



Cannabis Data Science

Meetup

December 8<sup>th</sup>, 2021

## Someone wiser than me once said...

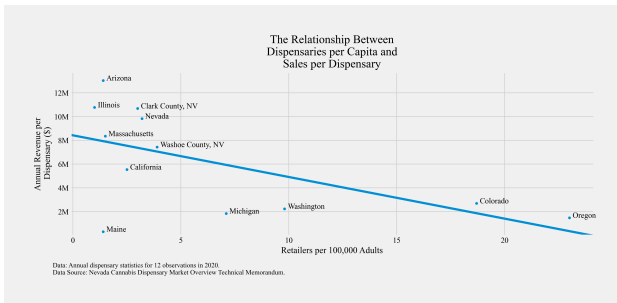
*"The reason you study economics is so that you don't get fooled by economists."*

Original quote:

*"The purpose of studying economics is not to acquire a set of ready-made answers to economic questions, but to learn how to avoid being deceived by economists."*

- Joan Robinson, British Economist (1903 - 1983)

# Research Question: What is the relationship between dispensaries per capita and revenue per dispensary?



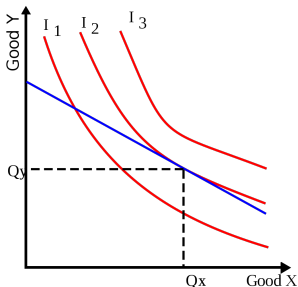
**Table 2: Basic Analysis Data & Calculations, by State: 2020**

State	Year Adult- Use Legalized	21+ Population	Revenue	Dispensaries (2021)	Dispensaries / 100,000	Revenue / Dispensary
Alaska	2014	542,152		145	26.7	
Arizona	2020	5,486,239	\$1,030,000,000	79	1.4	\$13,037,975
California	2016	30,131,464	\$4,101,540,638	740	2.5	\$5,542,622
Colorado	2012	4,347,444	\$2,191,091,679	812	18.7	\$2,698,389
Illinois	2019	9,570,274	\$1,034,790,099	96	1.0	\$10,779,064
Maine	2016	1,062,570	\$4,706,160	15	1.4	\$313,744
Massachusetts	2016	5,426,264	\$702,407,378	84	1.5	\$8,361,993
Michigan	2018	7,513,559	\$984,700,000	535	7.1	\$1,840,561
Montana	2020	811,418				
Nevada	2016	2,524,682	\$786,479,410	80	3.2	\$9,830,993
Oregon	2014	3,249,774	\$1,111,027,558	748	23.0	\$1,485,331
Vermont	2018	491,627		7	1.4	
Virginia	2021	6,473,738				
Washington	2012	5,783,473	\$1,266,224,177	566	9.8	\$2,237,145
Nevada Counties						
Clark	2016	1,878,401	\$609,167,054	57	3.0	\$10,687,141
Washoe	2016	387,180	\$111,585,750	15	3.9	\$7,439,050

Note: Blanks denote data not available.  
Sources: Various

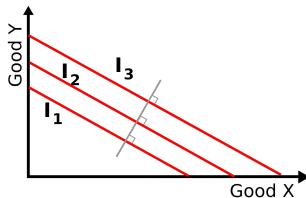
Source: Nevada Cannabis Dispensary Market Overview  
Technical Memorandum

## How do individuals make decisions at the margin?



Indifference curves and budget constraints for normal / inferior goods

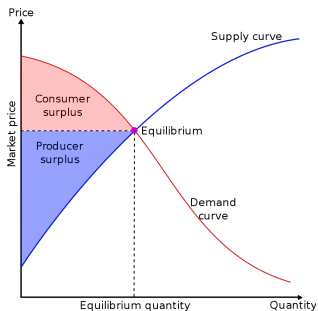
Source: SilverStar at en.wikipedia



Indifference “curves” for perfect substitutes

Source: SilverStar at en.wikipedia

# What is economic surplus in a competitive market?

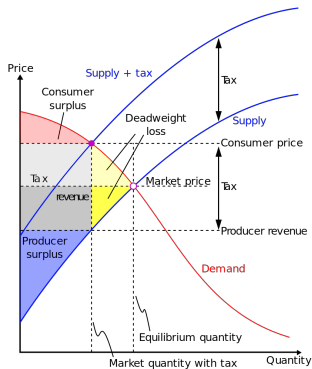


Economic Surplus in Perfect Competition Equilibrium

Source: SilverStar at en.wikipedia

It depends...!

# Who bears the cost of a tax?

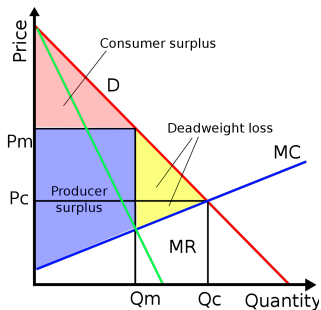


## Effects of a tax on a market

Source: SilverStar, Evan Derickson at [en.wikipedia](https://en.wikipedia.org)

It depends...!

# Who bears the cost of quantity restrictions?



Effects of a quantity restrictions  
on a market

Source: SilverStar at en.wikipedia

It depends...!

## Panel Data

A panel has the form

$$X_{it}, \quad i = 1, \dots, N, \quad t = 1, \dots, T,$$

where  $i$  is the individual dimension and  $t$  is the time dimension.

A general panel data regression model is written as

$$y_{it} = \alpha + \beta' X_{it} + u_{it}$$

where

$$u_{it} = \mu_i + v_{it}$$

Estimation with a **fixed effects** or **random effects** model depends on assumptions about  $\mu_i$ , the individual-specific, time-invariant effects.





Thank you for coming.

Take some time and discuss any conclusions drawn.