Cannabis Data Science

Meetup

March 10, 2021

By the numbers

There are now more American cannabis workers than electrical engineers

Leafly

Table 1. Sample Firm Size of Cannabis Businesses

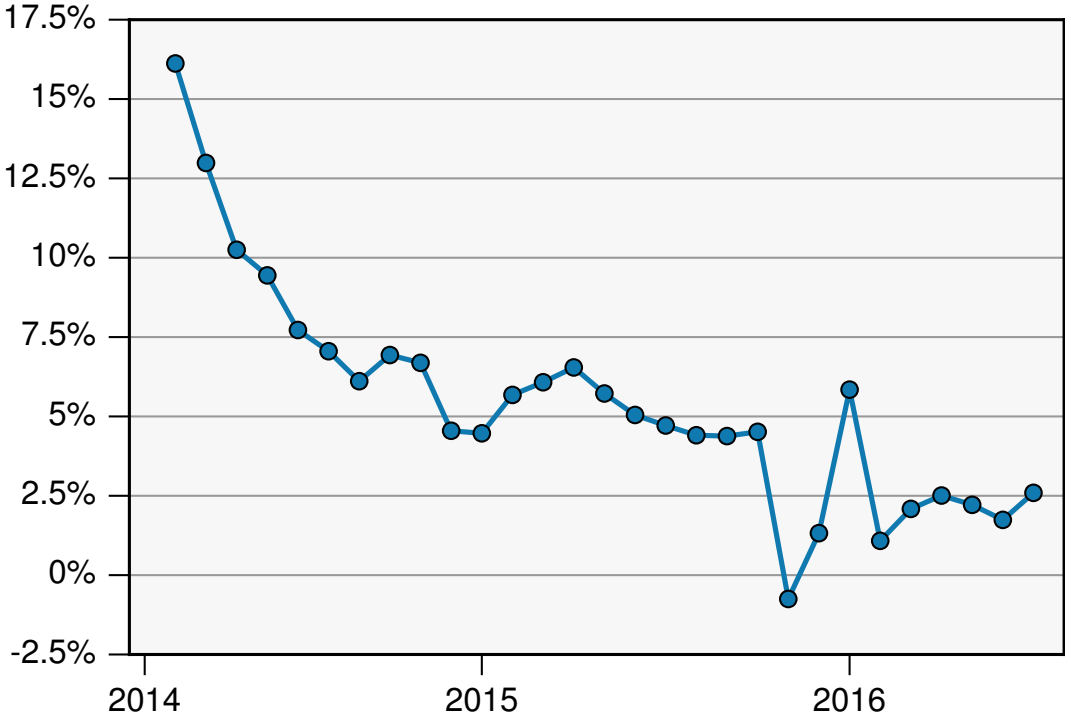
		Percentage of Sample (%)
1–10	Employees	25.4
11–20	Employees	29.3
21–30	Employees	18.2
31–40	Employees	4.4
41–50	Employees	6.6
51+	Employees	16.0

Notes: Organization size in 2014 as reported by survey participants, $N = 181$.

Source: Work and Well–Being in the Colorado Cannabis Industry.

Growth of Occupational Licenses

(Month–over–Month Percentage Change)



Data Source: MED 2014-2016 Annual/Mid-Year Updates.

Suppose that the total amount of flowers produced in a given period, y_t, is a simple function of the number of plants cultivated that period, k_t,

$$y_t = A k_t^{\alpha} e^{\varepsilon_t},$$

where A represents the state of cultivation technology and ε_t is a random production shock. Economic theory suggests that the production function should have diminishing marginal returns, such that $0 \leq \alpha < 1$. The function can be estimated after a linear transformation

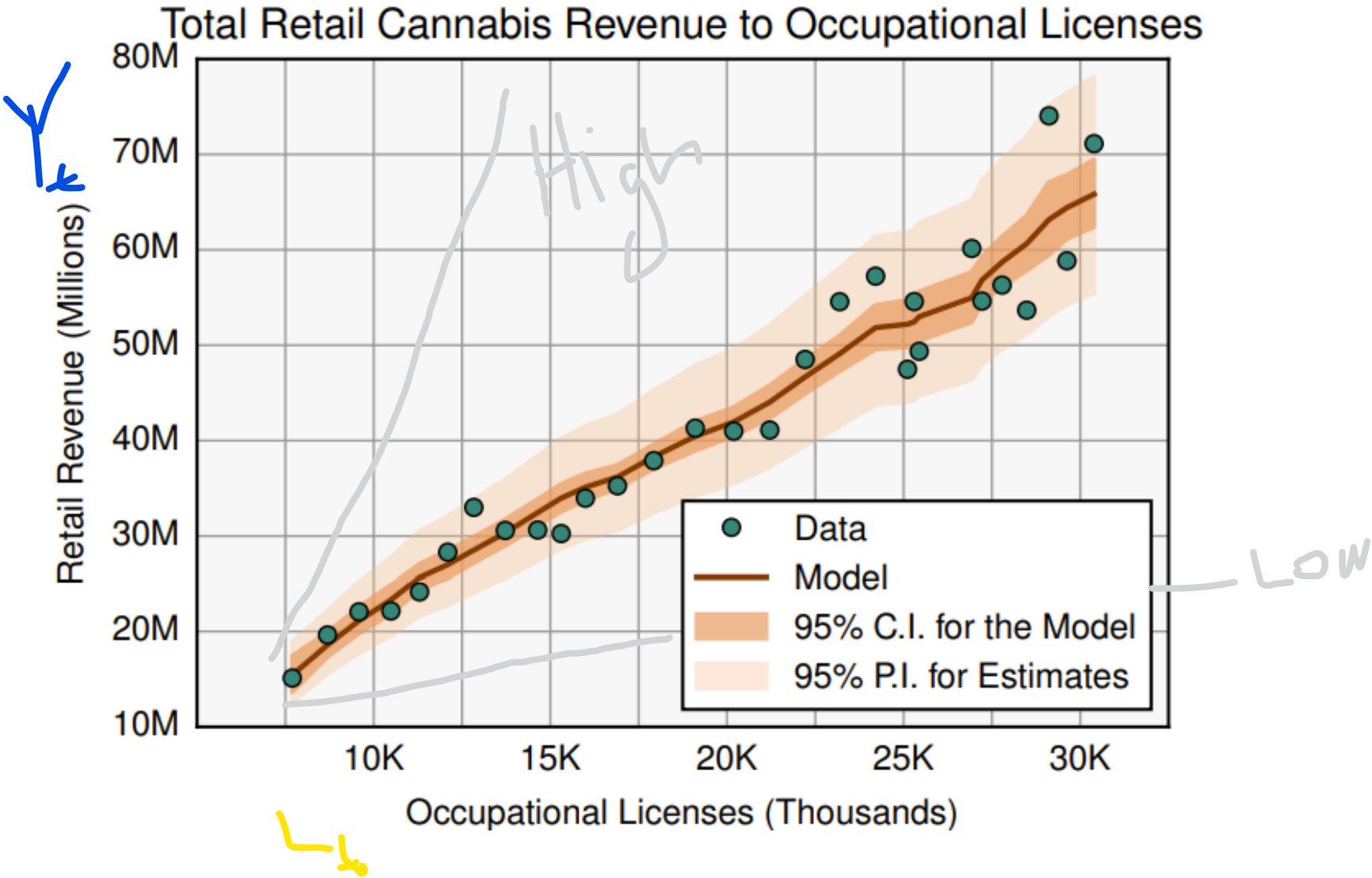
$$\ln y_t = \ln A + \alpha \ln k_t + \varepsilon_t.$$

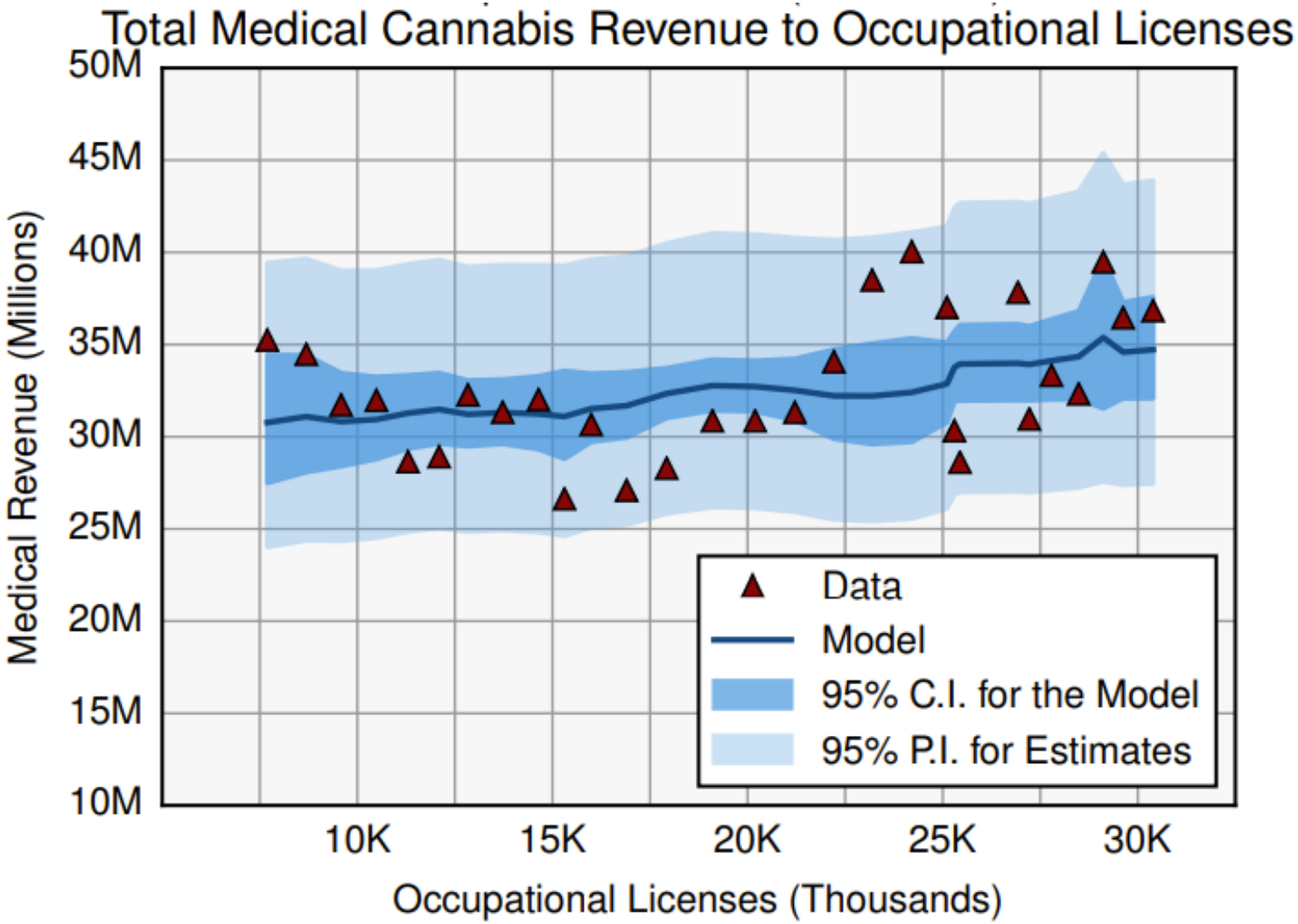
I will use the approximated area of cannabis cultivation as a proxy for the amount of capital, k_t, in any given month.

Now suppose that each producer, $i = 1, 2, \ldots, I$, in the Colorado cannabis markets have neoclassical production functions that depend on capital, $k_{t,i}$, and labor, $l_{t,i}$. Assuming that there is an aggregate production function and a Cobb–Douglas specification for production, then

$$Y_t = \mathrm{F}(K_t, L_t) = A_t K_t^{\alpha} (X_t L_t)^{\beta},$$

where $K_t = \sum_{i=1}^{I} k_{t,i}$ is the sum of all capital, $L_t = \sum_{i=1}^{I} l_{t,i}$ is the sum of all labor, and $Y_t = \sum_{i=1}^{I} y_{t,i}$ is the sum of all cannabis output of all producers in the cannabis market in a given month. There is labor augmenting technology, X_t, and a component for random variability, Z_t.


Total Retail Cannabis Revenue to Occupational Licenses
Retail Revenue (Millions)
80M
70M
60M
50M
40M
30M
20M
10M
10K
15K
20K
25K
30K
Occupational Licenses (Thousands)
Data
Model
95% C.I. for the Model
95% P.I. for Estimates
High
Low


Total Medical Cannabis Revenue to Occupational Licenses
Medical Revenue (Millions)
50M
45M
40M
35M
30M
25M
20M
15M
10M
10K
15K
20K
25K
30K
Occupational Licenses (Thousands)
Data
Model
95% C.I. for the Model
95% P.I. for Estimates

Theoretically, the competitive average wage for labor in the production of cannabis in Colorado should be equal to the marginal product of labor

$$w = \beta \frac{Y_t}{L_t}.$$

For calculations, it is assumed that each employee of a cannabis business works 40 hours per week.

Table 2. Sample Job Types of Cannabis Employees

	Percentage of Sample (%)
Worker: Growing/Cultivation/Trimming	21.5
Worker: Dispensary/Retail	35.5
Manager: Growing/Cultivation/Trimming	5.1
Manager: Dispensary/Retail	14.0
Manager: Other Departments	7.0
Upper–Level Management	6.5
Ancillary	10.3

Notes: Job types held in 2014 reported by survey participants, $N = 214$.

Source: Work and Well–Being in the Colorado Cannabis Industry.

Thank you for coming.