrests, there was still a significant difference in arrest rates for Black individuals versus non-Black individuals. This emphasizes that while disparities did decrease and that the legalization of cannabis potentially alleviated biases, other factors can continue to influence a difference in arrest rates, such as varying crime rates across racial groups.

Interestingly, when examining the shift in cannabis public consumption, it is noticeable that prior to legalization, the rate of non-Black arrests that occurred was very close to zero. This is important to note because while Black arrest rates decreased, they were still happening at a higher rate before and after legalization, which further adds to the idea that Black individuals were policed more for consumption than non-Black individuals and speaks to possible patrolling methods in minority communities.

As for the major crime categories, aside from drug offenses, public disorder racial disparities slightly decreased, but the ratio between Black and Non-Black arrest rates remained high, illustrating the possible impact of the mechanisms behind police discretion. Property arrest rates for Black individuals also decreased. When examining these rates after decriminalization, both increased. These findings suggest that decriminalization had more of an impact on arrest rates than legalization did, as there remained ground for stopping an individual on cannabis possession suspicion during the period of decriminalization, which could have contributed to continued high rates of arrests for public and property arrests. However, these rates were not statistically significant.

Only the shift in Black vs non-Black arrest rates for violent crime was statistically significant. This finding cannot be explained under the theory of planned behavior and police discretion as these offenses are typically felonies, and police officers do not have the same level of discretion regarding these offenses as they would for misdemeanors and lower-level offenses.

However, it does highlight the possibility of other factors impacting enforcement that could result in this shift of racial disparities in violent arrests.

Violent arrest rates increased in the regression discontinuity model but decreased in the difference-in-difference model. The specification of the different models could contribute to this result. Specifically, the 8-month bandwidth I use puts relatively more weight on the months nearest to legalization was used in the RDiT model, whereas a one-year timeline with equal weighting of months was used for the difference-in-difference model. The latter model should yield more conservative estimates of impact. In addition, prior to legalization, the rate of violent arrests for White individuals per month per police service area was near zero, while Black arrests occurred at much higher rates. If violent crime rates were decreasing overall across Washington D.C., then comparatively, Black arrests should decrease but White arrests were bound by zero.

These findings are important for both research and policy, as a major argument in favor of legalization is the reduction of racial disparities. The results support this argument, but the absolute difference in arrest rates by race persists. This highlights the need for a discussion on how policy change alone may not eliminate disparities. Even with the legalization of cannabis, Black arrests still occur at higher rates across all drug offenses and other crimes.

Limitations

While the findings of this analysis are essential to the field of research on the impact of legalization policy on arrests, there are a few limitations. One limitation was the inability to use police call-for-service data to compare whether the increase or decrease in arrest rates was related to shifts in police calls for service. The study was unable to measure the underlying causes of crime. Given this lack of information, this study cannot distinguish between shifts in arrest rates and underlying crime rates. To interpret relative changes in arrest rates by race as evidence of changes in racial disparities, we must assume underlying crime rates by race occur at

the same proportion before and after legalization. However, this does not consider other factors contributing to differences in arrest rates. As mentioned, consumption rates increased, which could explain the increase in public consumption arrest rates following legalization, regardless of police discretion. This speaks to the possible limitations of solely using arrest rates as it does not fully measure levels of crime shifting. In addition, the disparities seen cannot be measured solely as the result of racial bias.

Another limitation is that the arrest data used comes from police administrative data, so may be subject to errors in recorded race and other arrest details. As mentioned earlier, police departments use the hierarchy rule, which could influence the logging of arrests and, as a result, could have led to underreporting for drug offenses if an individual was arrested for a higher crime at the same time. The hierarchy rule may lead to systematic differences in recording minor offenses after decriminalization and legalization. For instance, if cannabis possession had been the highest offense on record but was accompanied by consumption or public disorder offenses, only possession would have been recorded. Reuter and Hirschfield's (2001) study on cannabis arrests in Maryland shows that when cannabis possession was the primary offense, it was frequently accompanied by public disorder offenses or minor possession offenses. When it was a secondary offense, the other charges were typically higher drug offenses such as distribution, rarely property, or violent arrests. Therefore, a recorded increase in public disorder and consumption arrests may be due in-part to shifts in decision-making or because more serious offenses that would have been recorded in 2008 were no longer illegal in 2015.

Finally, this analysis does not examine other races or ethnic groups due to missingness and small sample sizes reported in the data, so generalizability is limited.

Conclusion

This study contributes to the literature on police discretion and the impact of cannabis legalization. Using the theory of planned behavior, I argue that the legalization of cannabis led to a shift in policing discretion as arrest rates for public disorder and cannabis consumption increased, hinting at police officers making decisions based on policy (perceived behavioral control), beliefs of how legalization can contribute to more low-level crime and how police can use more discretion for misdemeanors (attitudes and subjective norms). The decreases in racial disparities illustrate the restriction of police discretion due to policy, but the continued higher rate of Black arrest rates to non-Black arrest rates may show how the other concepts of personal attitudes and subjective norms could contribute to the remaining disparities. Although the study has its limitations, the results indicate the importance of not only passing a policy that legalizes cannabis but also looking at the complexities of the law and how its effectiveness is impacted by how it is carried out by police officers.

This analysis highlight several areas for future research. One possible project would be to examine this shift in arrests in conjunction with police calls for service to understand whether the shift in arrests can be fully credited to police discretion or a shift in crime/calls for service. By conducting this research, the underlying causes of crime and arrests can also be accounted for. In addition to using calls for service, including a measure that identifies disparities in fines or penalties that are given as punishment following the decriminalization of cannabis can help shed light even more on the dynamics of race and enforcement of cannabis laws. Another avenue for research is to examine the impact that legalization of cannabis in Washington D.C. had on the surrounding states of Maryland and Virginia, which had yet to legalize cannabis during this time period. The proximity of cities in these states to D.C. can contribute to individuals crossing state borders to purchase cannabis and, therefore, contribute to arrests in both areas. Furthermore, as

of May 2023, Maryland legalized recreational cannabis, so studying how this new legalization will impact D.C. sales and arrests will also lead to an interesting discussion on the impact of laws and prices in surrounding areas on arrest rates.

Appendix

Table 6: Comparison of Policies Across States

State	Recreational Use	Public Consumption	Retail Sale (Alcohol Policy Information System, 2022)	Home delivery
Colorado	Yes	Restricted public consumption	Yes, for both on and off-premises, but requires a license (Colorado Laws and Penalties, n.d.).	Allowed, but the driver requires a specific license (Jachymiak, 2021)
California	Yes	None	Required License for off-premises (California Laws and Penalties, n.d.)	The driver requires a specific license (What to Know About Cannabis Delivery in 2023, 2023)
Arizona	Yes	None	Required license for off-premises	Only medical delivery is permitted (Weed Delivery in Arizona, n.d.)
Washington D.C.	Yes	None	None	Available

Table 7: Table 7: Penalties for Cannabis Offenses (District of Columbia Laws and Penalties, n.d.; Code of the District of Columbia § 48–904.01

Offense	Penalty	Incarceration	Max. Fine
Possession of more than 2 oz	Misdemeanor	6 months	$1,000
Sale, Distribution, or Intent to Distribute of 1/2lb or less	Not Classified	6 months	$1,000
Subsequent sale, distribution, or intent to distribute offense	Not Classified	2 years	$5,000
Any amount higher for sale, distribution, and intent offense	Not classified	5 years	$50,000

Table 8: Justifications for Classifications of Categories

Final Category	Merged Categories	Explanation
Drug Crime Arrests	Narcotics Rcotics	The original data had two different categories for drug arrests, but the reasoning was unclear. As a result, both categories were merged for a more straightforward analysis.
Controlled Substances Arrests	All non-cannabis arrests	There was too much discrepancy in what was labeled a controlled substance versus what was given its own category. To avoid error, all non-cannabis offenses were combined to form a controlled substance category.
Cannabis Arrests	All cannabis offenses	All cannabis-related offenses had their own categories but were also combined to form a total category to understand the overall impact.

Property Crime Arrests	Arson Burglary Damage to Property Motor Vehicle Theft Property Crimes Theft Theft from Auto	All offenses were categorized according to UCR definitions. Arson is included in both Property and Violent crime arrests as there is a discussion of how it can be considered either depending on the situation.
Public Disorder Crime Arrests	Disorderly Conduct Driving/Boating While Intoxicated Prostitution Public Intoxication	Based on the definition of victimless crimes and actions that go against societal norms. Some of these arrests were initially coded as other but were recoded to this category.
Violent Crime Arrests	Aggravated Assault Arson Assault on a Police Officer Assault with a Dangerous Weapon Homicide Kidnapping Robbery Sex Abuse Sex Offenses Simple Assault	Based on UCR definitions
Other Crime Arrests	Fraud and Financial Crimes Gambling Liquor Law violations NA Offenses Against Family & Children Release Violations/Fugitive Traffic Violations Vending Violations Weapon Violations Other Crime	Each category had a few arrests that would not appear in the data. Also, these offenses are not expected to be affected by cannabis legalization.

Figure 9: Bandwidth Sensitivity Analysis

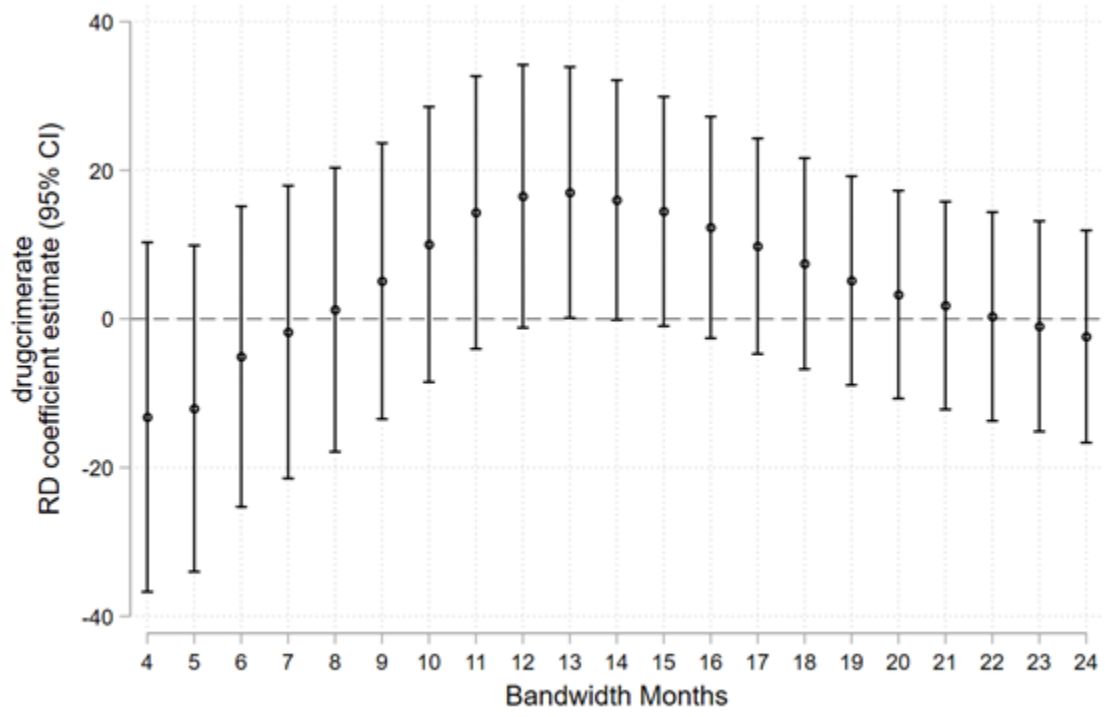


Figure 10: Black vs Non-Black Property Arrests Pre vs Post-Legalization

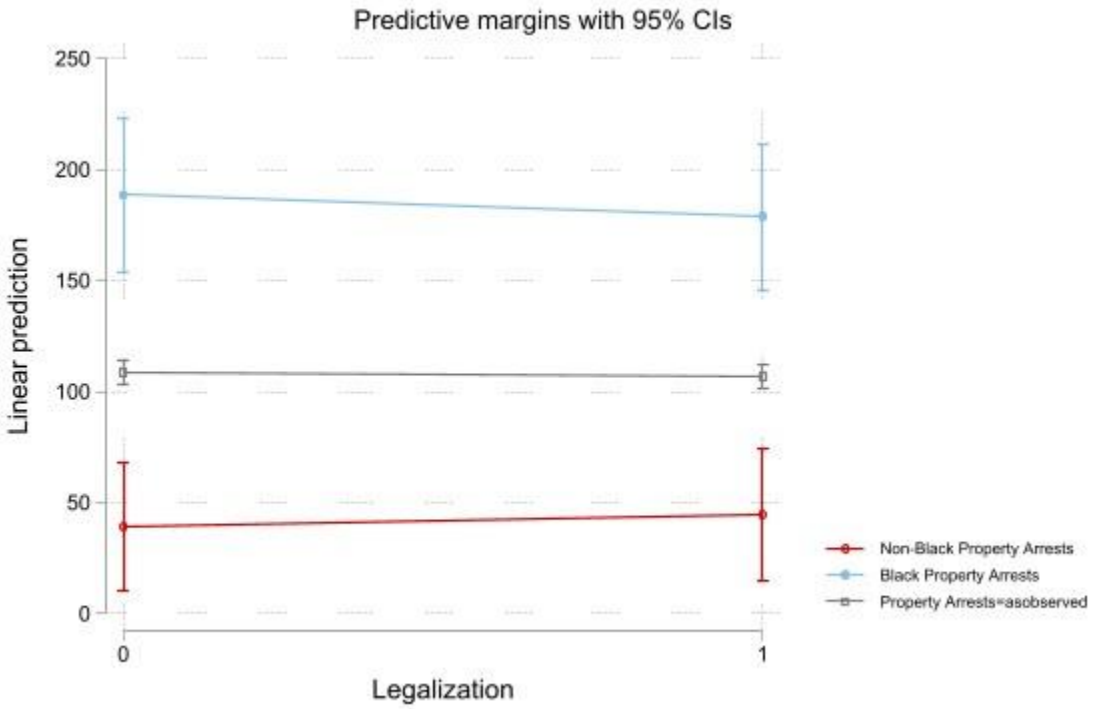


Figure 11: Black vs Non-Black Public Disorder Arrests Pre vs Post-Legalization

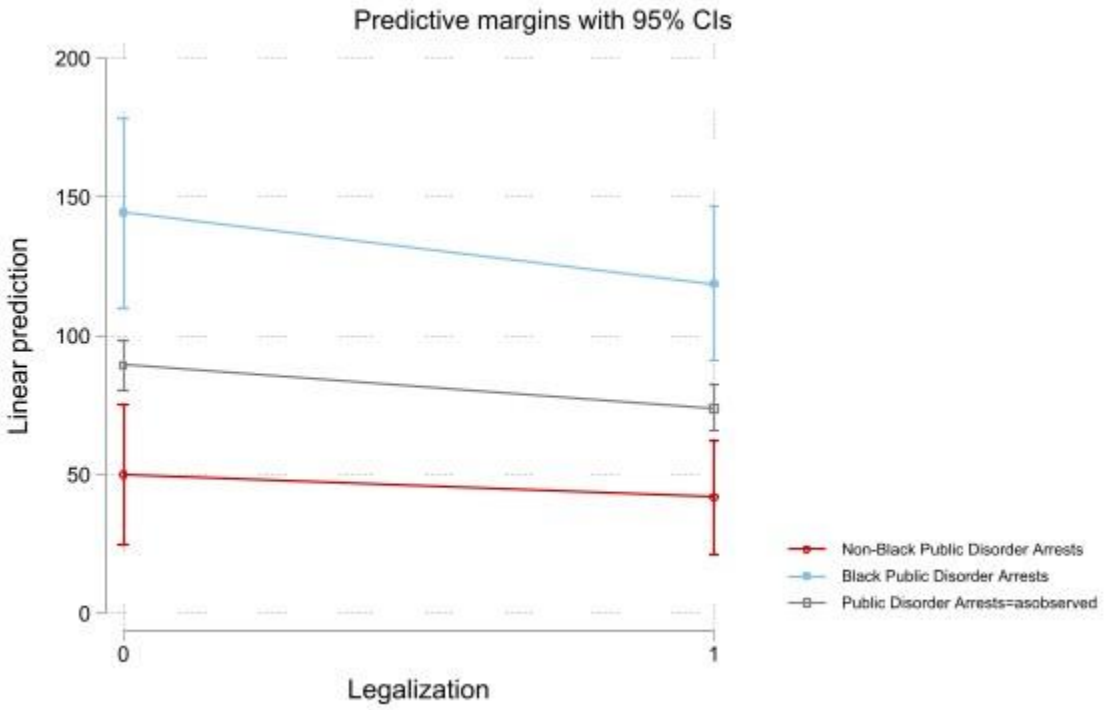


Figure 12: Black vs Non-Black Violent Arrests Pre vs Post-Legalization

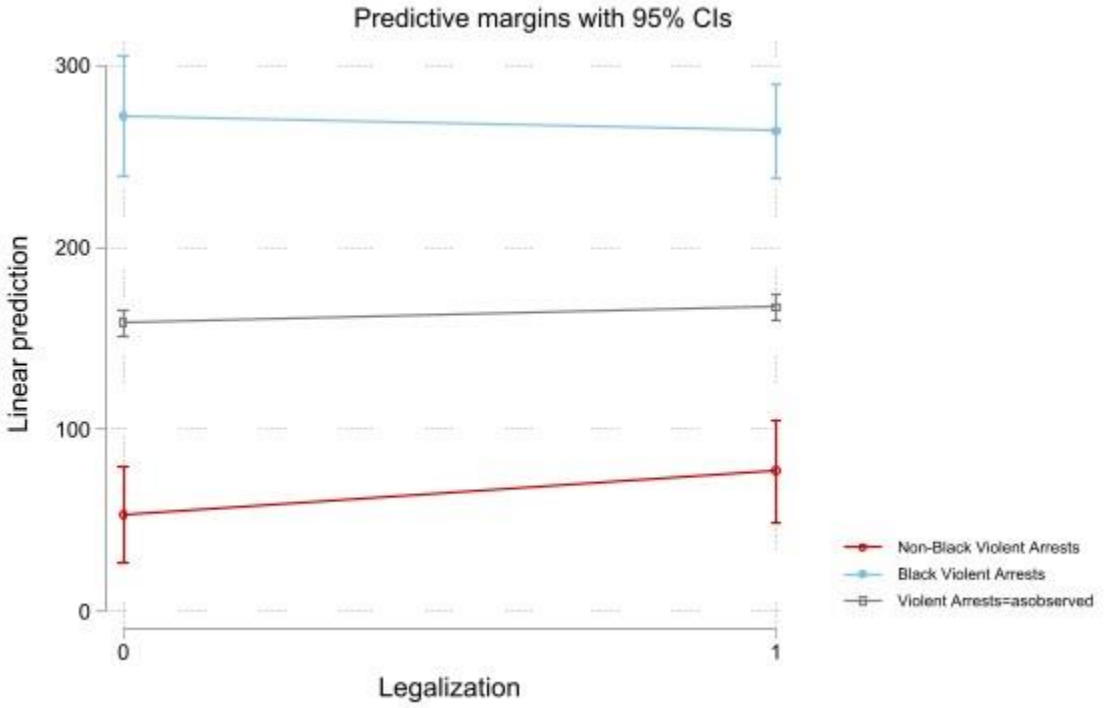


Figure 13: Black vs Non-Black Cannabis Public Consumption Arrests Pre vs Post-Legalization

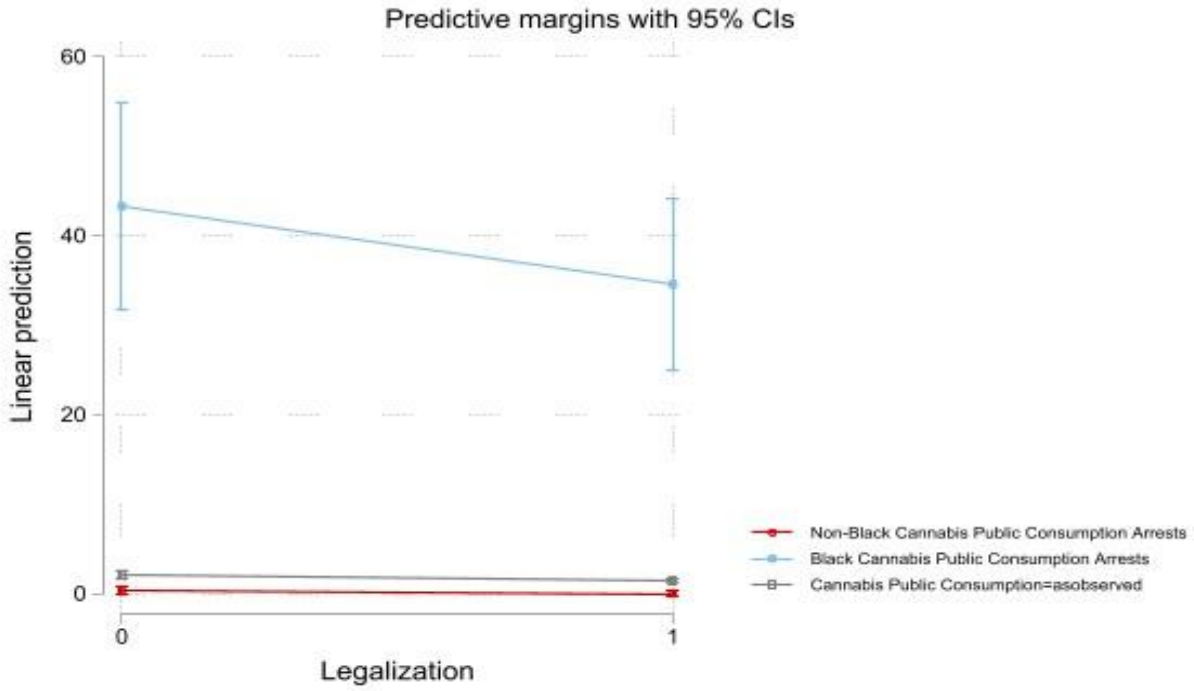


Figure 14: Black vs Non-Black Cannabis Possession Arrests Pre vs Post-Legalization

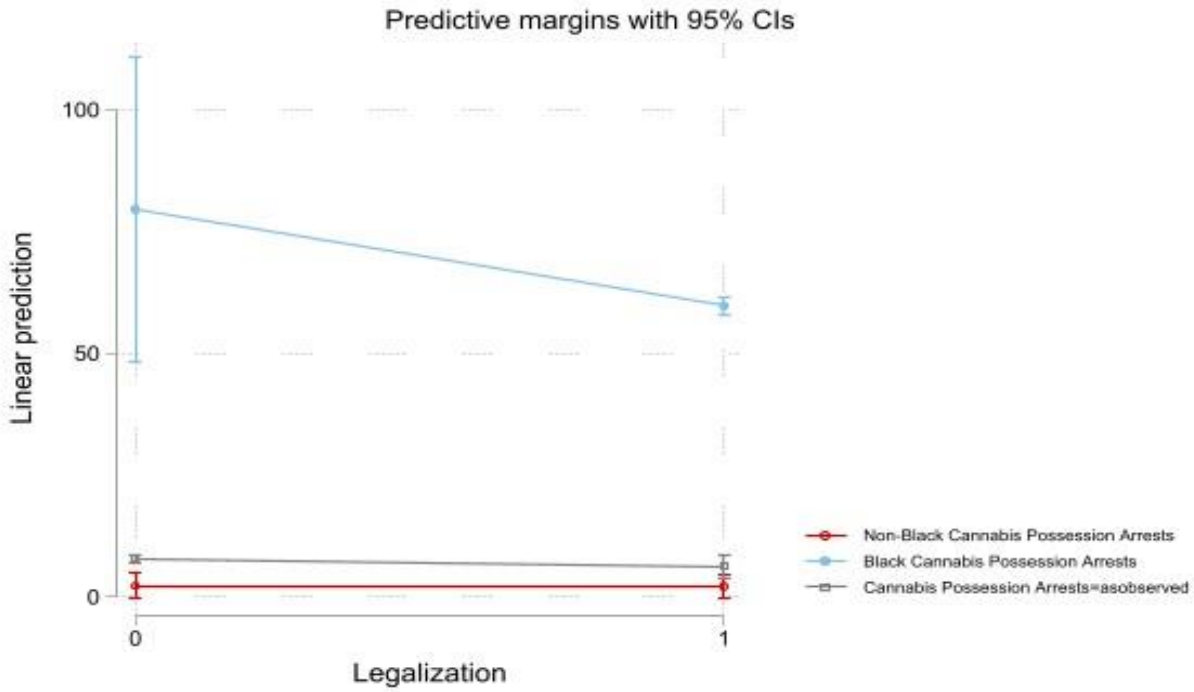


Figure 15: Black vs Non-Black Cannabis Distribution Arrests Pre vs Post-Legalization

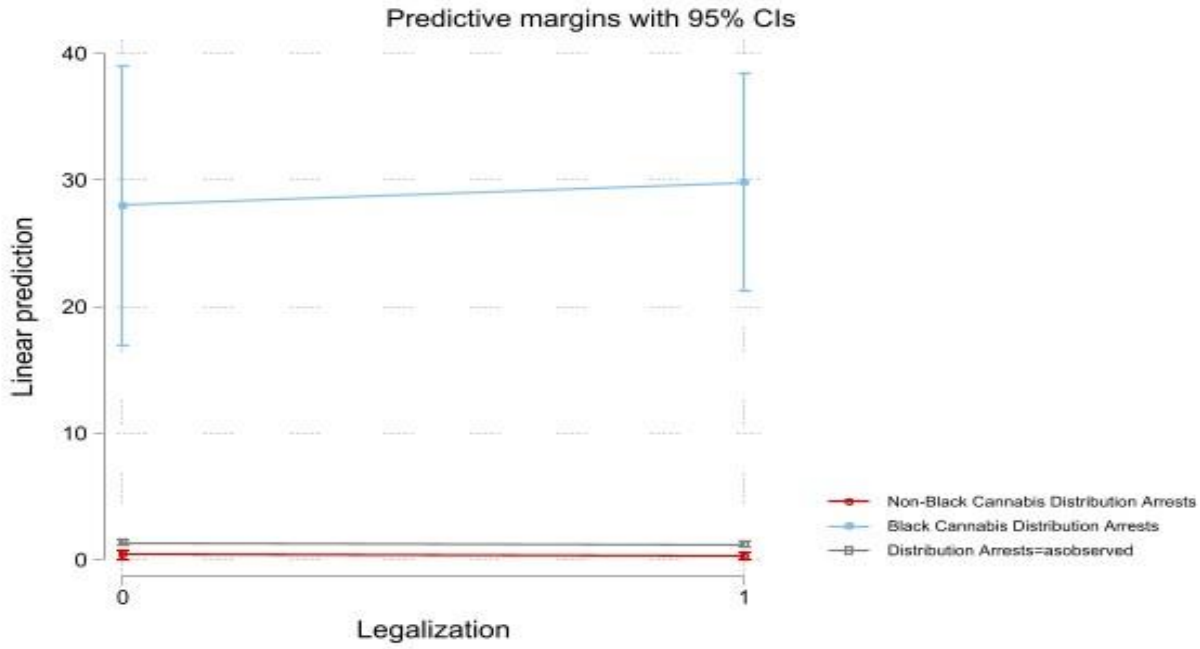
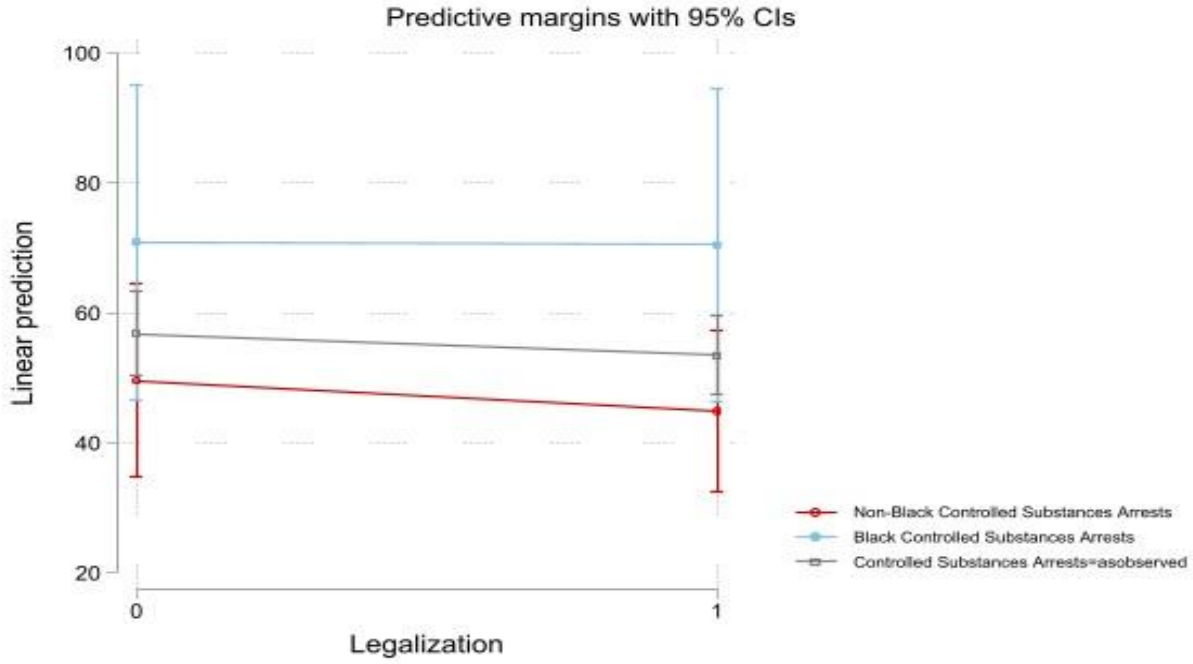


Figure 16: Black vs Non-Black Controlled Substances Arrests Pre vs Post-Legalization



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