

Pricing Conflict: Legal Regimes, Uncertainty, and Prices in Medical Marijuana Markets

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Abstract

How do sellers set prices in legally contested markets, which are rife with uncertainty engendered by conflicting legal regimes created by different levels of the federalist state? Although much research in economic sociology has recognized that states create markets, very little has explicitly recognized that many states are federalist systems, with nested levels of government; even less has studied how legal regimes (federalist or not) affect price-setting. Here, we build on sociological and legal scholarship to develop a theory of how legal regimes at multiple levels of government affect price-setting. We argue that conflict between levels of government increases uncertainty for sellers, which affects prices by increasing costs and hindering the development of pricing norms. We apply this theory to a legally critical battleground for federalism: state-legal markets for medical marijuana in the United States. Consistent with this theory, we find that when state-level and federal-level legal regimes conflict, marijuana prices are higher and more dispersed than when state-level and federal-level legal regimes are aligned. We also find that conflict between state and local governments results in higher and more dispersed marijuana prices. We conclude by considering how multi-level models of legal regimes might be applied to other markets.

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Introduction

States construct markets by creating rules (legislation, administrative regulations, and judicial decisions); the resulting legal regimes make markets legally calculable and market activities predictable (Weber 1927 [1981]; 1978). Legal regimes produce technical-material incentives and penalties that encourage some activities and forms of organization, and deter others; they also foster the development of cognitive-cultural understandings of which products, forms of organization, and practices are normal, celebrated, and rational, and which are deviant, deprecated, and inappropriate (e.g., DiMaggio 1990; North 1990; McAdams 2015). There are two primary mechanisms by which legal regimes affect market practices: by facilitating (or impeding) the development of market norms, and by facilitating (or suppressing) the actions of a wide array of market actors (i.e., organizations).

Although we have a wealth of research concerning the impact of legal regimes on markets, very little of this work has recognized that many states are federalist systems, with nested levels of government (for exceptions, see Dobbin 1994; Schneiberg and Soule 2005; for an analysis of how federalism affects markets, see Riker 1964). Therefore, most existing work has assumed implicitly that the legal regimes created by different levels of government are aligned. Yet tension inheres in federalist systems: a centripetal pull toward a single political center versus a centrifugal push away from the center toward political subunits. Therefore, different levels of a federation can create distinct, conflicting legal regimes to govern a particular market. For example, if one level of government authorizes the sale of a product or a particular form of organization to sell it but a second level bans it, then conflict, contradiction, and stalemate is likely to ensue (Campbell and Lindberg 1990). We argue that conflict between levels of government in a federalist system generates great uncertainty for market participants, and consider its impact on price-setting.

We focus on prices because they are central to market behavior (Uzzi and Lancaster 2004; Beckert 2011). At their most basic, prices are theorized as co-ordinating mechanisms that align buyers' and sellers' preferences and actions. Beyond this, prices both affect and

reflect the formation of those preferences. Prices are also linked to the distribution and allocation of wealth and goods, and thus to the comparative valuation of goods and services and, in the end, to power and inequality. Prices are determined by both technical factors (supply and demand) and social factors (social networks, legal institutions, and social norms). We focus here on social factors, but we also control for technical factors. Most sociological work on price-setting has focused on relationships (social networks) or cognitive-cultural understandings (social norms); far less has been done to understand how social institutions (legal regimes) determine prices (Beckert 2011). In this paper, we take the road less travelled and focus on institutions because institutions drive the development of networks and norms, so examining institutions has the greatest chance of yielding novel empirical and theoretical insights. Specifically, we argue that the uncertainty generated by conflict between different legal regimes (created by different levels of the federalist system) makes it difficult for sellers to plan, which impedes operations and increases costs, and so leads to higher prices. We further argue that such uncertainty hinders the development of widely shared, stable social valuation and evaluation norms, which makes it harder for sellers to agree on similar prices for products, and makes prices diverge. Moreover, uncertainty makes it difficult to develop norms about effective and appropriate forms of organization, which increases the variety of organizations operating in a market; in turn, organizational heterogeneity increases variation in operating costs, which further increases price dispersion.

We test this theory in a legally critical battleground for federalism: state-legal markets for medical marijuana in the United States (Mikos 2009; Schwartz 2013; Chemerinsky et al. 2015). We study markets in seven states (Arizona, California, Colorado, Michigan, Oregon, Nevada, and Washington) that together constitute over 95% of legal marijuana sales in the United States. This site has advantages beyond its importance for understanding federalism and markets. State-legal markets for marijuana are growing rapidly and an increasing number of Americans participate in them: Americans spent over \$2.7 billion in 2014 on marijuana in markets where it is legal (ArcView Market Research 2015) and 12% of American adults reported

in 2013 that they had used marijuana in the past year (Pew 2013). And the products traded in these markets are morally charged and legally contested, so state regimes are likely to exhibit considerable variation, which facilitates examining the impact of legal institutions on price.

We begin by reviewing research on states and markets from economics, sociology, and legal studies, which yields a single-level theory of how legal regimes affect prices. We then explain the complexities of federalist government systems and develop a multi-level theory of how conflict among levels of legal regime affects prices. Next, we review the history of laws about marijuana in the United States, and describe how we conducted research to test predictions from both theories. After summarizing the results of our empirical analysis, we consider the impact of our analysis for research on pricing in other markets.

Law, Markets, and Prices

States construct markets by creating rules (legislation, administrative regulations, and judicial decisions) that determine what can and cannot be produced and sold, and under what circumstances; who can and cannot own, produce, buy, and sell products; whether anyone can profit from selling them; and under what circumstances and in what ways they can and cannot be sold (Polanyi 1944; North 1981, 1990; Campbell and Lindberg 1990; Dobbin 1994; Fligstein 2001; Posner 2011). By making markets legally calculable and economic action predictable, law makes it possible for markets to function (Weber 1927 [1981]; 1978). Legal regimes – the array of state-created rules governing markets – affect market functioning in three ways. Most fundamentally, legal regimes *constitute* or *generate* markets by defining categories of economic actors and actions, thus determining what kinds of organizations and products are recognized as legal or prohibited (Edelman and Suchman 1997). This impact of legal regimes is most apparent when markets are in flux – either when new markets emerge or when existing markets are transformed by legal, cultural, economic, or technological change – and almost invisible (taken-for-granted) in stable markets (Róna-Tas and Guseva 2014). After they emerge and as they stabilize, markets are shaped by legal regimes in two other ways (Edelman and

Suchman 1997). Legal regimes *facilitate* market exchange by creating tools and forums buyers and sellers use to accomplish their goals, such as contracts, lawsuits, mediation procedures, and licensing and inspection agencies. And legal regimes *regulate* market exchange, through substantive edicts concerning acceptable strategies and practices in terms of such things as workers' rights, customer interactions, pollution, pricing, and cooperation, and through enforcement of those edicts.¹

Legal scholars hold that laws reflect ("express") the beliefs and values of state authorities who made those laws; in doing so, laws signal public attitudes concerning regulated practices and products (e.g., McAdams 2015). This argument holds most strongly when laws are passed in response to direct democracy (referenda or ballot initiatives), when laws are well-publicized, and when laws affect the public directly. But this argument is also likely to hold for laws that are initiated by legislators and executives, even in the face of concentrated interests such as industry lobbyists, to the extent that legislators and executives must appeal to "the median voter" to get re-elected. As signals of public attitudes, laws shape people's perceptions of what is normal and aberrant, right and wrong, and thus create social norms that regulate economic activity. When a law prohibits a product or practice (e.g., alcohol, marijuana, abortion, or gay marriage) it reveals public disapproval of that product or practice, which can lead people to condemn it. But when a law allows a formerly prohibited product or practice (e.g., alcohol or marijuana) or requires a new product or practice (e.g., child safety seats or privacy notices), it reveals changes in public attitudes toward that product or practice, which can lead people to consider it more positively than before the law was passed.

Even when laws do not express the beliefs and values of state authorities who made those laws, they can still shape public attitudes and behavior in several ways (e.g., Lessig 1995). Laws can tie a new social meaning to a practice or product; e.g., by making it illegal and

¹ The distinction between legal regimes' generative function and their facilitative and regulatory functions parallels the distinction North (1981: 203) drew between *constitutional* rules, "the fundamental underlying rules designed to specify the basic structure of property rights and control of the state," and *operating* rules, which "specify terms of exchange within constitutional rules."

symbolically tying it to already illegal, and thus socially stigmatized, practices or products. Such laws can also inhibit behavior – make people less likely to do that activity or buy that product. In other cases, laws can blur social distinctions; e.g., by mandating a product or practice, and thus giving it a new meaning and softening the association between it and its previous meaning. Such laws can also induce behavior through ritual – make it seem more natural to (not) do the activity or (not) buy the product.

These arguments indicate that legal regimes have profound effects on markets at both the macro level (the number and nature of buyers and sellers, their exchange relations, and their prevailing valuation and evaluation schemes) and the micro level (buyers' and sellers' understandings of acceptable and unacceptable actions, and the consequences of those actions, and thus their ability to calculate costs and benefits). At both levels, legal regimes affect buyers and sellers in two fundamental ways: (1) they produce technical-material incentives and penalties that encourage some activities and forms of organization, and deter others; and (2) they foster the development of cognitive-cultural understandings of which products, forms of organization, and practices are normal, celebrated, and rational, and which are deviant, deprecated, and inappropriate (DiMaggio 1990; Zukin and DiMaggio 1990; North 1990; Edelman and Suchman 1997; McAdams 2015).

Most basic are laws governing *property rights*, which define who can use things (usufruct) and exclude others from using them (excludability), as well as who can transfer things from one owner to another (alienability) (Alchian and Demsetz 1973; Weber 1978: 44, 130-150; Carruthers and Ariovich 2004: 24). Property-rights law determines the technical possibilities of and limitations on markets by defining the rules that govern ownership and control over the means of production, the products themselves, and modes of exchange. Thus, property-rights law determines the resources property owners have and the incentives they face (Campbell and Lindberg 1990; Fligstein 2001). Property-rights law also creates cultural opportunities for and constraints on markets: new cognitive schemas concerning the roles buyers, sellers, and other market participants play, novel understandings of their power vis-à-vis exchange partners, and

innovative conceptions of the nature of their exchanges (e.g., Edelman, Uggen, and Erlanger 1999; Dobbin and Dowd 1997; Fligstein 2001). Because property-rights laws make it clear who is risking what and who gets rewards for taking risks (Fligstein 2001: 33), they not only stabilize markets, but also make it possible to classify economic actors, facilitating rational calculation and planning (Guseva and Róna-Tas 2001; Carruthers 2013). Clear property rights make it possible to enforce contracts between buyers and sellers, reducing uncertainty.

But laws can instead cloud property rights or deny them outright. If legal regimes are ambiguous about property rights or contain conflicting directives, then buyers and sellers are not secure in their property rights. At the extreme, laws can make particular products illegal, which denies buyers and sellers property rights in those products; for example, when trade in morally contested goods and services, such as narcotics, sex work, and human organs, is deemed illegal (e.g., Healy 2004; Almeling 2011). When property rights are unclear (or at the extreme, non-existent), buyers and sellers cannot enforce contracts through formal legal channels, which limits the strategies, organizational forms, and enforcement mechanisms available to them (Beckert and Wehinger 2012). While actors with clear property rights can take disputes to mediation or court, those without clear (or, at the extreme, any) property rights must instead avoid conflict by building trust via informal social ties and norms, or adjudicating disputes with violence (Hillmann 2013). The lack of legal protections (non-violent) enforcement mechanisms increases uncertainty and makes planning and investment extremely difficult (Portes and Haller 2005).

Laws focused on *forms of organization* also influence buyers' and sellers' structures and practices (Edelman and Suchman 1997; Fligstein 2001; Schneiberg and Soule 2005). Such laws may set standards of accountability vis-à-vis the public, employees, and customers (e.g., Edelman 1990), and mandate, allow, or forbid horizontal expansion or vertical integration (e.g., Dobbin and Dowd 1997). Such laws can also define specific types of organization, such as laws constructing limited-liability corporations (e.g., Seavoy 1982; Kaufman 2008), and approve or forbid specific forms, such as non-profit versus for-profit organizations (e.g., Schneiberg and

Soule 2005) or bricks-and-mortar stores versus online-order-and-delivery services. In toto, such laws determine the number, location, and practices of buyers and sellers, as well as the formal requirements for organizations, in terms of licenses, permits, and fees. These laws also engender shared understandings of acceptable forms of organization and models for organizational action. Even more basically, these laws elaborate the underlying logic of legal rationality (Weber 1978), legitimating market participants that fit within the law's prescriptions.

Laws can either decrease or increase uncertainty, by authorizing or prohibiting certain forms of organization. Uncertainty is low in when laws explicitly authorize particular forms of organization, typically by licensing them. Organizations that fit into the parameters of licensing laws have clear property rights and face no legal uncertainty about their operations. In contrast, uncertainty is high when laws explicitly prohibit a particular form of organization. Organizations of that specific form are denied property rights outright, and can be fined or prosecuted just for operating. In-between these laws are that legally authorize organization to operate, but do not determine which forms of organization are acceptable. In such cases, organizations are neither clearly prohibited nor clearly approved by state authorities, and uncertainty is intermediate.

The clearer the property rights in a product or a form of organization buying or selling a product, the less the uncertainty surrounding where that product is sold or where that form of organization operates, and the easier it is for buyers and sellers to plan. Planning smooths operations and reduces costs, leading to lower prices. Thus, we predict:

Hypothesis 1: In markets where uncertainty is greater due to the lack of clear property rights, prices will be higher than in markets where uncertainty is lower due to the existence of clear property rights.

There is an obvious counter-argument to hypothesis 1: Although licensing laws reduce uncertainty for state-approved forms of organization, they also increase their costs, in terms of fees, time, and effort expended. To begin operations, entrepreneurs must take time to interact with state authorities, prepare documentation to satisfy formal legal requirements, hire staff to

deal with compliance with those requirements, and develop routines to guarantee workers' and customers' health and safety to meet those requirements. This counter-argument reduces our chances of finding support for hypothesis 1.

Moreover, the clearer the property rights and the lower the uncertainty in markets, the easier it is for sellers to develop shared understandings of what is acceptable, even normal, behavior. Setting prices requires categorizing products, comparing them and commensurating them in terms of monetary value (Fourcade 2011). Setting prices also requires sellers to understand competing sellers' strategies (White 1981). The greater the uncertainty facing sellers, the more difficult it is for them to develop widely shared, stable social valuation and evaluation norms. For example, in art markets, dealers follow heuristics ("pricing scripts") that obviate subjective judgments; specifically, prices for works from an individual artist increase with size and never decrease over time (Velthuis 2005). The stronger and more widely shared such norms are, the easier it is for sellers to agree on similar prices for similar products, which should lead to price convergence. In contrast, the weaker and more narrowly shared such norms are, the more sellers will diverge in their expectations about how to price similar products, which should lead to price divergence. Finally, the clearer the property rights, the lower the uncertainty about forms of organization, and the stronger the norms concerning what are reasonable strategies and structures, the more similar organizations are likely to be. Similarity of structure and strategy should lead to similarity of technical operating costs and cognitive-cultural pricing heuristics, and thus convergence in the prices they offer for similar products. Therefore we predict:

Hypothesis 2: In markets where uncertainty is greater due to the lack of clear property rights, price dispersion will be greater than in markets where uncertainty is lower due to the existence of clear property rights.

Federalism Complicates Matters

Although much sociological research has analyzed the impact of legal regimes on industries and markets, only a few studies paid attention to the fact that many nations,

including Australia, Brazil, Canada, India, Germany, Mexico, Russia, and the United States, have federalist governmental structures (e.g., Dobbin 1994; Schneiberg and Soule 2005). Federalist governments have multiple, nested components, each of which can create distinct legal regimes to govern particular markets. One scholar famously described federalism as follows: “(1) two levels of government rule the same land and people, (2) each level has at least one area of action in which it is autonomous, and (3) there is some guarantee (even though merely a statement in the constitution) of the autonomy of each government in its own sphere” (Riker 1964: 11). Federations are negotiated compromises between those who seek central control over the full population and all territory, on the one hand, and those who seek local control over subpopulations and territorial subunits. Therefore, tension – a centripetal pull toward a single political center versus a centrifugal push away from the center toward political subunits – is inherent in all federal governments.

Indeed, federalist governments offer multiple targets for lobbying for changes in laws governing markets, which may make them more open to change than unitary governments (Schneiberg and Soule 2005; Djelic and Quack 2007). For example, industry lobbyists, union officials, and social-movement activists can push for the expansion or restriction of markets – even the creation of new markets or the closure of existing ones – by promoting local ballot initiatives and referenda or by appealing to local-level politicians and bureaucrats, and ignoring central state agents. Such actions can lead to conflict between legal regimes created by different levels of government, which generates uncertainty for organizations operating in the focal markets. In this section, we build on research by legal scholars concerning ways in which conflicts between federalist governments’ nested legal regimes might be resolved, and how those resolutions might affect the uncertainty facing buyers and sellers. Because these resolutions are institutionally contingent – i.e., they depend on a combination of national constitutions, regulations, and judicial traditions – we focus exclusively on the United States.

By ignoring federalism, most previous sociological research on legal regimes and economic activity has implicitly assumed congruence between legal regimes created by

different levels of government, and co-operation between legal authorities reporting to different levels of government. But different levels in a federation can create distinct legal regimes to govern a particular market. For example, in the United States, both federal and state governments can pass laws that define property rights and acceptable forms of organization, although contract law lies in the hands of the federal government (Riker 1964; Feeley and Rubin 2008). If multiple levels of government in a federalist system can pass laws concerning property rights and forms of organization – one level authorizes the sale of a product or a particular form of organization to sell it, but a second level bans it – then conflict, contradiction, and stalemate between levels of government is likely to ensue (Campbell and Lindberg 1990).

To overcome the myopia caused focusing on a single level of legal regime, we propose a multi-level analysis explicitly taking into consideration the extent to which legal regimes at different levels (national, state, local) are congruent or in conflict. We argue that conflict between legal regimes at different levels of government generates uncertainty in markets because conflicting legal regimes provide political and social platforms for both proponents and opponents of market transactions. For example, if national and local governments prohibit a product or form of organization but a state government authorizes it, national and local officials can work together to stop the sale of that product or shut down the operations of that form of organization, while the state officials can provide social legitimacy to that product or form of organization – even if state officials cannot, in the face of conflicting national-level and local-level legal regimes, provide full legal legitimacy. In such situations, buyers and sellers face greater uncertainty than in situations where local, state, and national government legal regimes are congruent. As in the single-level analysis above, we propose that the greater the uncertainty concerning products and forms of organization, the higher the prices and the greater the price dispersion. Therefore, we predict:

Hypothesis 3: In markets where uncertainty is greater because there are conflicting legal regimes, prices will be higher than in markets where uncertainty is lower because they are subject to congruent legal regimes.

Hypothesis 4: In markets where uncertainty is greater because there are subject to conflicting legal regimes, price dispersion will be greater than in markets where uncertainty is lower because they are subject to congruent legal regimes.

In the next section, we put historical meat on the theoretical bones of our arguments by focusing on an important empirical case: laws regulating marijuana use and sale in the United States, which legal scholars have pointed to as significant battleground markets for federalist principles (e.g., Mikos 2009; Schwartz 2013; Chemerinsky et al. 2015). Our analysis encompasses three levels of government: national, state, and local.

The Evolution of Laws Regulating Marijuana

Early history. Before the twentieth century, cannabis (as hashish and in liquid form) was widely used in the United States as an analgesic. Although there were concerns about accurate labeling and purity, state governments made only scattered attempts to restrict cannabis use. After the Mexican Revolution of 1910, increased immigration of Mexicans to the United States, many of whom smoked cannabis, spurred a racist and xenophobic outcry that relabeled cannabis as “marihuana,” the name used in Mexico, and linked smoking it with an “alien,” “criminal,” and “deviant” subgroup; this outcry, in turn, provoked passage of a series of state laws outlawing cannabis (Bonnie and Whitebread 1970, 1974 [1999]). In 1937, the federal government joined suit, passing the Marihuana Tax Act (26 U.S.C. §§ 4741-4753), which required transfer tax stamps to grow, import, give away, or sell marijuana – stamps that were far more expensive than marijuana itself, thus effectively banning the use and sale of marijuana in the United States. This law complemented the Narcotic Drugs Import and Export Act (21 U.S.C.A. § 176(a)), passed in 1922, which made importing marijuana, among other drugs, illegal. For the next half-century, federal and state government policies were aligned: at both levels, legal regimes prohibited the ownership, consumption, and exchange of marijuana for any purpose.

Although starting in the 1960s, marijuana became associated with the middle class (first youth, older professionals), rather than poor Mexican immigrants, it remained illegal and authorities' concerns about marijuana did not diminish – instead, they intensified (Bonnie and Whitebread 1970, 1974 [1999]). The legal situation changed dramatically after Timothy Leary appealed his 1965 conviction for marijuana possession all the way to the U.S. Supreme Court. The Court ruled unanimously that complying with the Marihuana Tax Act would amount to self-incrimination under state laws banning marijuana; it further ruled that this Act and its companion, the Narcotic Drugs Act, were unconstitutional (*Leary v. United States* 1969). In the wake of this decision, the federal government in 1970 passed the Controlled Substances Act (21 U.S.C. § 801 *et seq.*), which classified marijuana, along with heroin, ecstasy, and LSD, as a Schedule 1 narcotic with “a high potential for abuse,” “no currently accepted medical or treatment use in the United States,” and “no accepted safety for use ... under medical supervision” (21 U.S.C. § 812(b)(1)).² Passage of this act marked the beginning of the “war on drugs,” in which federal, state, and local governments escalated the arrest, prosecution, and incarceration of marijuana producers, distributors, and consumers. Despite repeated efforts by activists to reclassify marijuana as a Schedule V drug, the least restrictive category, the federal government remained obdurate.

States legalize marijuana for medical use. The legal situation began to change in the late 1980s, when AIDS patients and their caregivers in San Francisco, the epicenter of the AIDS epidemic, discovered that smoking marijuana helped alleviate “wasting disease,” a common symptom of HIV/AIDS, and the nausea that accompanied use of anti-retroviral medications (Grinspoon, Bakalar, and Doblin 1995). This discovery led to the formation of buyers' clubs, where activists distributed marijuana to the seriously ill and dying. Thus, a market for medical marijuana emerged from the well-established black market for the recreational use of marijuana. Spurred by AIDS activists, in November 1996 California voters passed Proposition

² This Act classified marijuana as more dangerous than such Schedule II drugs as cocaine and morphine.

215, which was codified as the California Compassionate Use Act (Cal. Health and Safety Code §§ 11362.5 *et seq.*). This law exempted qualified patients and their primary caregivers from state criminal prosecution for cultivation or possession of marijuana for medical use. It defined a primary caregiver as “the individual designated by the person exempted under this section who has consistently assumed responsibility for the housing, health, or safety of that person” (Cal. Health and Safety Code § 11362.5(B)(e)). While at the state level, this law provided legal protection for patients, caregivers, and physicians in the form of an affirmative defense against criminal charges,³ it had two important gaps: it did not explicitly allow patients to exchange marijuana among themselves, or allow patients or their caregivers to establish organizations to cultivate, distribute, or sell marijuana. Thus, it did not authorize the sale of marijuana or provide an affirmative defense for anyone who did so. Moreover, as we explain in the next section, the federal response to this law was swift and decisively negative.

Over time, medical applications for marijuana expanded from HIV/AIDS to include a wide array of conditions, including (but not limited to) anxiety, cancer, chronic pain, Crohn’s disease, depression, epilepsy, glaucoma, insomnia, and post-traumatic stress disorder, and an increasingly diverse array of activists sponsored state ballot initiatives and lobbied state legislators to legalize marijuana use for medical purposes. In hindsight, this was a wise use of direct democracy in an era when the voting public viewed medical marijuana far more positively than did state authorities. Pushed by activists, more and more states legalized marijuana for medical use. Between 1998 and 2008, 11 states – Alaska (Ballot Measure 8, 1999), Oregon (Ballot Measure 67, 1998), Washington (Initiative 692, 1998), Maine (Ballot Question 2, 1999), Colorado (Ballot Amendment 20, 2000), Hawaii (S.B. 862, 2000), Nevada (Ballot Question 9, 2000), Vermont (S.B. 76, 2003), Montana (Initiative 148, 2004), Rhode Island (S.B. 0710, 2006), and Michigan (Proposition 1, 2008) – passed laws to similar California’s.

³ An affirmative defense is a claim (which must be proven by the defendant) that justifies the conduct for which the defendant is on trial, even if that conduct is otherwise unlawful. In practice, this means the defendant admits to the conduct and uses the affirmative defense to limit liability for that conduct. Common examples outside marijuana cases include pleading insanity, self-defense, or entrapment.

These laws typically specified a set of debilitating medical conditions that might be treated with marijuana (the lists vary from state to state and over time within states) and required patients to obtain a recommendation for such treatment from their physicians. Most laws required patients to register with the state and submit a signed recommendation from their physician; once their eligibility was confirmed, states added patients to their registers and issued them identification cards. Finally, most laws limited the amount of marijuana patients and caregivers may possess, in terms of the number of plants, ounces of flowers, or both.

These laws provided state-level exemption from criminal prosecution for qualified medical marijuana patients, caregivers, and physicians, as well as exemption from civil sanctions. Thus, while these laws provided an affirmative defense for medical marijuana patients, caregivers, and physicians, most did not create clear property rights in the ownership of marijuana (Mikos 2009). Finally, most laws did not authorize or legally protect the sale of medical marijuana; indeed, one state (Alaska) explicitly banned the sale of medical marijuana. Most states neglected *in toto* the issue of how patients and caregivers were to gain possession of marijuana, much less detail whether or how marijuana could be distributed or sold.

In the wake of these laws, many organizations – non-profit cooperatives and collectives, as well as for-profit enterprises – were launched to distribute marijuana to medical patients. Prominent examples of such marijuana providers include the Oakland (California) Cannabis Buyers' Cooperative (1995-1998), the Colorado Compassion Club (2004 -2008), and the Emerald Cross (Seattle, Washington, 1998-2015). These organizations operated in legal gray areas, as state laws explicitly allowed individuals, not organizations, to provide marijuana, but state laws did not explicitly ban organizations from doing so. Because marijuana-providing organizations were neither clearly legal nor clearly illegal under these state-level legal regimes, some industry analysts labeled these regimes as “quasi-legal” (e.g., Samuels 2008; Ohlson 2013).

In 2003, with the passage of Senate Bill 420, California became the first state to explicitly authorize the economic exchange of medical marijuana and formally recognize that organizations, rather than individuals as caregivers, could provide marijuana to patients. This

bill allowed medical marijuana patients to form co-operatives and collectives to buy and sell marijuana and to ask for “reasonable compensation” (S.B. 420 § 11362.765(c)), but required these organizations to be non-profits. Rather than actively regulate providers selling marijuana, this bill merely gave them restrictive property rights and detailed acceptable forms of organization. And this bill said nothing about how growers (who are concentrated in far northern California counties like Humboldt and Mendocino) should get their products to providers and patients (who are concentrated in urban areas like Los Angeles, San Diego, and San Francisco).

In 2007, New Mexico passed a law that not only authorized organizations to sell medical marijuana, but also regulated them by detailing the requirements to become “licensed producer[s] ... qualified to produce, possess, distribute and dispense cannabis” (S.B. 523 § 3(D)). Between 2009 and October 2015, 10 states – Arizona (Proposition 203, 2010), New Jersey (S.B. 119, 2010), Delaware (S.B. 17, 2011), Connecticut (H.B. 5389, 2012), Illinois (H.B. 1, 2013), Massachusetts (Ballot Question 3, 2013), New Hampshire (H.B. 573, 2013), Maryland (H.B. 1101, 2014), Minnesota (S.F. 2470, 2014), New York (A. 6357/S. 9723, 2014) – plus the District of Columbia (B18-622, 2010) – followed suit. These laws created state-regulated systems for the cultivation, distribution, and sale of medical marijuana. During this period, nine states that had previously passed affirmative-defense laws – Maine (Question 5, 2009), Rhode Island (Edward O. Hawkins and Thomas C. Slater Medical Marijuana Act, 2009), Colorado (H.B. 1284/S.B. 109, 2010), Vermont (S.B. 17, 2011), Nevada (S.B. 394, 2013), Oregon (H.B. 3460, 2013), California (Medical Marijuana Safety Act, 2015), Hawaii (Act 241 H.B. 321, 2015), and Washington (S.B. 5052, 2015) – amended their legal regimes to create state-regulated systems for the cultivation and distribution of medical marijuana, although several of these laws (California, Hawaii, Washington) did not come into effect until after 2015, and one law (Nevada) was only partly in effect by then.

To facilitate comparisons between state-level legal regimes, and to trace how individual states’ legal regimes varied over time, Figure 1 charts all states that legalized marijuana for

medical use through 2015 and details how key features of their legal regimes evolved over time.

[Figure 1 about here]

Each state law legalizing marijuana altered social norms about marijuana within the focal state, by legitimating the use of marijuana for medical purposes in that state (Lessig 1995). State law should have had stronger effects on social norms about marijuana than federal law because state laws reflected local norms while federal law reflected norms across the nation as a whole, and because state laws were passed more recently than federal law, so they reflected more current norms (McAdams 2015). In combination, the many state laws had even stronger effects on norms about marijuana, as they repeatedly suggested that many state authorities – not just those in the state in which medical marijuana patients, growers, distributors, and sellers lived – perceived marijuana as medically safe and beneficial, and not wicked.⁴

The federal government's response to state action. Although by 2015, 23 states and the District of Columbia, home to 47 percent of the American population, had legalized marijuana for medical use, this drug remains illegal at the federal level. Marijuana continues to be classified as a Schedule 1 narcotic under the Controlled Substances Act and, after California pioneered the legalization of medical marijuana in 1996, federal authorities continued to prosecute patients, providers, wholesale distributors, and growers in state-legal marijuana markets.

In the United States, there are three routes through which conflict between federal-level and state-level legal regimes might be resolved, relating to the pre-emption doctrine, the commerce clause, and co-operation. First, the pre-emption doctrine is based on the Supremacy

⁴ The situation recently became more complicated, as four states – Colorado (2012), Washington (2012), Alaska (2014), and Oregon (2014) – and the District of Columbia (2014) passed laws legalizing marijuana for recreational use by adults. These legal regimes for markets for the recreational use of marijuana have many similarities: they repealed criminal penalties for possession of small amounts of marijuana, tasked state officials with developing regulations for these markets, and taxed the sale of marijuana. Because our empirical focus is on medical markets for marijuana, we do not discuss these in detail.

Clause of the Constitution (Article VI, Clause 2), which grants federal law priority over state law when the two conflict. In some cases, pre-emption can be limited by claims of privilege based on other foundational legal documents, such as the First Amendment's guarantee of freedom of speech. A key test of the pre-emption doctrine came soon after California legalized medical marijuana: in a policy brief, federal authorities stated that they would continue to enforce the Controlled Substances Act holding that marijuana is an illegal substance with no medical use (McCaffrey 1997). A group of physicians, patients, and nonprofit retailers contested this policy, which ultimately led to a District Court ruling that the federal policy violated the First Amendment rights of physicians and patients who communicated with each other about the use of medical marijuana to treat disease (*Conant v. McCaffrey* 1997). More generally, pre-emption in other markets has been limited by the anti-commandeering doctrine of Tenth Amendment to the Constitution, which forbids the federal government from forcing states to enact laws or assist federal officials in enforcing federal law within any state (e.g., *Printz v. United States* 1995). The distinction between pre-emption and commandeering is roughly the same as the distinction between federal authorities preventing states from acting (pre-empting) and demanding states act (commandeering). Legal scholars have argued that under the commandeering doctrine, while states could legalize marijuana, they could not prevent federal authorities from prosecuting those who grew, bought, sold, or possessed marijuana – but state authorities did not have to assist federal authorities (Mikos 2009; Chemerinsky et al. 2015; for a contrary view, see Schwartz 2013). There is no decisive judicial ruling about this issue, indicating that state officials and medical marijuana buyers and sellers continue to face great legal uncertainty about pre-emption.

Second, the Commerce Clause of the Constitution (Article I, Section 8, Clause 3) gives federal officials authority over interstate trade. It has long been interpreted by the courts as giving federal officials authority over *intrastate* trade, if they can demonstrate that trade occurring entirely within the boundaries of one state “substantially affect” related trade in other states (Tribe 2000: 811-824). But as the phrase “substantially affect” implies, such

demonstrations may not always be possible. In 2005, the Supreme Court applied the commerce clause to marijuana, ruling that the federal government could prosecute those who cultivated and possessed marijuana in California, even when allowed under state law, because even if marijuana was not sold or transported across state lines, there could be an "indirect" effect on interstate commerce (*Gonzales v. Raich* 2005). But this decision was balanced by the Supreme Court's refusal, four years later, to hear appeals from San Diego and San Bernardino (California) counties to seeking declare California's medical marijuana market illegal (*County of San Diego v. San Diego NORML* 2009). Thus, application of the commerce clause to marijuana markets has also generated uncertainty about their legal status.

Third, federal authorities can enforce federal law themselves. But effective enforcement may require assistance from state and local authorities, who may be reluctant to provide it, and who can use the anti-commandeering doctrine as an excuse for inaction. This is true for medical marijuana markets: while in theory federal authorities could enforce federal drug laws themselves, in practice federal enforcement has depended heavily on state and local officials, who have superior local knowledge and larger pools of resources (Mikos, 2009). In response to these constraints, pragmatic federal authorities in the Obama Administration developed a co-operative policy: when deciding whether to prosecute marijuana possession, they began to take into consideration the quality of state-level legal regimes (Kamin 2014; Chemerinsky et al. 2015). This policy waxed and waned over time. In 2009, federal authorities announced that they would conserve their scarce resources and not prosecute medical marijuana users "whose actions are in clear and unambiguous compliance with existing state laws" (Ogden 2009). But in 2011, federal authorities reversed that accommodation and recommenced active prosecution of marijuana providers, singling out "commercial operations cultivating, selling, or distributing marijuana" (Cole 2011). Two years later, after Colorado and Washington voted to legalize marijuana for recreational use by adults, the federal stance softened anew. Federal authorities declared they would not prioritize enforcement of federal law in states that had robust regulation of marijuana; prosecution was advised for a limited set

of circumstances derived from lax regulation (Cole 2013).⁵ In an interview, this memo's author said: "If you don't want us prosecuting [marijuana users] in your state, then get your regulatory act together" (Phelps 2014: A1).

In sum then, it has remained unclear whether the pre-emption or anti-commandeering doctrine applied to state-legal marijuana markets, as well as whether the commerce clause applied. But by 2013, the application of cooperation to medical marijuana markets had become clear, through the Ogden Memorandum of that year, which stated that federal officials would be less likely to expend federal resources enforcing the law in states with comprehensive statewide licensing systems that ensured that marijuana would not be diverted from the medical marijuana market to the recreational market. Under this co-operative federalism policy, states that authorized organizations to sell marijuana but did not regulate their forms and activities through comprehensive licensing were sites of the greatest conflict between federal and state law. States that authorized organizations to sell marijuana *and* regulated their forms and activities through comprehensive licensing were sites of limited (but not zero) conflict between federal and state law because those state-level legal regimes were deemed "reasonable" by federal officials. Finally, states that did not authorize organizations to distribute marijuana were also sites of limited conflict between federal and state law, because they had very small medical marijuana markets and the few organizations that did provide marijuana in those states were likely to "fly under the radar" of federal scrutiny, evading scrutiny by, for example, not filing federal taxes.

Local responses to state actions. Municipalities in many states opposed state legalization of marijuana for medical use and enacted laws that either banned marijuana providers outright or made their establishment impossible through zoning regulations. Some

⁵ According to this memo, states could lower the likelihood of federal prosecution if they prevented: (1) the distribution of marijuana to minors, (2) revenue from the sale of marijuana flowing to criminal enterprises or gangs, (3) the distribution of marijuana across state lines, (4) marijuana markets serving as cover for other forms of drug trafficking or any other illegal activity, (5) the use of firearms by marijuana buyers and sellers, (6) drugged driving or other public-health problems, (7) growing marijuana on public land, and (8) marijuana possession or use on federal property.

state laws explicitly addressed whether municipalities could prohibit marijuana providers: Arizona's law mandated that medical marijuana providers were allowed throughout the state and prohibited municipalities from banning them, while Colorado's, Oregon's and Nevada's laws allowed municipalities to ban providers. Other state laws (e.g., California's before late 2015) were silent on this issue, giving municipalities legal leeway. Where they had leeway to do so, many municipalities prohibited medical marijuana providers through ordinances; others used permissive zoning rules, which allowed municipalities to reject applications by medical marijuana providers.⁶ Until 2016, most of these ordinances focused on bricks-and-mortar stores and ignored order-online-and-delivery services. Despite such bans, many marijuana providers of both forms continued to operate in those local markets.

Local prohibitions on medical marijuana providers create additional sites for conflict between levels of the federalist system. But, different from state-federal conflict, municipal-state conflict is generally clear-cut: municipalities are not sovereign entities under the U.S. Constitution, so state law can determine whether municipalities can ban marijuana providers. Therefore, when municipalities ban marijuana providers, they clearly increase the likelihood that municipal officials will raid or shutter providers, and so increase the uncertainty they face.

Summary. Table 1 shows the predictions concerning uncertainty for the single-level analysis of legal regimes versus the multiple-level analysis. It focuses on state-federal conflict and lists the states with each type of state-level legal regime.⁷ Within each state (except Arizona, which prohibits municipalities from banning medical marijuana providers), municipal bans generate state-local conflict in the affected localities, further increasing uncertainty.

[Table 1 about here]

⁶⁶ Permissive zoning rules are ones that list all land uses that are permitted; everything not specifically listed is prohibited.

⁷ The research design section provides details on how we coded these state-level legal regimes.

Research Design

Data sources

State-level legal regimes. As briefly explained above, each state followed a different path to legalizing marijuana. To assess whether states authorized formal organizations to sell marijuana to consumers and whether states licensed marijuana sellers, we analyzed each state's history, paying special attention to ballot propositions, statutes, and court decisions about marijuana markets. We also visited the websites of the government agencies charged with regulating marijuana markets, to assess what on-the-ground guidelines had been implemented or were in the process of being implemented. The Appendix summarizes changes in the legal regime for each of the seven states we study.

Marijuana providers. We gathered data on marijuana providers in state-legal markets, including location, product menu, and prices, by collecting provider menus from Weedmaps, the oldest and largest online directory of marijuana providers in the United States. We chose Weedmaps because it lists more marijuana providers than any other online directory. We analyze data from 10 October, 2015, the day after California Governor Jerry Brown signed that state's Medical Marijuana Regulation and Safety Act (MMRSA). We chose this date because it preceded the implementation of MMRSA, which for a four-month period required municipalities to pass their own ordinances regulating or prohibiting medical marijuana if they wanted to maintain local-level legal control of those markets. During those four months, dozens of cities modified their medical marijuana laws. Because California was the largest market for medical market at that time, this action created complicated the situation in ways that are as yet difficult to chart. On 10 October, 2015, Weedmaps listed 5,342 provider menus in the seven largest state medical marijuana markets. Figure 2 shows a screenshot from Weedmaps on this date, demonstrating the wealth of data available on that site.

[Figure 2 about here]

Our analysis covers the seven largest state-legal medical marijuana markets: Arizona, California, Colorado, Michigan, Nevada, Oregon and Washington. In October 2015, these

constituted 99.9 percent of product observations and 99.2 percent of provider observations collected from Weedmaps. Figure 3 shows the estimated size of these markets (\$4.17 Billion) in terms of sales revenue in 2015, and compares them to the other 15 jurisdictions (14 states plus DC) that we do not study.

[Figure 3 about here]

Data collection yielded data on provider name, organizational form (bricks-and-mortar store or delivery-only service), location (city, state, and zip code, plus street address for most providers), the date on which the provider last updated its product menu (which allows us to check that they are still operating; we removed providers that had not updated their menus during the 30 days preceding the date of data collection because marijuana prices tended to change frequently), number of page views, attributes of each product in the menu, and price for each product. Data from Weedmaps cover a wide variety of marijuana product types: flowers (smokeable and vaporizable plant), edibles (cookies, candies, crackers, etc.), concentrates (primarily hash and oil), pre-rolled joints, gear (paraphernalia and clothing), topicals (ointments and salves), seeds, and clones (marijuana starter saplings for home growing). As we explain below, we focus on prices for flowers, the largest product category.

Measures

Dependent variables: price. We measured prices for each marijuana product sold by each provider in each market.⁸ We focused on flowers, the most common form in which marijuana is sold in the United States. Providers typically sell marijuana flowers in 1 gram, 3.5 gram, and 28 gram increments. We limited our analysis to 3.54 grams of marijuana flowers because that is the most common amount sold by weight. This equals one-eighth of an ounce, so this quantity is often called an eighth; it is enough to create four to seven joints. We log-transformed price because a one-unit increase from a low price (e.g., \$20 to \$21) has more impact on customers than a one-unit increase from a high price (e.g., \$80 to \$81).

⁸ These are before-tax prices: they do not include sales taxes charged by state or local authorities.

Explanatory variables: state-federal conflict. To measure the conflict between state and federal law, we first assessed state-level legal regimes on two key dimensions: whether or not the explicitly authorized organizations to sell marijuana for medical purposes, and whether or not they set up licensing procedures and rules for such organizations. To measure state authorization of formal organizations, we created a dummy variable, *State Legal*, coded 1 if state law clearly and without contradiction articulated that formal organizations could sell marijuana and 0 if state law (a) did not explicitly state that formal organizations could sell marijuana or (b) contained contradictory information about this. The first category we labeled “legal,” as formal organizations are clearly allowed to be sellers in the focal market under state law; the second category we labeled “illegal/quasi-legal,” as formal organizations are either clearly banned (any organization in Michigan and unlicensed and delivery-only providers in Nevada) or soon to be banned upon implementation of the law (medical providers in Washington). To measure state licensing and regulation of marijuana providers, we created a dummy variable, *State Licensed*, coded 1 if the state required marijuana providers to acquire specific licenses under a comprehensive statewide medical marijuana regulatory regime and 0 otherwise.⁹ These measures were coded at the level of the focal organization as some states (i.e., Nevada and Oregon) with new licensing regimes were home to licensed providers (legal under state law), but also unlicensed providers (illegal under state law).

Explanatory variables: state-local conflict. To code local-level legal regimes, we examined ordinances (laws and zoning rules) banning medical marijuana providers and newspaper articles describing city council actions banning providers. We coded *Local Ban* as 1 if the focal municipality specifically prohibited the operation of an organization selling medical marijuana or had permissive zoning codes that did not list marijuana sale as permitted, and 0 otherwise. There are hundreds of municipalities in our data set, and we have not yet coded all municipalities. As of January 2017, we have coded local laws covering 87.9% of observations on

⁹ As explained above, Nevada initiated licensing procedures in 2014, but these licenses did not take effect until after the date of our data.

products and 84.1% of observations on providers. (We will finish coding all municipalities in the next month.) So when we bring local laws into the analysis, we drop a small fraction of provider-product observations. When we do so, we judge whether reducing the sample changes the results in materially (it does not). Many local bans were specific to organizational form; for example, most local bans in California prohibited bricks-and-mortar stores, but not online-order-delivery-only services. Therefore, the variable *Local Ban* is specific to each provider. We then captured *state-local conflict* with an interaction variable between *State Legal* and *Local Ban*.

Control variables: market structure. To make sure findings on legal regime were not driven by other aspects of market structure, we controlled for competition and organizational heterogeneity. Economic theory holds that more intense competition between sellers will drive prices lower and reduce price dispersion. Competition creates incentives for sellers to take advantage of arbitrage opportunities; for example, if entrepreneurs observe that providers in one area are selling products at high prices, those entrepreneurs will begin offering products for less, forcing incumbents to lower prices to match or lose market share. To measure competition, we used Google's geolocation application program interface (API) to determine the longitude and latitude of every medical marijuana provider based on its address. If providers did not list a specific address, we used the centroid of the most specific geographic unit (zip code, city, county, etc.) listed. Following previous research (Sorenson and Audia 2000), we calculated *local competition (LC)* as the inverse of the distance between each provider and every other provider in the state, as follows:

$$LC_{is} = \sum_{js} \frac{1}{(1 + d_{ijs})},$$

where i indexes the focal marijuana provider, j indexes all other providers, s indexes the state in state, and d_{ijs} is the distance between providers i and s . We limited this measure by state because it is illegal to sell marijuana across state lines. We included recreational marijuana sellers in states that have both medical and recreational providers (Colorado, Washington, and

Oregon) because medical patients can also purchase recreational marijuana, so recreational marijuana sellers are competitors of medical marijuana providers. This variable was right-skewed, so we logged it to normalize it.

The heterogeneity of competitors might also have influenced price. Medical marijuana providers can take two forms: bricks-and-mortar stores or online-order-and-delivery-only services. The former offer walk-in service; some also offer delivery service. The latter do not have a physical location accessible to the public, but rather have drivers bring products to customers. For each firm, we calculated organizational heterogeneity as follows:

$$OH_i = 1 - 2|0.5 - b_{ji_{10s}}|,$$

where $b_{ji_{10s}}$ is the proportion of brick-and-mortar providers within a 10-mile radius of provider i that operate within state s . The component inside the absolute value bars captures organizational homogeneity: if $b_{ji_{10s}}$ equals 0.50, this component equals zero (minimum homogeneity – half delivery-only, half bricks-and-mortar), but if $b_{ji_{10s}}$ equals 1.0 or 0.0 (both maximum homogeneity – all of one form and none of the other), this component equals 0.50. We multiplied this fraction by 2 to have it range from 0 to 1. We then subtracted the resulting fraction from 1 to create *Organizational Heterogeneity*.

Control variables: provider characteristics. To take into account *provider age*, we measured days since the provider joined Weedmaps. This measure was left-censored for a few providers that operated before Weedmaps came online in July 2008. But 70% of providers in the dataset joined Weedmaps after 2013, well after it had become the industry hub. Although date of joining Weedmaps is not the same as date of founding, it does capture how long a provider has been stable enough to advertise their wares online and so is a suitable proxy for provider stability. For providers that joined Weedmaps at the website's launch, we set date of joining Weedmaps as July 2008. We log-transformed this variable because its distribution was right-skewed.

We controlled for *provider reputation* by using 275,000 user reviews on Weedmaps that rate providers along five dimensions: overall rating, price, accessibility, staff, atmosphere, and

product quality. On each dimension, ratings ranged from one to five stars. We measured *provider rating* as the rating at the time of data collection. These ratings covered the vast majority of product-provider observations. We dropped from the analysis 414 providers that were not rated; most of these were very new or very small, so they accounted for only a small fraction (7.68 percent) of product-provider observations (7,735 out of 100,765).

We also controlled for provider service form, coding service form (*delivery only*) as 1 if the provider offered *only* delivery service and 0 if it had a physical location. We also controlled for the number of different flower strains sold by the provider. If producers with more varied menus had greater price variance, this outcome could be due to product differentiation, rather than market uncertainty. We log-transformed this measure because the difference between selling three products and four products was greater than the difference between selling 33 products and 34 products.

Control variables: product characteristics. We included two binary indicator variables to capture product type: *Indica* was set to one for products derived from pure strains of the *C. indica* species and zero otherwise, while *Sativa* was set to one for products derived from pure strains of the *C. sativa* species and zero otherwise. The reference group is *hybrids*, products derived from combinations of the two pure species. Although their physiological and psychological effects are debated, indica products tend to contain higher ratios of cannabidiol (CBD) to tetrahydrocannabinol (THC) than sativa products, and most marijuana users perceive indica products as relaxing and sedative, while they perceive sativa products as energizing and creativity-inducing.

Modeling strategy

To model both the mean and the dispersion of price, we used the multiplicative heteroskedasticity model, which is sometimes called the variance function regression model (Harvey 1976; Davidian and Carroll 1987). We broke the price of product i sold by provider j at time t (p_{ijt}) into two components, the mean (μ_{ijt}) and variance (σ^2_{ijt}):

$$p_{ijt} = \mu_{ijt} + \sigma^2_{ijt} \times \varepsilon_{ij}$$

where ε_{ijt} is the error term. We modeled each component as a function of explanatory variables, X_{ijt} and Z_{ijt} :

$$\mu_{ijt} = E(p_{ijt}) = \beta' X_{ijt}$$

$$\text{and } \sigma^2_{ijt} = \text{Var}(p_{ijt}) = \exp(\gamma' Z_{ijt}).$$

Because the first (mean) and second (variance) moments of a normal distribution are independent of each other, we maximized the likelihood function to obtain the estimates of the β and γ parameters separately, using the `reghv` command in Stata (Weesie 1998). We have multiple observations per provider – one for each product sold. Therefore, observations are not independent. To deal with this, we clustered standard errors by provider.

Robustness checks. In results not shown here to save space, we assessed the robustness of our results to model specification in several ways. First, we estimated models of price variance that included mean price, in order to take into consideration the possibility that higher-priced products would have greater dispersion. Second, we estimated multi-level models of mean price, with products nested in providers.

Results

Table 2 presents descriptive statistics. Because the local ban variable is missing for about 85 percent of observations, we used the pairwise deletion option in Stata. Most correlations are low or moderate, indicating that multicollinearity is not an issue. Among the moderate correlations, *State Legal* was positively correlated with competition ($r=0.39$) and the *Delivery-only* service form ($r=0.21$), while *State Licensed* was negatively correlated with competition ($r=-0.36$) and *Delivery Only* ($r=-0.34$). *Delivery Only* was positively correlated with *Local Competition* ($r=0.49$) and *Organizational Heterogeneity* ($r=0.21$).

[Table 2 about here]

Tables 3 and 4 show results of the analysis of the first two levels of conflict: federal and state. Table 3 presents results on mean price, table 4 on price dispersion. In Table 3, model 1 is

a baseline containing provider and product characteristics, as well as local competition. Model 2 adds both attributes of the state-level legal regime (*State Legal* and *State Licensed*) to distinguish among three state legal-level regimes: illegal/quasi-legal (the reference category; *State Legal*=0 and *State Licensed*=0), legal but unlicensed (*State Legal*=1 and *State Licensed*=0), and legal and licensed (*State Legal*= 1 and *State Licensed*=1). It shows that prices for marijuana sold by providers in legal but unlicensed markets are higher prices for marijuana sold by providers both in legal and licensed markets and illegal/quasi-legal markets. These results are net of product type (indica vs. sativa vs. hybrid), provider characteristics, and local competition. These results support hypothesis 3 (derived from the multi-level theory) and fail to support hypothesis 1 (derived from the single-level theory). This pattern suggests that uncertainty derived from conflict among legal regimes created by different levels of government, rather than uncertainty derived from legality or illegality at any single level of government, that drives price. Under the current federal co-operative policy (set by the 2013 Cole Memorandum), conflict between state-level and federal-level legal regimes is greatest in legal but unlicensed markets, so uncertainty, which makes it difficult to plan and so raises operating costs, is greatest in those markets. This pattern also suggests that if licensing adds to operating costs (relative to costs of operating in legal but unlicensed markets), that effect is trumped by the reduction in uncertainty created by aligning state-level and federal-level legal regimes. We note that prices for marijuana in legal and licensed markets are not only lower than prices in legal but unlicensed markets ($\beta=0.13$ for *State Licensed*), but also lower than prices in illegal/quasi-legal markets ($\beta=-0.27$ for *State Legal*). This pattern suggests that while providers in illegal/quasi-legal markets may be few in number and may try to evade the notice of federal authorities, they still recognize their status is tenuous, which means they are operating under more uncertainty than providers in legal and licensed markets.

[Tables 3 and 4 about here]

Model 3 adds the *Delivery Only* dummy variable, to see if the organizational service form (online-order-and-delivery-only service vs. bricks-and-mortar store) mediates the

relationship between legal regime and price. Delivery-only providers have higher prices than providers with bricks-and-mortar stores ($\beta=0.15$ for *Delivery Only*). Organizational form mediates the relationship between one aspect of legal regime and price, as the negative effect of *State Licensed* is decreased substantially between models 2 and 3. The Sobel/Goodman test for mediation indicates that 41.2 percent of the effect of *State Licensed* is mediated by *Delivery Only*. This may be due to two facts: delivery-only services tend to have less intimate connections to their clients than bricks-and-mortar stores, and delivery-only services tend to be younger than bricks-and-mortar stores (indeed, table 2 shows the correlation between delivery-only and age is -0.227). This pattern of results suggests that organizational form – delivery-only service versus bricks-and-mortar store – is one of the causal mechanisms underlying the relationship between legal regime and price, as legal regimes determine which forms of organizations, using which strategies, are acceptable.¹⁰

Instead of the mediator (and causal mechanism) being the delivery-only form, it may be that the mix of organizational forms – delivery-only services and bricks-and-mortar stores – that creates uncertainty and raises prices. To assess this possibility, model 4 substitutes *Organizational Heterogeneity for Delivery Only*. It shows that this speculation is not borne out by the data: *Organizational Heterogeneity* has a negative effect on price, net of controls, and the effect of both aspects of state-level legal regimes are increased, not decreased, by adding *Organizational Heterogeneity*. Together with the results of model 3, the results of model 4 suggest that the delivery-only service form partly mediates the effect of the state-level legal regime's conflict with the federal-level legal regime. This makes sense because several state licensing regimes do not allow for delivery-only service forms, so delivery-only providers are more likely to operate in legal but unlicensed markets ($\beta=0.21$) are more likely than legal and licensed markets ($\beta=-0.34$). Model 5 includes both *Delivery Only* and *Organizational Heterogeneity*, and shows similar results to those in models 4 and 5.

¹⁰ But the *Delivery Only* variable accentuates the effect of the other aspect of state-level legal regime, as the coefficient on *State Legal* increases, rather than decreases, between models 2 and 3.

In results not shown here, we dropped the variable for provider reputation (dispensary rating), which allowed us to include in the analysis a small number of generally newer, smaller providers. These results are virtually identical to those shown here, demonstrating that the analysis is not sensitive to exclusion of the newest and smallest providers.

In Table 4, model 1 shows that the price dispersion of marijuana products sold by providers in legal but unlicensed markets was greater than the price dispersion of marijuana products sold by providers in both illegal/quasi-legal and legal and licensed markets. These results are net of product type (indica vs. sativa vs. hybrid), provider characteristics, and local competition. (In results not shown here, we added average price to the model and found a similar pattern of effects.) These results support hypothesis 4 (derived from the multi-level theory) and fail to support hypothesis 2 (derived from the single-level theory). They indicate that, under current federal policy, conflict between state-level and federal-level legal regimes is greatest in legal but unlicensed markets, so uncertainty, which makes it difficult to develop norms about how to set prices and how to organize, both of which lead to divergence in prices across providers, is greatest in those markets. Price dispersion is greater in legal but unlicensed markets than in illegal/quasi-legal markets ($\beta=0.72$ for *State Legal*), but price dispersion nearly equal in legal and licensed and illegal/quasi-legal markets ($\beta=0.72$ for *State Legal* and $\beta=-0.74$ for *State Licensed*, so the net effect $=-0.02$, which is neither statistically nor substantively significant).

Model 2 adds the *Delivery Only* dummy and shows that price dispersion for marijuana products is much less for delivery-only providers than it is for bricks-and-mortar providers. This variable does not mediate the effects of state-level legal regime; instead, it strengthens those effects, as the positive effect of *State Legal* and negative effect of *State Licensed* both become stronger. Model 3 substitutes *Organizational Heterogeneity* dummy and shows that it moderates the effects of both *State Legal* and *State Licensed*, whose effect estimates decrease substantially. Model 4 includes both *Delivery Only* and *Organizational Heterogeneity* dummies, and shows similar results as those in Models 2 and 3.

Tables 5 and 6 show the analysis of all three levels of conflict, by adding variables that capture state-local conflict to models that capture state-federal conflict. Model 1 of Table 5 replicates model 4 in Table 3, and shows the same pattern of results. This indicates that this analysis, which drops municipalities for which we have not yet coded local-level marijuana provider bans, adequately replicates the analysis of all municipalities. Model 2 adds the *Local Ban* dummy and shows that prices are higher in municipalities that ban the focal form of marijuana provider. (Despite such bans, many marijuana providers continued to operate in those markets.) Model 3 adds the interaction between *State Legal* and *Local Ban* to capture conflict between state-level and local-level legal regimes. It shows that such conflict increases price, which supports hypothesis 3 (derived from the multi-level theory) and fails to support hypothesis 1 (derived from the single-level theory). Moreover it shows that even after controlling for this conflict, marijuana prices are lower in illegal/quasi-legal markets than in legal and licensed markets. Again, this pattern of results suggests that uncertainty derived from conflict among legal regimes created by different levels of government, rather than uncertainty derived from legality or illegality at any single level of government, that drives price.

[Tables 5 and 6 about here]

In Table 6, model 1 replicates model 3 of Table 4. It shows a very similar pattern of results, bolstering our conclusion that this analysis adequately replicates the analysis of all municipalities. Model 2 adds the dummy for *Local Ban*, and shows no effect of this variable on price dispersion. Model 3 adds the interaction between *State Legal* and *Local Ban*, and shows that price dispersion greater in markets where local-level legal regimes conflict with state-level legal regimes, and a persistent non-significant effect of *Local Ban*. This provides more evidence for our argument that price patterns are driven by uncertainty derived from conflict among legal regimes created by different levels of government, rather than uncertainty derived from legality or illegality at any single level of government. Moreover, model 3 shows that even after controlling for conflict between state-level and local-level legal regimes, price dispersion in illegal/quasi-legal markets is greater in in legal and licensed markets ($\beta=0.27$ for *State Legal* and

$\beta = -0.73$ for *State Licensed*, so the net effect $= -0.36$), reflecting conflict between state-level and federal-level legal regimes.

Conclusion

Price is central to markets, so it is not surprising that price is the focus of a growing number of sociological studies of markets (e.g., Uzzi and Lancaster 2004; Velthuis 2005; Beckert 2011). Most of this work examines relationships (social networks) or cognitive-cultural understandings (social norms); far less has been done to study how social institutions (legal regimes) determine prices (Beckert 2011). Here, we focused on institutions because doing so has the greatest chance of yielding novel empirical and theoretical insights. We noted that most economic sociology research on markets and state institutions (this work generally did not study prices) has examined a single level of government, typically the national level, and has ignored the fact that many states are federalist, with nested levels of government (for exceptions, see Dobbin 1994; Schneiberg and Soule 2005; Djelic and Quack 2007). This general neglect of federalism means that previous sociological research on states and markets has assumed, implicitly, that legal regimes are in alignment at all levels of government.

In this paper, we used sociological and legal research to lay out a single-level theory of legal regimes and pricing patterns, and then built a multi-level theory of conflict (or alignment) among nested legal regimes and its effect on pricing patterns. We went beyond most previous research on price by developing arguments based on both theories, not just about the central tendency of price, but also about price dispersion. We tested these theories on prices in one market that is a battleground for federalism in the United States: state-legal medical marijuana markets. We found support for the multi-level theory rather than the single-level theory, in terms of both mean price and price dispersion. Overall, our results provide strong (and substantively significant) evidence for the argument that price patterns (central tendency and dispersion) are driven by uncertainty derived from conflict among legal regimes created by

different levels of government, rather than by uncertainty derived from legality or illegality at any single level of government.

Although markets for medical marijuana are large and growing rapidly (as more and more states legalize marijuana for medical use), and although these markets have been deemed critical battlegrounds for federalism in the United States (Mikos 2009; Schwartz 2013; Chemerinsky et al. 2015), there are many other markets that are affected by conflict between national-level and state-level legal regimes, as well as conflict between local-level and state-level legal regimes. Most of these markets are for goods and services that are contentious on moral, religious, or scientific grounds, because contention along one or more of those dimensions provides a solid basis for legal and social contestation. Current examples of contentious markets include those in “the sharing economy” (or, pejoratively, “the gig economy”), such as those for accommodations (e.g., Airbnb) and local transportation (e.g., Uber), as well as markets for “fracking” natural gas and for trading carbon dioxide permits and credits; historical examples include the late nineteenth-century market for life insurance and early twentieth-century markets for fire insurance and electricity (Zelizer 1979; Schneiberg and Bartley 2001; Yakubovich, Granovetter, and McGuire 2005). In all these markets, many different kinds of actors (industry lobbyists, union officials, and social-movement activists) motivated by ethics, religion, or science can push for market expansion or restriction, even new market creation or existing market closure, by promoting local ballot initiatives and referenda or by appealing to local-level politicians and bureaucrats, and ignoring national state agents. Such actions can lead to conflict between legal regimes created by different levels of government, which generates uncertainty for organizations operating in the focal markets. Therefore, contentious markets are excellent sites for applying our multi-level theory of legal regime conflict, to investigate price-setting and other market practices.

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Figure 1: State (and District of Columbia) Laws Concerning Medical Marijuana

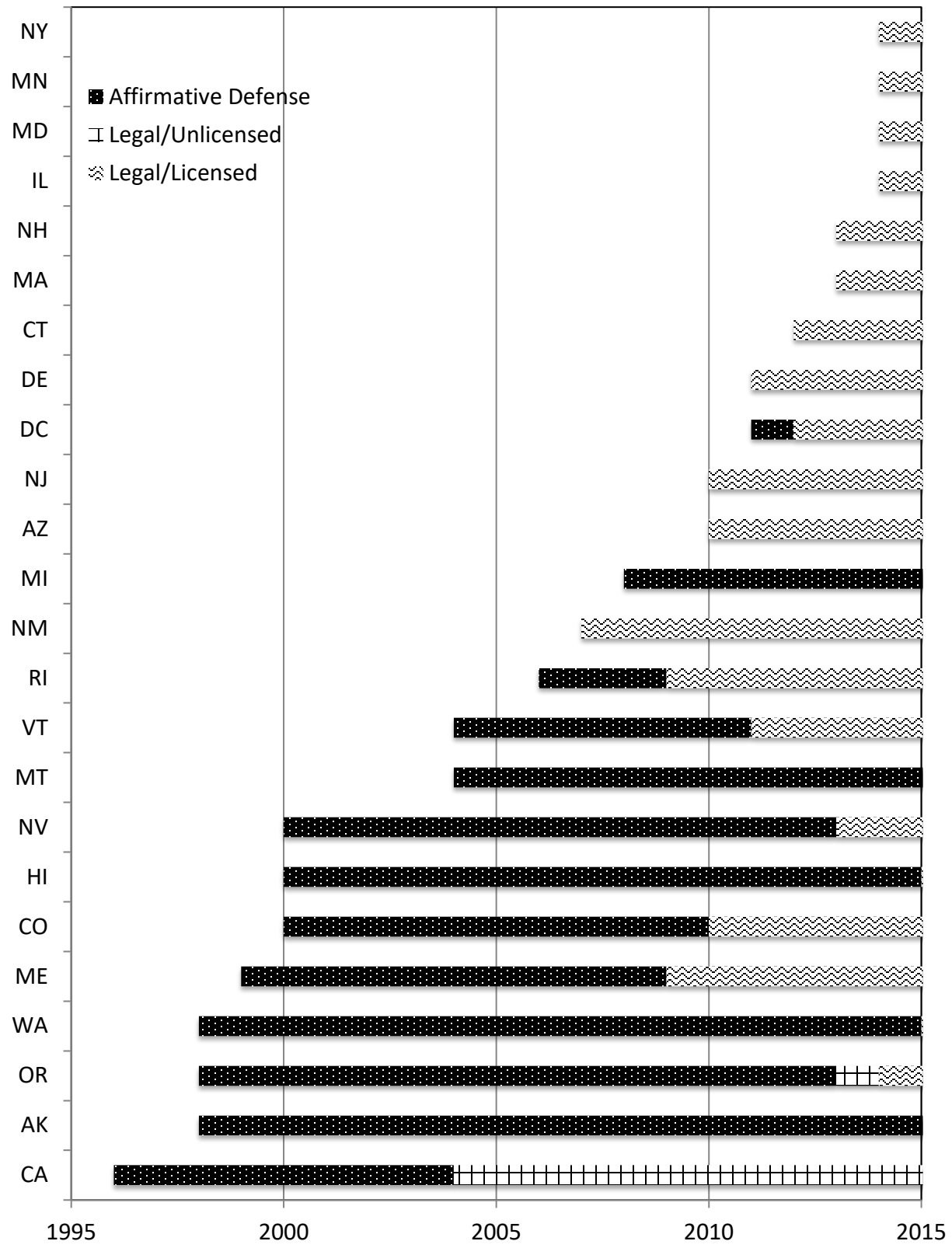


Figure 2: Screen Snapshot of Weedmaps Website for One Provider

weedmaps™ Dispensaries Select Region

Berkeley Patients Group
Medical Dispensaries / Berkeley (148,114 hits)

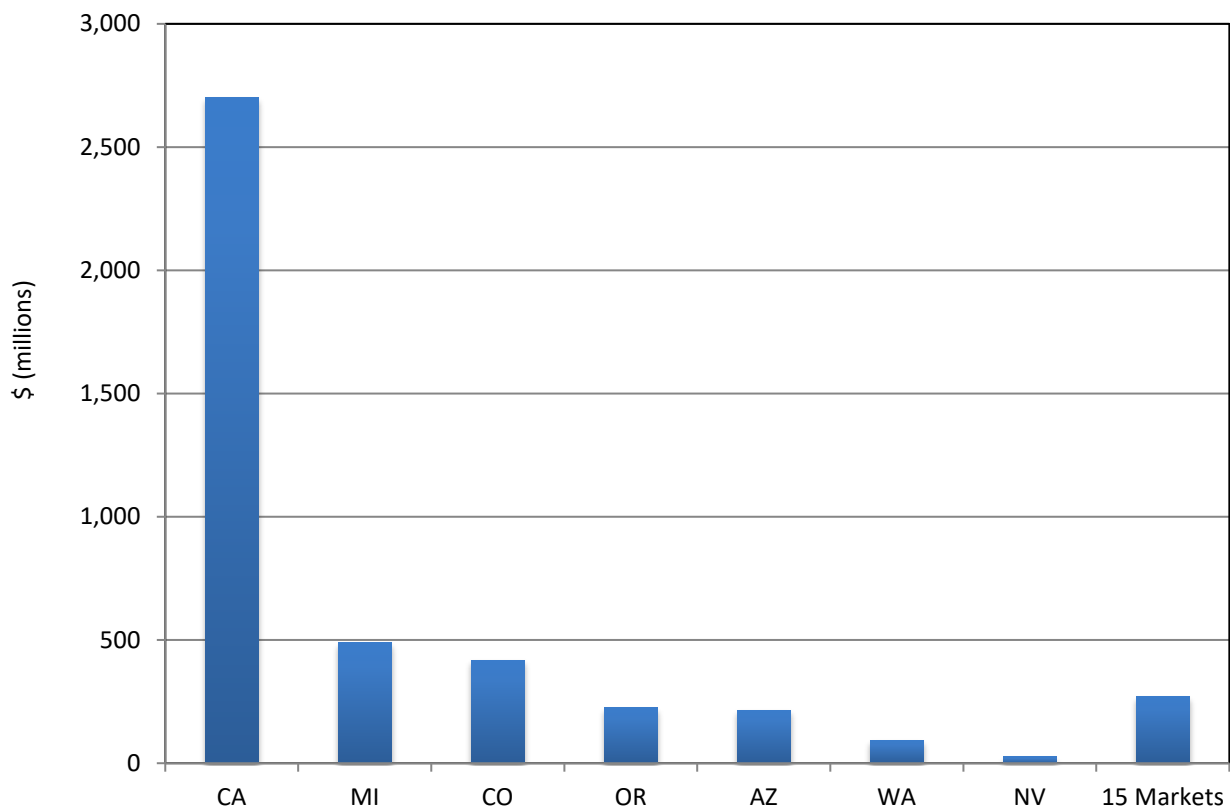
Photos Videos

WeedMenu Description

WeedMenu updated 42 minutes ago

Indica	g	1/8	1/4	1/2	oz
All Star White x Pure Afghani	18 g	60 1/8	200 1/2	375 oz	
All Star White Alien	18 g	60 1/8	200 1/2	375 oz	
3X Crazy	15 g	50 1/8	170 1/2	325 oz	
Chocolate Hashberry	15 g	50 1/8	170 1/2	325 oz	

Source: <https://weedmaps.com/dispensaries/bpg-express>, retrieved October 10, 2015)

Figure 3: Market Size (by Revenue) of the Largest Legal Marijuana Markets in 2015

Note: The category “15 Markets” consists of medical marijuana markets in Alaska, Connecticut, District of Columbia, Delaware, Hawaii, Illinois, Maine, Massachusetts, Minnesota, Montana, New Jersey, New Mexico, New York, Rhode Island, and Vermont.

**Table 1:
Predictions about Uncertainty from Legal Regime Theories
Applied to Medical Marijuana Markets**

Legal Regime	Authorized Providers	Licensing of Providers	Conflict with Federal Law	Single-Level Theory: Uncertainty	Multi-Level Theory: Uncertainty	States (+ DC)
Illegal/quasi-legal	Individuals	No	Low	High	Low	AK, HI, MI, WA
Legal but unlicensed	Organizations	No	High	Medium	High	CA
Legal and licensed	Organizations	Yes	Low	Low	Low	AZ, CO, CT, DC, IL, MA, MD, ME, RI, NV, NH, NJ, NM, NY, VT

Note: The predictions of the multi-level theory about uncertainty assume cooperation between federal and state officials that is described in the second Cole Memorandum (2013). As of the end 2015, this was the federal government's stance. That stance could change in the future, when the next Administration is sworn into office.

Table 2: Univariate Statistics and Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13
Mean	3.752	5.576	4.784	3.278	0.240	0.460	0.925	0.057	0.672	1.821	0.357	0.428	0.401
Standard deviation	0.250	1.308	0.339	0.658	0.427	0.498	0.263	0.232	0.470	0.811	0.295	0.495	0.490
Median	3.807	5.609	4.900	3.258	0.000	0.000	1.000	0.000	1.000	1.798	0.283	0.000	0.000
Minimum	1.099	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	-3.503	0.000	0.000	0.000
Maximum	4.500	7.864	5.000	4.905	1.000	1.000	1.000	1.000	1.000	3.533	1.000	1.000	1.000
N. of observations	100765	100765	93030	100765	100765	100765	100765	100765	100765	100765	100765	88613	88576
1 Eighth (Ln)	1.000												
2 Disp Age (Ln)	-0.087	1.000											
3 Disp Rating	0.072	-0.150	1.000										
4 Flower Count (Ln)	-0.066	0.042	-0.005	1.000									
5 Sativa	0.002	0.020	0.001	-0.012	1.000								
6 Indica	0.016	-0.032	0.024	0.061	-0.519	1.000							
7 State Legal	0.088	-0.029	0.036	0.064	0.025	0.062	1.000						
8 State Licensed	-0.258	0.160	-0.136	-0.079	0.010	-0.062	0.070	1.000					
9 Delivery	0.382	-0.227	0.144	-0.178	0.010	0.016	0.214	-0.337	1.000				
10 Competition(Ln)	0.232	-0.166	0.144	0.101	0.024	0.064	0.388	-0.363	0.485	1.000			
11 Org Heterogeneity	-0.084	-0.020	-0.038	0.164	-0.014	0.085	0.144	-0.202	-0.207	-0.008	1.000		
12 Local Illegal	-0.049	-0.129	0.036	0.161	-0.019	0.082	0.044	-0.227	-0.159	0.029	0.336	1.000	
13 State Legal x Local Illegal	-0.041	-0.140	0.037	0.185	-0.014	0.095	0.236	-0.215	-0.139	0.098	0.368	0.946	1.000

Table 3: The Legal Regimes on the (Mean) Price of 3.5g of Marijuana Flowers

	(1)	(2)	(3)	(4)	(5)
Dispensary Age (logged)	0.003*** (0.001)	0.004*** (0.001)	0.009*** (0.001)	0.004*** (0.001)	0.009*** (0.001)
Dispensary Rating	0.004 (0.002)	0.002 (0.002)	-0.002 (0.002)	0.002 (0.002)	-0.002 (0.002)
Flower Count (logged)	-0.024*** (0.001)	-0.025*** (0.001)	-0.008*** (0.001)	-0.024*** (0.001)	-0.008*** (0.001)
Sativa	0.005* (0.002)	0.005* (0.002)	0.005** (0.002)	0.005* (0.002)	0.005** (0.002)
Indica	0.014*** (0.002)	0.014*** (0.002)	0.015*** (0.002)	0.014*** (0.002)	0.015*** (0.002)
Local Competition (logged)	0.047*** (0.002)	0.045*** (0.002)	-0.001 (0.002)	0.044*** (0.002)	-0.001 (0.002)
State Legal		0.134*** (0.023)	0.165*** (0.022)	0.132*** (0.023)	0.163*** (0.022)
State Licensed		-0.266*** (0.015)	-0.156*** (0.015)	-0.307*** (0.016)	-0.187*** (0.015)
Delivery Only			0.154*** (0.002)		0.152*** (0.002)
Organizational Heterogeneity				-0.128*** (0.008)	-0.092*** (0.008)
Constant	3.549*** (0.082)	3.555*** (0.082)	3.375*** (0.080)	3.576*** (0.082)	3.392*** (0.080)
R ²	0.270	0.272	0.303	0.275	0.305

Note: * indicates $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$, two-tailed t tests. All models are based on 93,030 provider-product observations and include fixed effects for municipality.

Table 4: The Effects of Legal Regimes on the Price Dispersion of 3.5g of Marijuana Flowers

	(1)	(2)	(3)	(4)
Dispensary Age (logged)	0.001 (0.006)	-0.028*** (0.006)	0.014** (0.006)	-0.017** (0.006)
Dispensary Rating	-0.415*** (0.021)	-0.370*** (0.022)	-0.395*** (0.022)	-0.323*** (0.022)
Flower Count (logged)	0.157*** (0.011)	-0.099*** (0.012)	0.085*** (0.011)	-0.102*** (0.012)
Sativa	-0.274*** (0.020)	-0.318*** (0.020)	-0.277*** (0.020)	-0.316*** (0.020)
Indica	-0.227*** (0.017)	-0.293*** (0.017)	-0.269*** (0.017)	-0.303*** (0.017)
Local Competition (logged)	-0.381*** (0.011)	-0.113*** (0.012)	-0.277*** (0.011)	-0.084*** (0.012)
State Legal	0.717*** (0.031)	0.807*** (0.031)	0.363*** (0.031)	0.618*** (0.032)
State Licensed	-0.735*** (0.035)	-1.104*** (0.036)	-0.287*** (0.036)	-0.813*** (0.038)
Delivery Only		-1.147*** (0.019)		-0.991*** (0.020)
Organizational Heterogeneity			1.066*** (0.026)	0.552*** (0.028)
Constant	-1.838*** (0.122)	-0.842*** (0.158)	-1.977*** (0.122)	-1.305*** (0.123)

Note: * indicates $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$, two-tailed t tests. All models are based on 93,030 provider-product observations and include fixed effects for municipality.

**Table 5: The Effects of Legal Regimes on the (Mean) Price of 3.5g of Marijuana Flowers:
Adding Local-State Conflict**

	(1)	(2)	(3)
Dispensary Age (logged)	0.009*** (0.001)	0.012*** (0.001)	0.012*** (0.001)
Dispensary Rating	0.000 (0.002)	0.001 (0.002)	0.000 (0.002)
Flower Count (logged)	-0.009*** (0.001)	-0.009*** (0.001)	-0.010*** (0.001)
Sativa	0.005** (0.002)	0.005* (0.002)	0.005* (0.002)
Indica	0.015*** (0.001)	0.015*** (0.002)	0.015*** (0.002)
Local Competition (logged)	0.000 (0.001)	-0.001 (0.002)	-0.001 (0.002)
State Legal	0.208*** (0.019)	0.219*** (0.026)	0.164*** (0.029)
State Licensed	-0.211*** (0.015)	-0.166*** (0.021)	-0.182*** (0.021)
Delivery Only	0.154*** (0.002)	0.167*** (0.003)	0.166*** (0.003)
Organizational Heterogeneity	-0.100*** (0.007)	-0.098*** (0.009)	-0.101*** (0.009)
Local Ban		0.052*** (0.003)	-0.047* (0.023)
State Legal x Local Ban			0.100*** (0.023)
Constant	3.180*** (0.117)	3.524*** (0.033)	3.580*** (0.035)
R ²	0.305	0.307	0.307

Note: * indicates $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$, two-tailed t tests. All models are based on 81,967 observations. Model 1 includes fixed effects for municipality.

**Table 6: The Effects of Legal Regimes on the Price Dispersion of 3.5g of Marijuana Flowers:
Adding Local-State Conflict**

	(1)	(2)	(3)
Dispensary Age (logged)	-0.024*** (0.007)	0.026*** (0.007)	-0.023 (0.007)
Dispensary Rating	-0.338*** (0.024)	-0.373*** (0.024)	-0.365*** (0.024)
Flower Count (logged)	-0.135*** (0.012)	-0.163*** (0.013)	-0.166*** (0.013)
Sativa	-0.291*** (0.021)	-0.304*** (0.021)	-0.303*** (0.021)
Indica	-0.266*** (0.018)	-0.303*** (0.013)	-0.301*** (0.185)
Local Competition (logged)	-0.166** (0.013)	-0.168*** (0.013)	-0.173** (0.012)
State Legal	0.435*** (0.034)	0.407*** (0.034)	0.273*** (0.042)
State Licensed	-0.858*** (0.040)	-0.745*** (0.040)	-0.728*** (0.041)
Delivery Only	-0.829*** (0.021)	-0.789*** (0.022)	-0.760*** (0.022)
Organizational Heterogeneity	0.609** (0.030)	0.332*** (0.031)	0.313*** (0.031)
Local Ban		0.264 (0.018)	0.044 (0.057)
State Legal x Local Ban			0.348*** (0.061)
Constant	-0.849*** (0.135)	-0.627*** (0.135)	-0.562*** (0.136)

Note: * indicates $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$, two-tailed t tests. All models are based on 81,967 observations. Model 1 includes fixed effects for municipality.

Appendix: History of State Medical Marijuana Laws

Arizona. In 2010, Arizona voters passed Proposition 203 (50.1% to 49.9%), a ballot initiative that legalized the medical use of marijuana, providing an affirmative defense to patients that possessed and used marijuana with a physician's recommendation. Proposition 203 also authorized non-profit medical marijuana dispensaries to operate and called on the Arizona Department of Health Services (ADHS) to regulate and license medical marijuana providers. The initiative limited the maximum number of dispensaries to one for every ten licensed pharmacies, allowing for a maximum of 126 dispensaries at the programs launch in 2012. For the first year of the program the ADHS issued one dispensary license per Community Health Allocation Area, a geographic designation constructed from the 2000 census block groups, using a random lottery, granting a total of 98 licenses through this process.

Prior to opening, dispensaries must apply for an Approval to Operate with documents "such as site plans, floor plans, conditional use permits, special use permits, or certificates of occupancy" (ADHS 2012: 8). Licensed dispensaries are also subject to a mandatory state inspection, where the ADHS will "verify, among other requirements, the inventory control system, security, systems to establish, maintain, and ensure confidentiality of QP records, authorized personnel verification, product labeling and analysis, and cleanliness and sanitation" (ADHS 2012: 8). Between July 1, 2014 and June 30, 2015, the ADHS conducted 265 compliance inspections with an average of 5.2 deficiencies per inspection (ADHS 2015: 7).

While the state law does not require local licensing, it does require that applicants meet local zoning requirements. Under Arizona law, cities and towns are not allowed to ban medical marijuana dispensaries, although towns "may adopt 'reasonable regulations' regarding the location and operations of medical marijuana dispensaries (ADHS 2010; Zepeda 2011).

California. In 1996, California voters passed Proposition 215, a ballot initiative that allowed the possession and use of marijuana by qualified patients with a doctor's recommendation, stating: "the right to obtain and use marijuana for medical purposes where that medical use is deemed appropriate and has been recommended by a physician who has

determined that the person's health would benefit from the use of marijuana.” Proposition 215 did not explicitly authorize a market in which patients would purchase marijuana from retailers or growers, nor did it sanction any specific type of organization to produce or supply marijuana to patients. Instead, it provided an affirmative defense against prosecution under state law, allowing patients and their caregivers – those individuals who were responsible for the health and wellbeing of the patients – to grow marijuana without fear of criminal arrest under state law.

Proposition 215 neither provided guidelines for regulating caregivers, nor did it cap the number of patients that a caregiver might serve. In the years after the passage of Proposition 215, dozens of organizations that provided marijuana to patients emerged, claiming that they were legitimate because they were serving as caregivers to marijuana patients. State and local law enforcement agencies contested these claims, arresting and prosecuting these organizations’ owners and managers, arguing that they were not responsible for the health and wellbeing of patients beyond the supply of marijuana.

This legal ambiguity persisted until 2003, when California passed Senate Bill 420 (SB420), which explicitly authorized specific forms of organization for marijuana providers, namely collectives and cooperatives. While cooperatives were required to register with the state, falling under California’s longstanding “Corporations or Food and Agricultural Code,” collectives were not historically defined under California state law (Corp. Code, § 12201, 12300). Instead SB 420 specified that members of collectives must have a medical recommendation for marijuana and that the collective shall not purchase marijuana from (or sell marijuana to) a non-member. While such organizations were allowed to cultivate, produce, and facilitate the exchange of medical marijuana, SB420 did not create a regulatory authority to oversee marijuana providers; instead, it protected providers from criminal prosecution at the state level.

In 2008, the California Attorney General issued guidelines regarding the operation of medical marijuana dispensaries, but stopped short of constructing statewide licensing system.

The guidelines specified that medical marijuana collectives and cooperatives must pay sales tax, have a membership application that verifies that a patient is over 18 and that a medical marijuana recommendation has not expired, distribute only lawfully cultivated marijuana to members, and not make a profit (Brown 2008). It also specified that marijuana providers could be reimbursed for their overhead costs and operating expenses, and that they must provide adequate security.

During this period, many municipalities banned the establishment of dispensaries through ordinances that explicitly prohibited medical marijuana storefronts and through permissive zoning rules, which allowed the city to reject applications by medical marijuana providers. While these ordinances almost prohibited storefronts, they by-and-large ignored the sale of marijuana through marijuana delivery services, leading to the emergence of regional delivery services that would serve municipalities where medical marijuana storefronts were authorized and municipalities where they were explicitly prohibited.

On September 11, 2015, the California legislature passed three bills, known collectively as the Medical Cannabis Regulation Safety Act (MCRSA), which established a comprehensive statewide licensing system with 17 specific licenses for every type of organization that conducted business in the market, including cultivators, distributors, testing labs, retailers, and delivery services. While the law went into effect on January 1, 2016, the state will need until 2018 to implement it. This law requires local municipalities to pass their own ordinances regulating (or alternately outlawing medical marijuana dispensaries) by March 2016. If municipalities did not pass ordinances by this date, they would give up local control of marijuana to the state and thus allow for the licensing of medical marijuana providers. During the first months of 2016, many towns, cities, and counties that had originally passed ordinances banning medical marijuana dispensaries updated their bans by passing regulations that explicitly prohibited marijuana delivery services.

Colorado. In 2000, Colorado voters passed Amendment 20, amending the Colorado Constitution to remove state-level criminal penalties for marijuana possession, cultivation, and

use. On June 1, 2001, the date the amendment took effect, the state created a central registry for medical marijuana patients and caregivers. Caregivers were limited to five patients each until 2007, when a Denver district judge overturned this cap (Pankratz 2007). Following this legal decision, entrepreneurs rushed to launch organizations as quasi-legal providers, serving as caregivers to hundreds, if not thousands, of patients.

The Colorado medical marijuana market remained relatively small, with a few dozen providers, until the Obama administration released the Ogden Memo in October 2009 (Breathes 2012). Over the next ten months, the number of medical marijuana patients in the Colorado markets increased five-fold, from 20,000 to 100,000.

The Colorado legislature responded to the rapid proliferation of medical marijuana providers by passing HB 1284 in 2010, which created the Medical Marijuana Enforcement Division (MMED), a new agency that was a part of the Colorado Department of Revenue and charged with licensing and regulating medical marijuana dispensaries. This bill created a dual licensing system in which a legal medical marijuana dispensary had to be authorized by both the state and the municipality where it operated. Municipalities were allowed to ban medical marijuana sales within their jurisdiction, and by 2012, over 80 cities had passed ordinances doing so. The law also provided a number of guidelines regarding the operations of medical marijuana dispensaries, including, operating hours, seed-to-sale tracking of plants, and security requirements. Finally, the law mandated that medical marijuana dispensaries grow at least 70% of the marijuana that they sell and prohibited marijuana delivery.

In 2012, Colorado voters passed Amendment 64, a ballot initiative authorizing the formation of a regulated legal recreational marijuana market in that state; that is, a market for marijuana that could be purchased and consumed by any adult over 21 years of age. This law, which went into effect January 2014, gave preference to providers that were already operating in the medical marijuana market for the first months, before opening up the application process to non-medical providers.

Michigan. In November 2008, Michigan voters passed the Michigan Medical Marijuana Act (MMMA), a ballot initiative that created legal protections for medical marijuana patients and their caregivers. This act authorized patients to grow up to 12 plants and a licensed caregiver could grow up to 12 plants for five patients. The ambiguous language of the MMMA, which contained inconsistent sections and contradictory statutes, led to a great deal of uncertainty regarding what was legal or prohibited under the law. Following the release of the Ogden Memo in 2009, activists and entrepreneurs created medical marijuana dispensaries, arguing that patient-to-patient transfers were legal under the ambiguous statute. Municipalities responded by adopting their own ordinances either licensing or prohibiting medical marijuana dispensaries. A raft of lawsuits followed.

In a footnote to a 2010 Appeals Court ruling by Judge Peter O'Connell described the legal confusion created by the act: "Reading this act is similar to participating in the Triwizard Tournament described in J.K. Rowling's Harry Potter and the Goblet of Fire: the maze that is this statute is so complex that the final result will only be known once the Supreme Court has had an opportunity to review and remove the haze from this act" (*People v. Redden* 2010). A year later, the Michigan Court of Appeals ruled that a Michigan dispensary owner was in violation of the MMMA (*State v. McQueen* 2011). In 2013, the Michigan Supreme Court ruled on this case, concluding that patient-to-patient marijuana sales, the justification for dispensaries in Michigan, were not authorized under the MMMA. Following these decisions, law enforcement shut down dispensaries around the state. Following the 2013 decision, many municipalities that had previously allowed medical marijuana dispensaries passed moratoriums on the licensing and approval of new medical marijuana dispensaries with a number of these ordinances grandfathering in the dispensaries that had been approved before 2013. Notably, Flint Michigan went forward with licensing a dispensary in ____ [need date], despite the Supreme Court Decision. Many medical marijuana providers continued to operate despite the illegal status of dispensaries.

In September 2016, the Michigan Legislature passed the Marijuana Facilities Licensing Act, which authorized dispensaries and created the Michigan Marijuana Licensing Board to create and accept applications for grower, processor, transporter, and dispensary licenses. The new regulations will create a dual license system in which dispensaries must first receive a city license before applying for a state license.

Nevada. In 2000, Nevada voters approved Question 9, which amended the state constitution to remove criminal penalties for the use of marijuana by patients with a doctor's recommendation. The initiative did not specify a method of distributing marijuana, but instead called on the legislature to "authorize appropriate methods of supply to patients" (Ballotpedia 2014). In 2001, legislators passed AB 453, which allowed patients to grow up to 12 plants and allowed patients to have caregivers who cultivated marijuana for them. The caregiver provision was much more restrictive than in other states, as it limited caregivers to one patient each and barred caregivers from receiving compensation for supplying marijuana.

Despite these prohibitions, some enterprising caregivers opened storefronts and delivery services and accepted monetary "donations" for the services they provided. This led to police raids and arrests, as officials classified donations as a form of compensation, which was illegal under state law. One such arrest led Clark County Judge Donald Mosely to call on the legislature to create a sustainable system for the distribution of marijuana. Mosely stated "I'm looking at it thinking I can't make any sense out of this law... Are people supposed to give it away?" (Marijuana Policy Project 2013: F18).

In 2013, the legislature passed SB 394, which set up a system through which the Nevada Division of Public Health and Behavior (NDPHB) licensed and regulated for-profit medical marijuana providers. By December 2014, officials had issued provisional licenses for 66 for-profit providers across 16 counties, with the first licensed provider opening July 31, 2015. By December 2016, 49 dispensaries were licensed in Nevada. During this period, illegal marijuana delivery services continued to operate, leading to a law enforcement crackdown of illegal medical marijuana providers (Bodley 2015). The NDPBH website discussed these illegal

providers, stating “The Division is aware of illegal medical marijuana delivery services, and law enforcement works hard to close them down. Patients should beware of illegitimate dispensaries” (NDPBH 2016).

The NDPBH mandates that medical marijuana dispensaries use independent testing agencies to test all marijuana for potency and pesticide. It also requires that all packaging include the name and registration number of the cultivation facility that grew the marijuana, the lot number, date of harvest, date and quantity dispensed, patient name and registry ID number, and cannabinoid profile, terpenoid profile, and potency level. NDPBH regulations go so far as regulating the types of statements and claims made by providers. For example, the following warning is currently (January 2017) on the NDPHB website:

TO: All patients who purchased Sage N Sour Live, lot#1588828195779887 and Black Cherry Soda Live, Lot#3092899899644166 products produced by The CannaVative Extracts, LLC

RE: Bisabolol terpene

The advertised content values for Bisabolol terpene were inaccurate on the labels. The laboratory testing results were found to be in error and the above listed products do not contain the levels of Bisabolol reported on the labels. The products contain a package insert stating that Bisabolol inhibits cancer cell growth and fights leukemia; this statement is not approved by the FDA

(NDPBH 2017).

Unlike most other states, Nevada’s law includes reciprocity, meaning that medical marijuana patients with recommendations from other states can buy marijuana in Nevada.

Under Nevada state law, municipalities can regulate and license dispensaries; municipalities can also ban dispensaries. For example, the city of Las Vegas licenses dispensaries, requiring a Medical Marijuana Establishment Compliance Permit as well as a Special Use Permit from the city’s Planning Department (City of Las Vegas 2017), while Nevada City had a ban on medical marijuana dispensaries in 2015 (Funez 2016).

In November 2016, Nevada voters passed Question 2, legalizing the recreational use. The state is now beginning the implementation of law and expects a large influx of marijuana-related tourism.

Oregon. In 1998, Oregon voters passed Measure 67, a ballot initiative that removed state-level criminal penalties for marijuana possession, cultivation, and use. This measure, which took effect one month after it was passed, allowed patients to possess and use marijuana and caregivers to cultivate and distribute marijuana. But because this measure did not include any language authorizing the sale of marijuana to patients, it did not authorize the creation of a market for marijuana. Activists sponsored ballot initiatives to legalize medical marijuana providers in 2004 and 2010; both initiatives were defeated. During this period, quasi-legal providers opened storefronts and sold marijuana to patients, despite the lack of state recognition or support. In 2005, the Oregon state legislature passed a law that created a registry for grow sites and a permit for growers. This bill also allowed for growers to receive compensation for their costs of supplies and utilities, but did not allow compensation for labor.

In 2013, the state legislature passed HB 3640, which directed the Oregon Health Authority (OHA) to create a licensing and registry system for medical marijuana dispensaries in Oregon. This bill explicitly allowed for the operation of non-profit medical marijuana providers and created a registry. On March 3, 2014, the state began licensing providers. Oregon law does not restrict the number of medical marijuana providers, so any medical marijuana provider that meets licensing requirements can receive a license.

In 2014, the state legislature passed SB 1531, which allowed cities to and counties to adopt ordinances that regulated or prohibited medical marijuana facilities within their jurisdiction. By May 2014, over 150 Oregon cities and counties had banned medical marijuana dispensaries (Lehman 2014). At the same time other cities, such as Portland, have implemented licensing procedures for dispensaries, creating dual licensing procedures in some municipalities.

In 2012, Oregon voters rejected Measure 8, a ballot initiative that would legalize recreational marijuana use. But two years later, voters approved Measure 91, which legalized

recreational marijuana for adults over 21 years of age. In 2015, the Oregon legislature passed Senate Bill 406, which allowed medical marijuana dispensaries to temporarily sell recreational marijuana between October 1, 2015 and December 31, 2016. More than 300 Oregon dispensaries participated in this program for early medical marijuana sales. As of January 1, 2017, OHA-licensed medical marijuana will no longer be able to sell marijuana. From this date forward, only dispensaries licensed by the Oregon Liquor Control Commission will be able to sell recreational marijuana.

Washington. In 1998, Washington voters passed Initiative 692 (I-692; 59% to 41%), a ballot initiative that established an “affirmative defense to the violation of state laws relating to marijuana used and possessed for medicinal purposes” (Washington State Senate 2015). Washington state law classified marijuana as a Schedule 1 narcotic that had no medical use (RCW 69.50.204 1998). I-692 did not reschedule marijuana, but rather provided an affirmative defense against prosecution under state law. This affirmative defense was granted to patients with a medical marijuana recommendation from a physician. I-692 did not set up a system for the production and distribution of marijuana, rather allowing patients to grow marijuana themselves or procure marijuana from a designated caregiver.

I-692 also left the amount of marijuana that a patient could possess ambiguous, simply stating that a patient could maintain a 60-day supply without defining what quantity of marijuana was adequate for that period of time. In 2007, the Washington State Senate addressed this ambiguity and passed SB6032, which called on the Washington Department of Health to create rules that defined the quantity of marijuana that constituted a 60-day supply, while also expanding the conditions that qualified for medical use (SB 6032 2007). In 2010, the Washington State Senate passed SB5798, a bill that authorized a more expansive list of medical professionals, such as nurse practitioners, osteopathic physicians, naturopaths, and physicians’ assistants, to recommend marijuana for medical use (SB 5798 2010). Up to this point, no statute authorized (or provided an affirmative defense) for the organized distribution of marijuana.

In 2011, Washington lawmakers passed SB5073, which was the state's first full-fledged attempt to license marijuana production and distribution, while also creating a voluntary registry for patients and their designated providers, so as to have additional security with respect to arrest. The bill initially authorized three modes of distribution: medical marijuana dispensaries, collective gardens, and home-grows (SB 5073 2011). In the bill, the Senate recognized "that there are cannabis producers and cannabis dispensaries in operation as of the effective date of this section that are unregulated by the state and who produce and dispense cannabis for medical use by qualifying patients" and put forward a system for licensing these dispensaries (SB 5073: p34: lines 30-34 2011). Under this provision, dispensaries that distributed marijuana would have an affirmative defense against prosecution under state law as long as they had registered with the Washington secretary of state. In contrast to the dispensary provision, another provision in the bill specified that medical marijuana patients could band together and create a "collective garden" in order to produce, process, transport, and deliver cannabis. Under this provision, a collective garden could not have more than 10 patients, 45 plants, and 72 ounces of cannabis at any given time. Washington Governor Christina Gregoire signed SB 5073, but used her line-item veto to reject the provisions authorizing the licensing of dispensaries, stating that "I cannot disregard federal law on the chance that state employees will not be prosecuted" (Martin 2011). Gregoire left the parts of the bill that authorized collective gardens and home-grows intact, in part, because they did not involve state employees.

In 2012, Washington voters passed Initiative 502 (I-502), which legalized marijuana for medical use. Unlike I-692, I-502 included an explicit and comprehensive regulatory structure, specifying how the state would license producers and retailers. I-502 would take nearly two years to implement, with the first legal and licensed recreational providers opening in the summer of 2014. The passage and implementation of I-502 created two markets for marijuana in Washington, a state legal and licensed market for recreational marijuana and an unlicensed and, it could be argued, illegal or quasi-legal market for medical marijuana, where members of

collective gardens had an affirmative defense under state law. In April 2015, state lawmakers reconciled these two markets by passing SB 5052, which folded the medical marijuana market into the recreational marijuana market. Rather than legalizing all of the current medical marijuana providers, this law granted another 222 recreational licenses, which medical marijuana providers could apply for – far fewer than the total number of medical marijuana dispensaries in the market. To apply for these licenses, medical marijuana providers would have to prove that they were operating before January 2013.

While the state law would go into effect on July 1st, 2016 – effectively outlawing the current medical marijuana market – many local municipalities began shutting down medical marijuana providers prior to the implementation date. For example, during the summer of 2015, Seattle, the largest medical marijuana market in Washington, began shutting down medical marijuana dispensaries that could not prove that they had opened before 2013 (Young 2015).

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