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Retail prices of licensed and unlicensed cannabis

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Introduction

All U.S. states that have regulated and taxed adult-use cannabis ("adult-use states") have made it mandatory for retail businesses to acquire a state cannabis license. Licenses are granted by state agencies (Goldstein and Sumner, 2019). The state licensing of retailers, cultivators, manufacturers, and distributors generates revenue through license fees, enables state governments to track cannabis through the supply chain and helps regulators collect taxes and enforce regulations (BCC, 2018a, 2019a; Washington Administrative Code, 2018). However, not all cannabis businesses in adult-use states obtain licenses. Among the major policy objectives of legalizing cannabis marketing and use was to shift buyers to the legal, licensed cannabis sources. In addition, states and local jurisdictions stated strong interests in gaining government revenue from cannabis (Sumner et al., 2018a, 2018b; Goldstein and Sumner, 2020). These objectives have been difficult to achieve and raise important policy issues.

Unlicensed businesses do not incorporate the substantial costs of legal compliance, including licensing fees, testing, safety, environmental, labor, and "track-and-trace" regulations, and state and local taxes (Valdes-Donoso et al., 2019). Therefore, unlicensed cannabis is cheaper to produce and market than licensed cannabis. With lower costs of raw material and operations, unlicensed retailers are able to sell comparable products at lower prices than licensed retailers can. That means we expect lower prices for unlicensed retailers, unless there are major offsetting costs, such as vigorous legal enforcement that creates a high probability of shutdown and confiscation of inventory, or high costs of loss from a lack of protection from other illegal competitors.

In both licensed and unlicensed segments, cannabis is available from store-front and delivery-only retailers. In California, as in other states, substantial populations live in

jurisdictions with local bans on store-front retail. In those areas, delivery-only retailers provide the only licensed source of cannabis. Unlicensed delivery-only retailers seem to be much more common than unlicensed store-front retailers. Unlicensed store-front retailers are also common, as state and local agencies have found enforcement costly and difficult.

This is the first paper in the economics literature to systematically measure licensing premiums in cannabis retail prices in an adult-use state. In this paper, we analyze data from California, taken from a set of more than 3 million licensed and unlicensed cannabis prices that we collected online in 2019.

Data collection

In the second half of 2019, we collected cannabis prices posted online by storefront and delivery-only retailers on Weedmaps, a popular online cannabis e-commerce platform where both unlicensed and licensed retailers have advertised their products and prices (Weedmaps, 2019). Weedmaps listings, which may be search by location of the store-front or delivery area, include product attributes, package sizes, licensing status, and a variety of other merchant characteristics (Goldstein, Sumner, and Fafard, 2019), thus enabling us to compare licensed-unlicensed price difference while controlling for some other factors. We collected a total of more than three million prices in three periods.

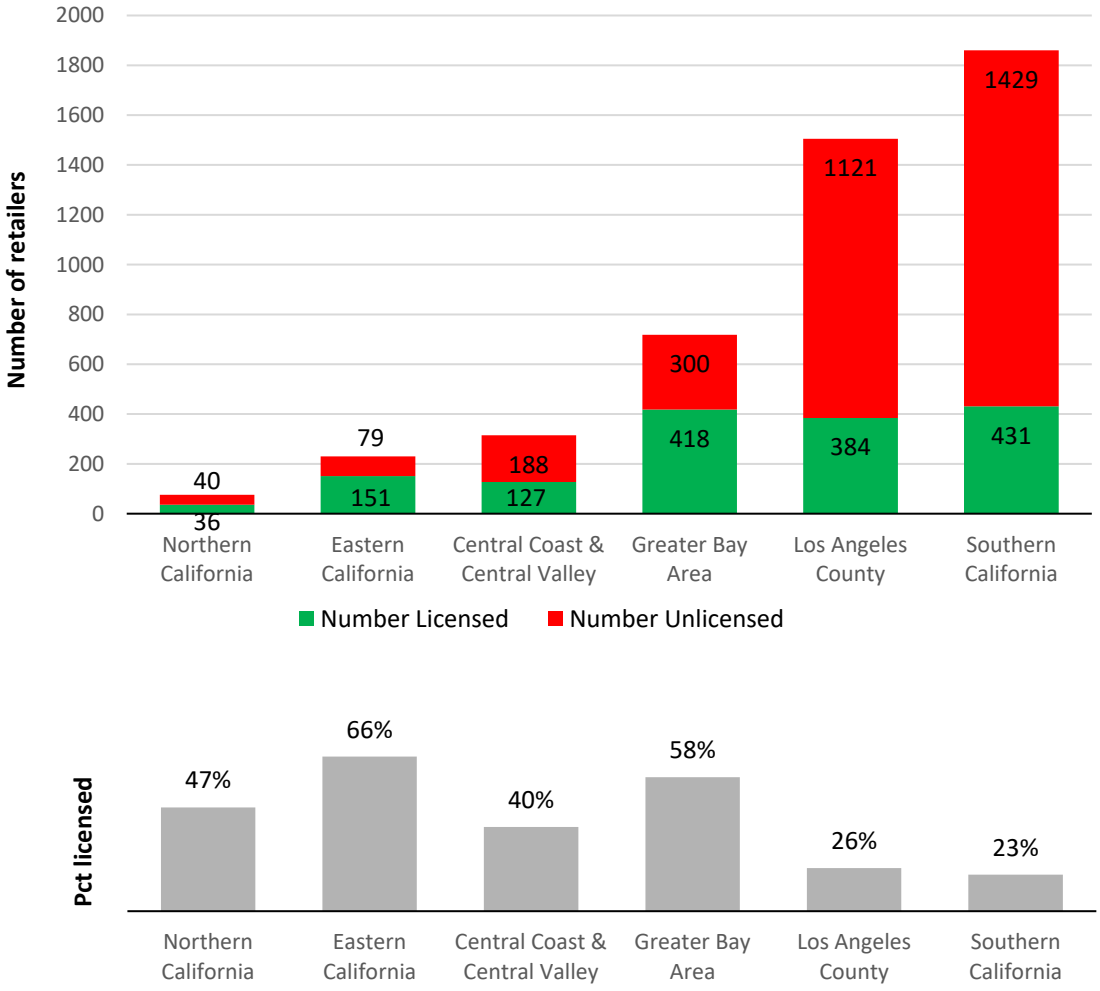
To help clarify and interpret our results, we conducted supplemental interviews with consumers, producers, and industry experts to determine the difference between licensed and unlicensed cannabis from the consumer perspective.

Results

From our June 2019 data, we found that 72% of retailers advertising public listings on Weedmaps in California were unlicensed (Goldstein, Saposhnik, and Sumner, 2019). We found that "the highest proportions of unlicensed retailers were in Southern California (83 percent of all retailers) and the Los Angeles area (78 percent). The lowest proportions of unlicensed retailers were in eastern California, including Sacramento (43 percent), and the greater Bay Area, including Napa and Sonoma (44 percent)" (Sumner et al., 2020). These data do not include sales from retailers that do not advertise publicly (which could comprise many or perhaps most sellers in some locations). Our division of California into regions is shown in Figure 1, and results by region in California are shown in Figure 2.

Figure 1: Division of California into six regions

Figure 2. Numbers and percentages of licensed and unlicensed retailers by region



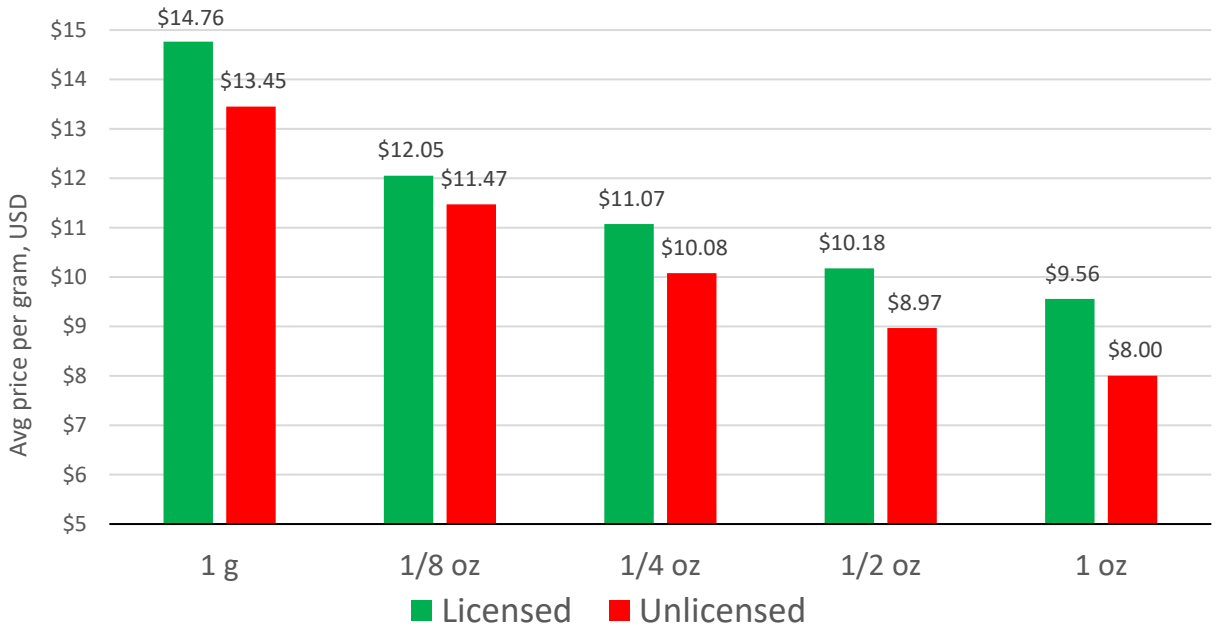
Overall, in our data set of more than 200,000 retail prices for cannabis flower in California, we observed that listed retail prices for dried flower at licensed storefronts were 25% higher than prices for dried flower at unlicensed storefronts (Goldstein, Sumner, and Saposhnik, 2019). Licensed delivery-only retailers listed prices 7% higher than unlicensed delivery-only retailers. Average retail prices are shown in Table 1.

Table 1. Licensed vs. Unlicensed Retail Cannabis Prices in California, 2019

	Licensed		Unlicensed	
	Retail price per gram	Retail price per pound	Retail price per gram	Retail price per pound
Storefronts	$11.50	$5,200	$9.20	$4,200
Delivery-only	$11.80	$5,400	$11.00	$5,000

We observed retail cannabis prices by package size. The five most common flower package sizes (by far) are 1 gram, 1/8 oz, 1/4 oz, 1/2 oz, and 1 oz of flower. Figure 3 shows California retail price per gram for licensed and unlicensed cannabis flower by package size, again from the Weedmaps data.

Figure 3. Avg California retail price per gram of cannabis flower by package size



By constructing a weighted average of the five most common package sizes for cannabis flower and the three most common package sizes for cannabis oil. We observe average retail "licensing premiums" of 10%–25% for licensed cannabis flower over unlicensed flower, and we observe that licensing premiums are generally proportional to package size.

The 2019 prices we observed are above the 2017 price we observed (on the same Weedmaps platform) for cannabis in the medicinal retail market (before state regulation and taxation), which was about $8 per gram. One source of noise in the 2019 (post-regulatory) data is that there is some variation across retailers in the inclusion or omission of the excise tax (which in 2019 was assessed at 24% of wholesale price) in list prices.

Table 2 compares licensed and unlicensed price and quantity estimates in the 2017 California market, before taxation and regulation began, versus the 2019 market.

Table 2: Estimated California Retail Cannabis Quantities, Prices, and Revenues, Legal and Illegal, 2017 vs. 2019

Market Segment	2017	2019
Legal Market	**Medicinal in 2017**	**Licensed in 2019**
Total Weight Sold at Retail, lbs	700,000	540,000
Avg Retail Price/lb Without Any Taxes	$3,600	$4,300
Avg Retail List Price/lb (Incl Cultivation & Excise Taxes but Not Sales & Local Cannabis Retail Taxes)	$3,600	$5,200
Avg Retail Price/lb After All Taxes	$3,600	$5,900
Total Retail Revenue (Incl Cultivation & Excise Taxes but Not Sales and Local Cannabis Retail Taxes)	$2.5 billion	$3.2 billion
Legal's Pct Share of Total Mkt By lbs	25%	20%
Legal's Pct Share of Total Mkt by Revenue (Incl Cultivation & Excise Taxes but Not Sales & Local Cannabis Retail Taxes)	33%	36%
Illegal Market	**Non-medicinal in 2017**	**Unlicensed in 2019**
Total Weight, lbs	2,100,000	2,220,000
Avg Retail Price per lb	$2,400	$2,500
Total Retail Revenue	$5 billion	$5.6 billion
Illegal's Percent Illegal of Total Market By lbs	75%	80%
Illegal's Percent Share of Total Market by Revenue	67%	64%
Aggregate Market (Legal + Illegal)		
Total Weight, lbs	2,800,000	2,760,000
Avg Retail Price Per lb	$2,700	$3,200
Total Retail Revenue	**$7.5 billion**	**$8.7 billion**

Source: Sumner et al., 2020

We also find that:

- More than three-quarters of listed retailers and retail price listings for specific products in California were unlicensed as of mid-2019.

- The relative licensed-unlicensed price difference is greatest for the cheapest common form of THC: one ounce of dried flower. Thus low-income consumers, who are likely to be the most price-elastic and buy the lowest-cost form of cannabis, are likely to face the highest relative premiums for licensed cannabis.

Discussion

In cannabis, as in wine, consumers cannot often detect differences between the two products or their sellers (Goldstein et al., 2008). Many consumers are unaware that some cannabis store-fronts and delivery services are unlicensed and others unlicensed, while other consumers who are aware of licensing still cannot distinguish licensed from unlicensed retailers or products. Some minor visual packaging attributes of cannabis packaging may signal licensing status—e.g. testing certification labels or famous brand names—but media reports across the United States suggest that such packaging attributes are commonly counterfeited.

Although a tiny fraction of contaminated unlicensed cannabis that is thought to have caused immediate illness, the vast majority does not appear to have done so, and no evidence to date has suggested that consumers are capable of differentiating between the sensory and therapeutic attributes of most licensed vs. unlicensed (or counterfeit) cannabis upon consumption. News reports and interviews reveal that some licensed cannabis packages have been sold through unlicensed retailers, and that some unlicensed cannabis packages have been sold through licensed retailers. From all of the above evidence, we conclude that licensed and unlicensed cannabis are substantially interchangeable for many consumers.

More U.S. states legalize and tax adult-use cannabis each year. State policymakers, whether they are drafting new laws for future adult-use states or revising regulations in existing

ones, each face their own sets of difficult choices and barriers to meeting their objectives. These objectives may include implementing regulations that are feasible and enforceable, increase state tax revenues, create a viable market for newly licensed cannabis businesses, or reduce criminal activity associated with cannabis. If states are to meet any of these objectives, then licensed cannabis must be able to compete successfully with unlicensed cannabis.

The published scientific literature to date has contained little discussion and virtually no empirical evidence of price differences between licensed and unlicensed cannabis. Also neglected has been evidence on the effects of tax or regulatory changes on relative prices and quantities in the licensed and unlicensed markets.

Our data are the first to show concrete, measurable patterns of licensing premiums—the price differences between legal and illegal cannabis—that arise in adult-use states after cannabis regulations and taxes are implement. Our paper is also the first to study the variation of licensing premiums by product type, retailer type, and retail location. We hope that these results may help policymakers better predict the concrete economic outcomes of policy options as they face the challenge of creating and maintaining a viable legal cannabis market in the face of extraordinary market uncertainties.

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