

# Ako vyhodnotiť zmenu politiky

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# Dnes

Nastala zmena politiky: nová udalosť, nová daň, nový zákon.

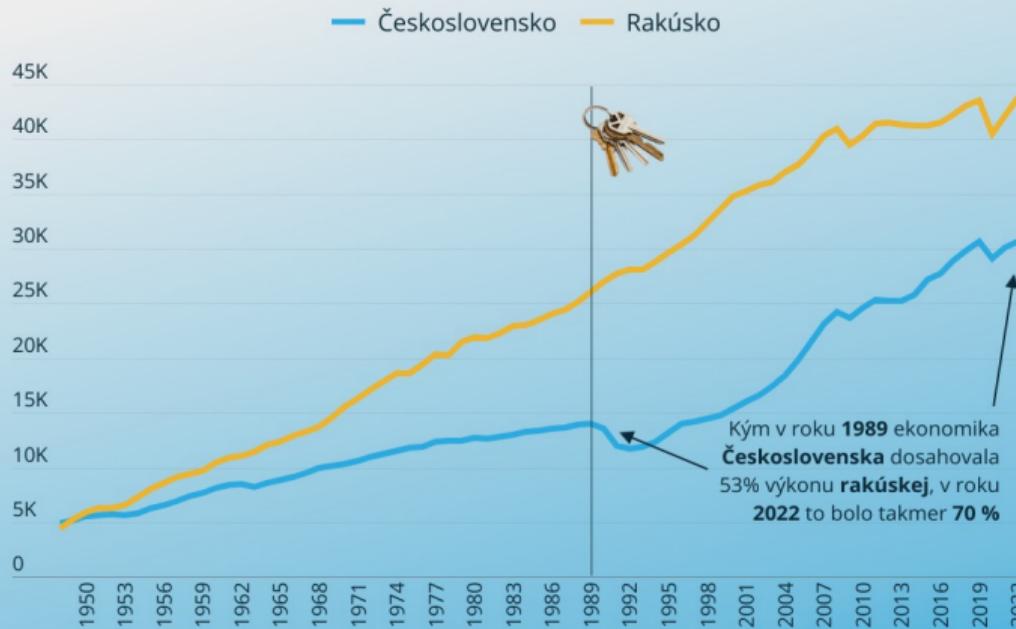
Spôsobilo to niečo?? Malo to impakt??

Ťažko povedať...

# Aj pre ekonomiku bol rok 89 klúčovým



Hrubý domáci produkt na obyvateľa, v cenách 2011\$

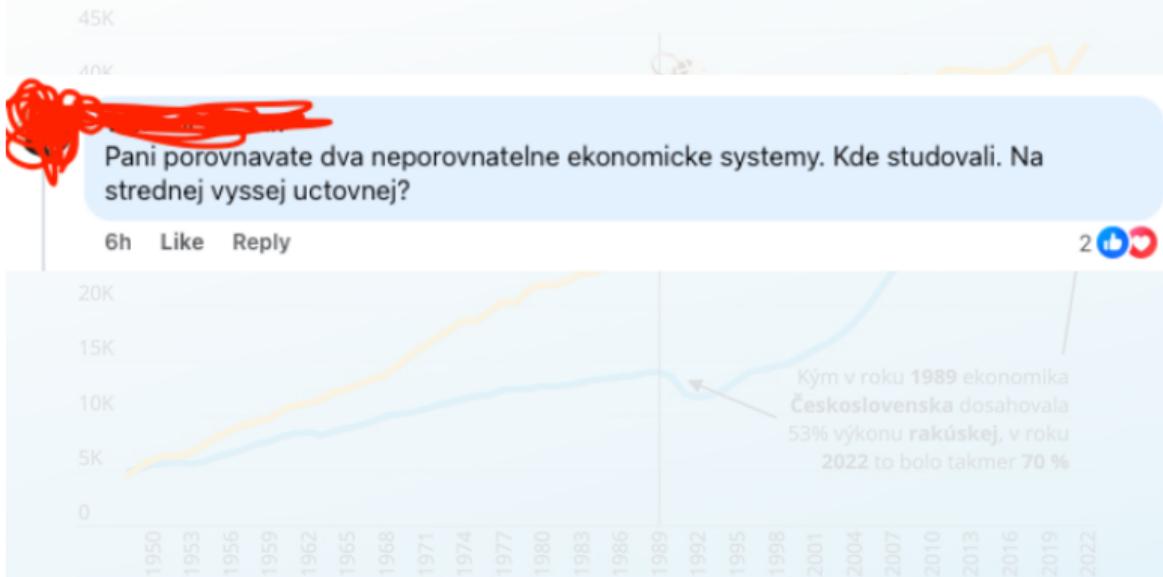


# Aj pre ekonomiku bol rok 89 klúčovým



Hrubý domáci produkt na obyvateľa, v cenách 2011\$

— Československo — Rakúsko



# Otázky

Bolo prijatie eura výhodné pre Slovenskú ekonomiku?

Aký bol vplyv objavenia ropy pre Nórsku ekonomiku?

Aký bol vplyv Brexitu pre nezamestnanosť UK?

# Nemáme

Bolo prijatie eura výhodné pre Slovenskú ekonomiku?  
Slovensko, ktoré neprijalo euro.

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Aký bol vplyv objavenia ropy pre Nórsku ekonomiku?  
Nórsko, ktoré neobjavilo ropu.

# Nemáme

Bolo prijatie eura výhodné pre Slovenskú ekonomiku?  
**Slovensko, ktoré neprijalo euro.**

Aký bol vplyv objavenia ropy pre Nórsku ekonomiku?  
**Nórsko, ktoré neobjavilo ropu.**

Aký bol vplyv Brexitu pre nezamestnanosť v UK?  
**Spojené kráľovstvo, ktoré neprijalo Brexit.**

Zmena na individuálnej úrovni (človek).

Zmena na agregátnej úrovni (mesto, štát).

Zmena na individuálnej úrovni (človek).  
Väčšinou nájdeme niekoho podobného.

Zmena na agregátnej úrovni (mesto, štát).  
**Tu už je to ľažšie.**

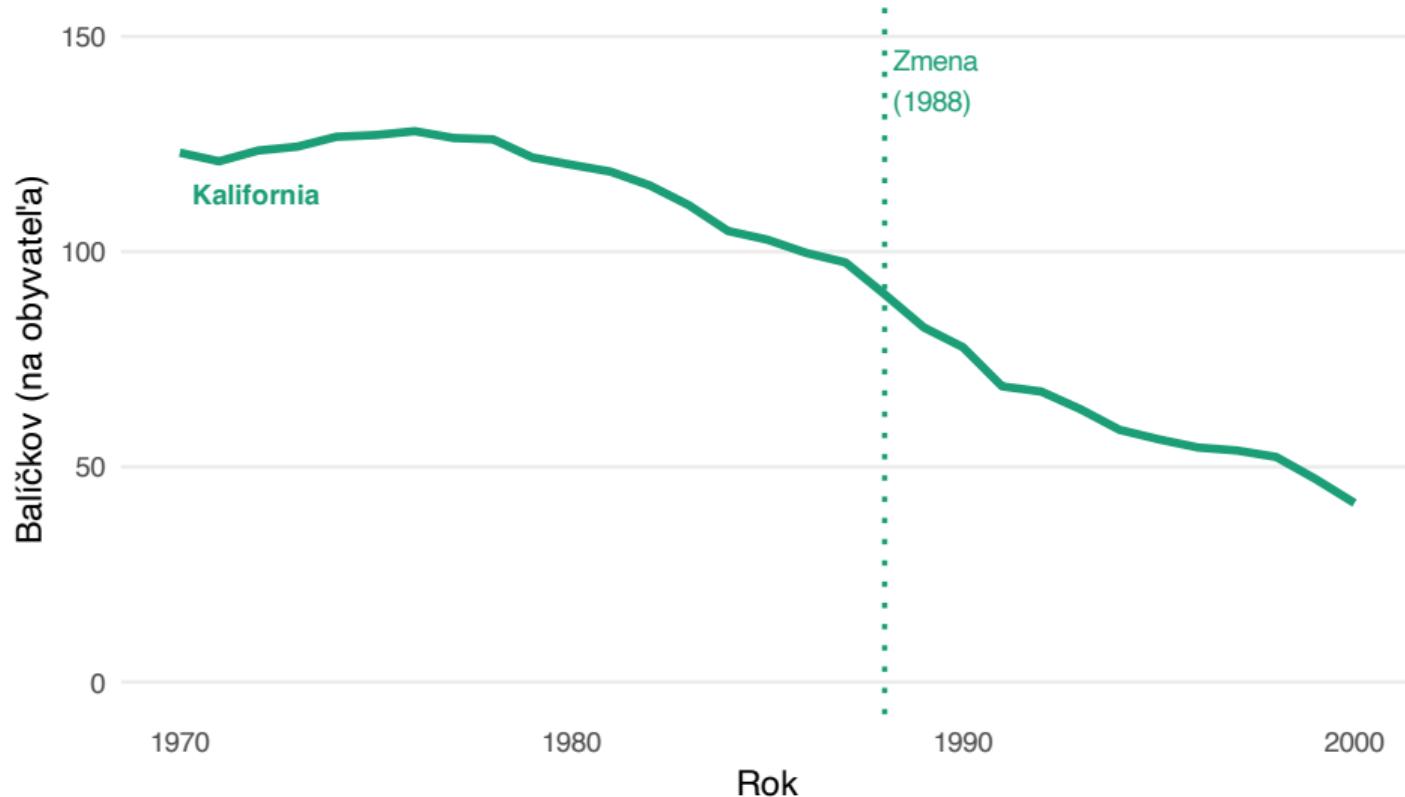
# Príklad

V roku 1988 zaviedol štát Kalifornia 25% daň na tabakové výrobky.

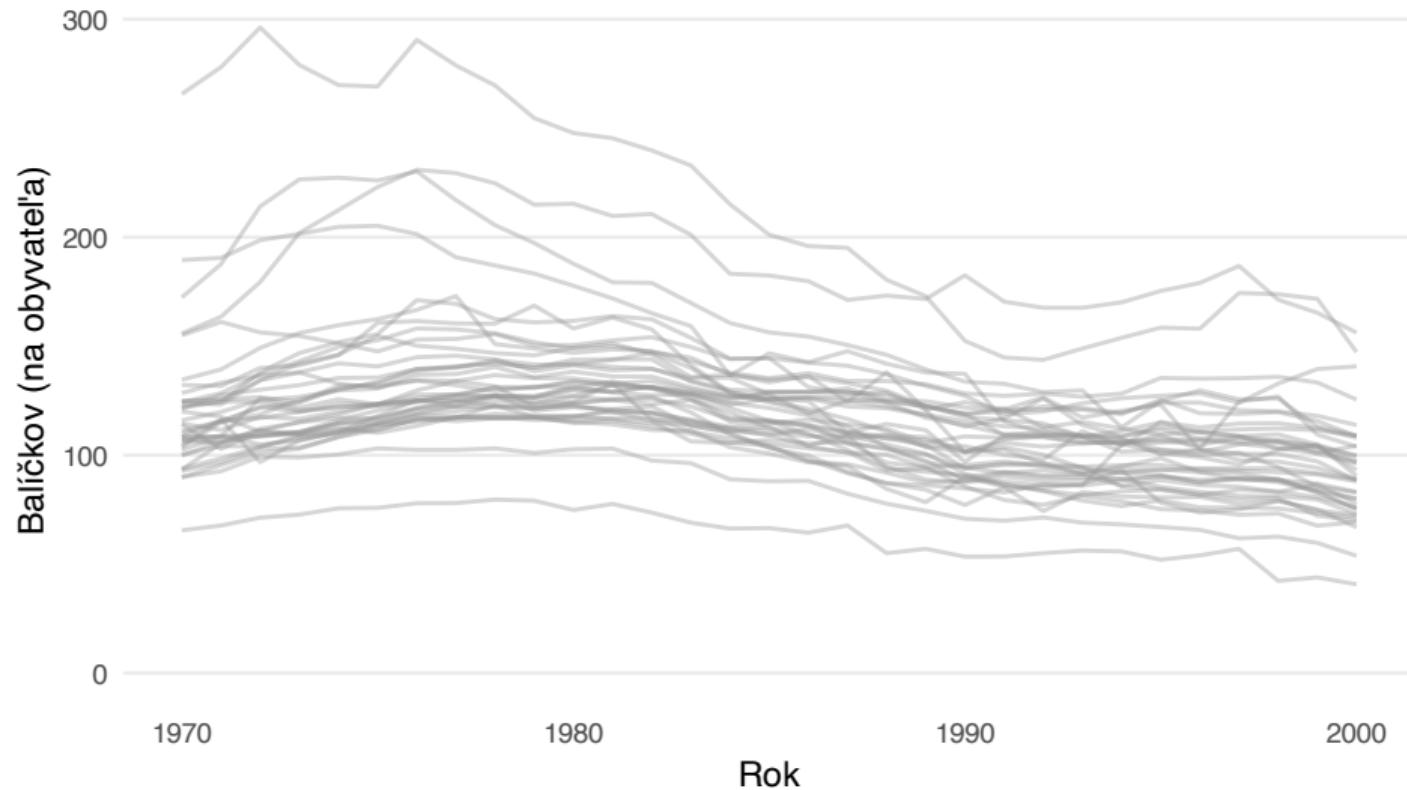
Zákaz automatov na tabakové výrobky a kusového predaja cigariet.

Príjmy z dane boli investované do programov na zlepšenie zdravia a proti-tabakové reklamy.

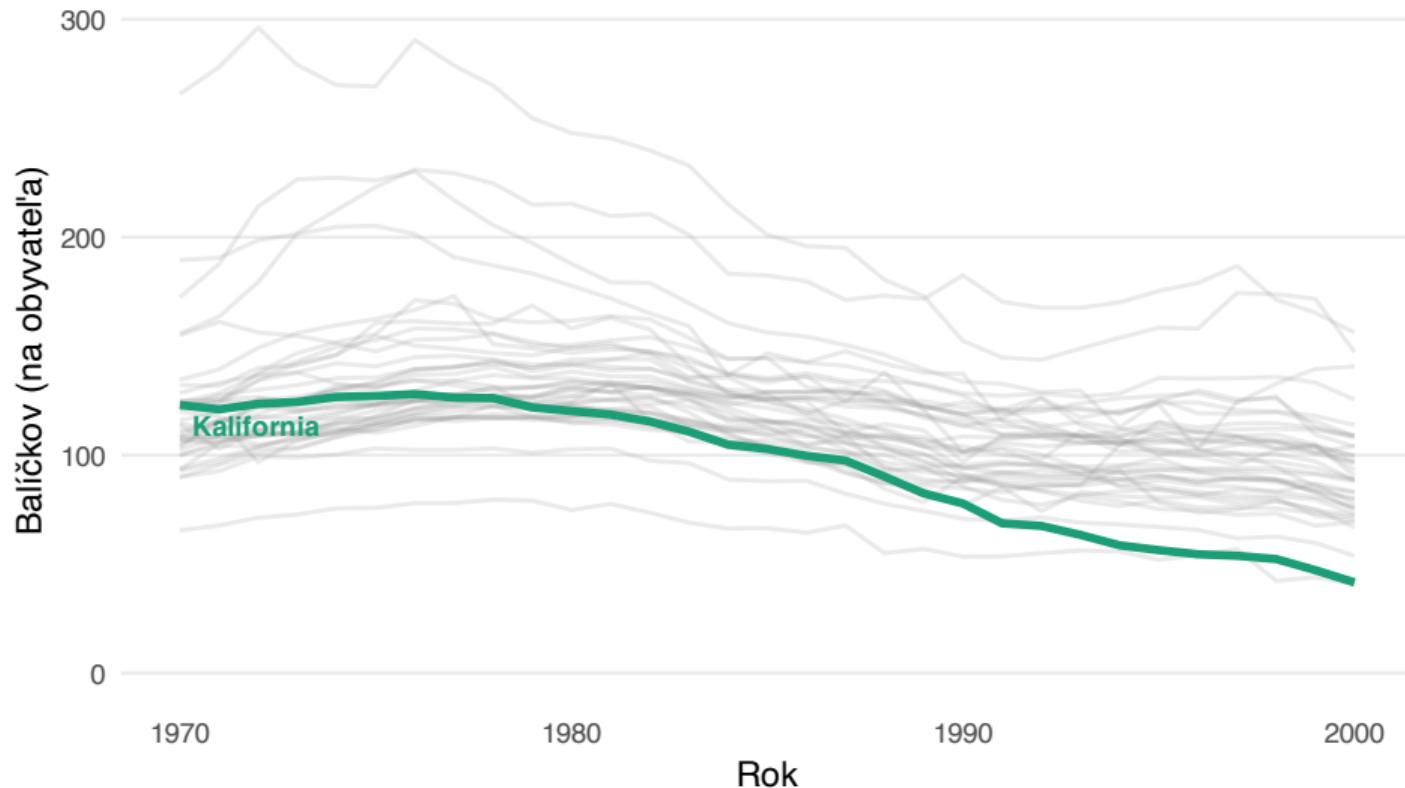
## Predaj cigariet Kalifornia



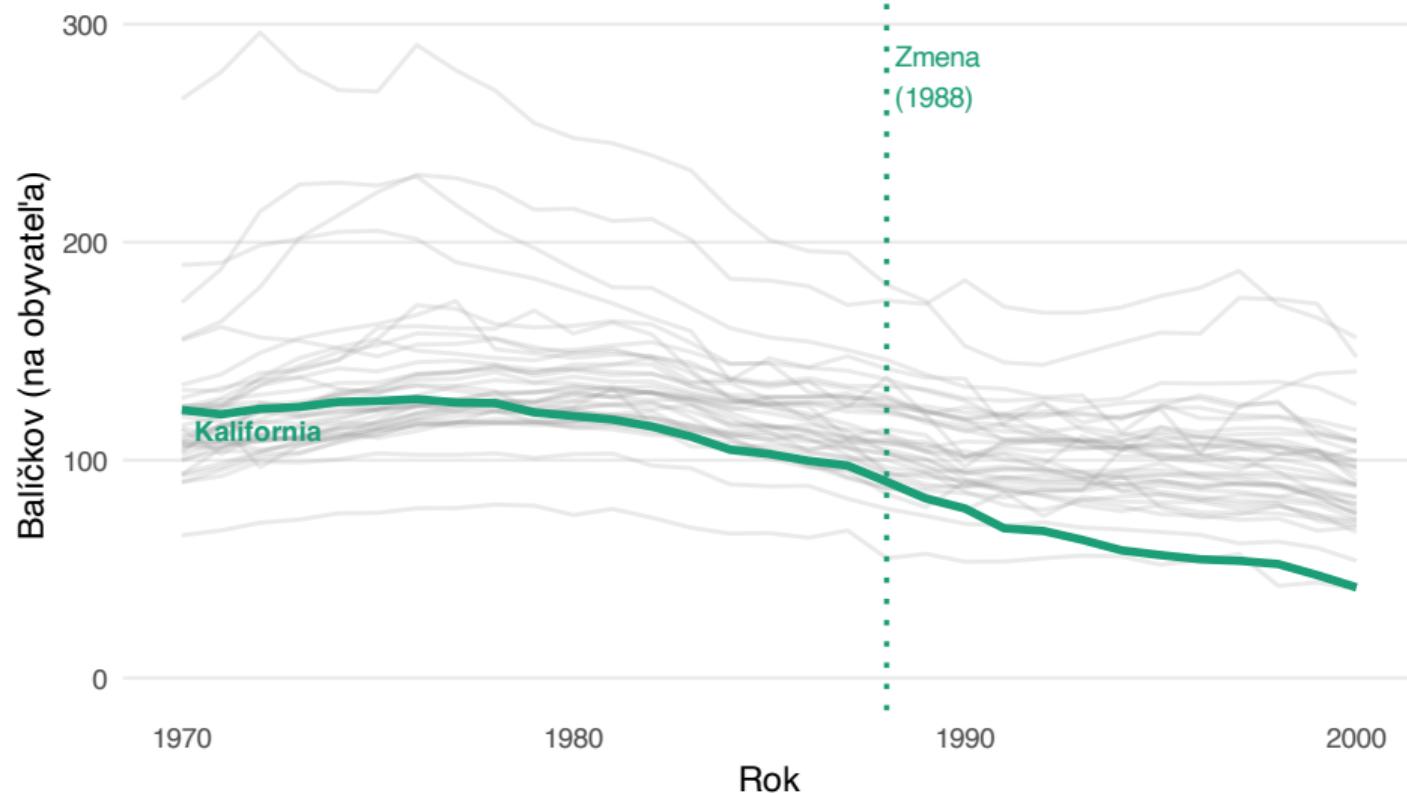
# Predaj cigariet



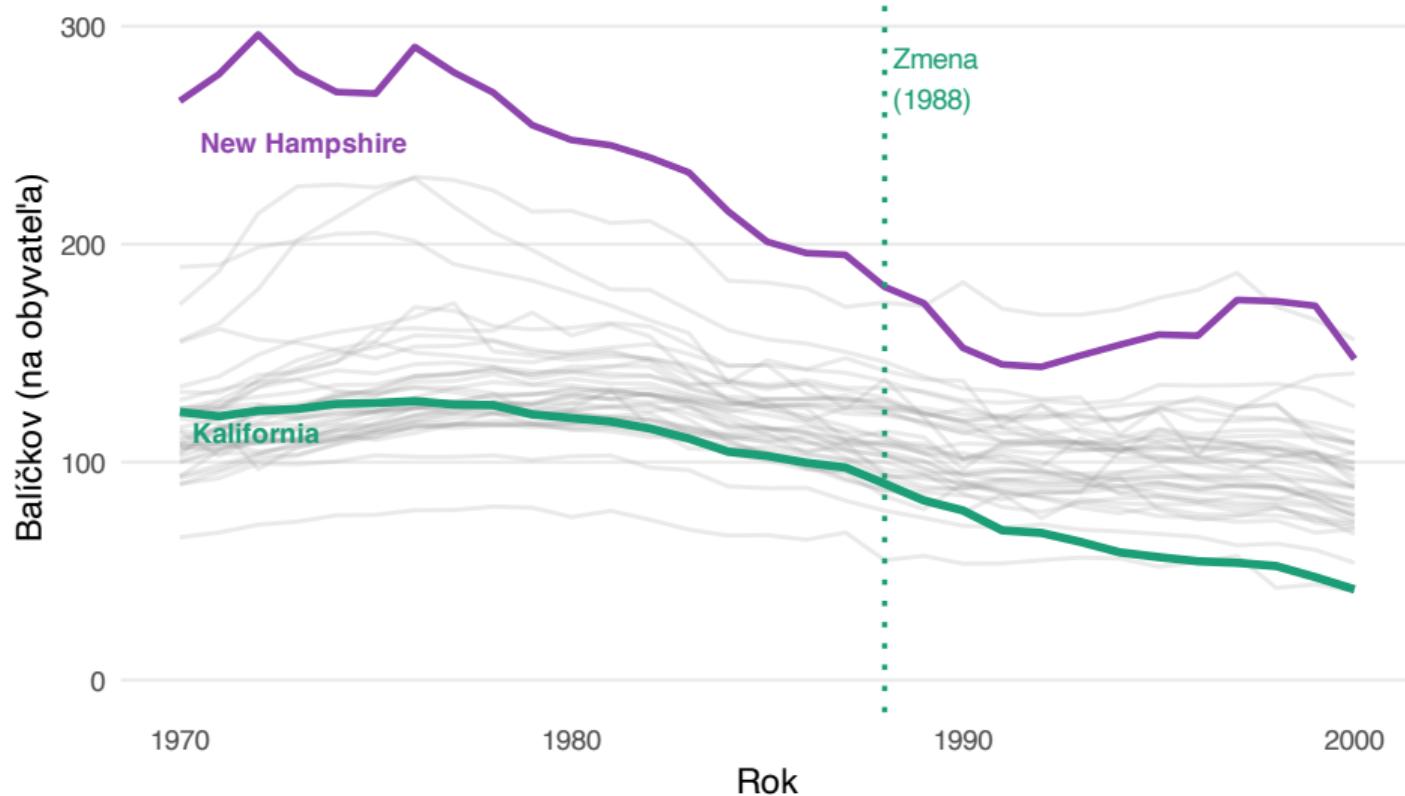
## Predaj cigariet Kalifornia vs ostatné štáty



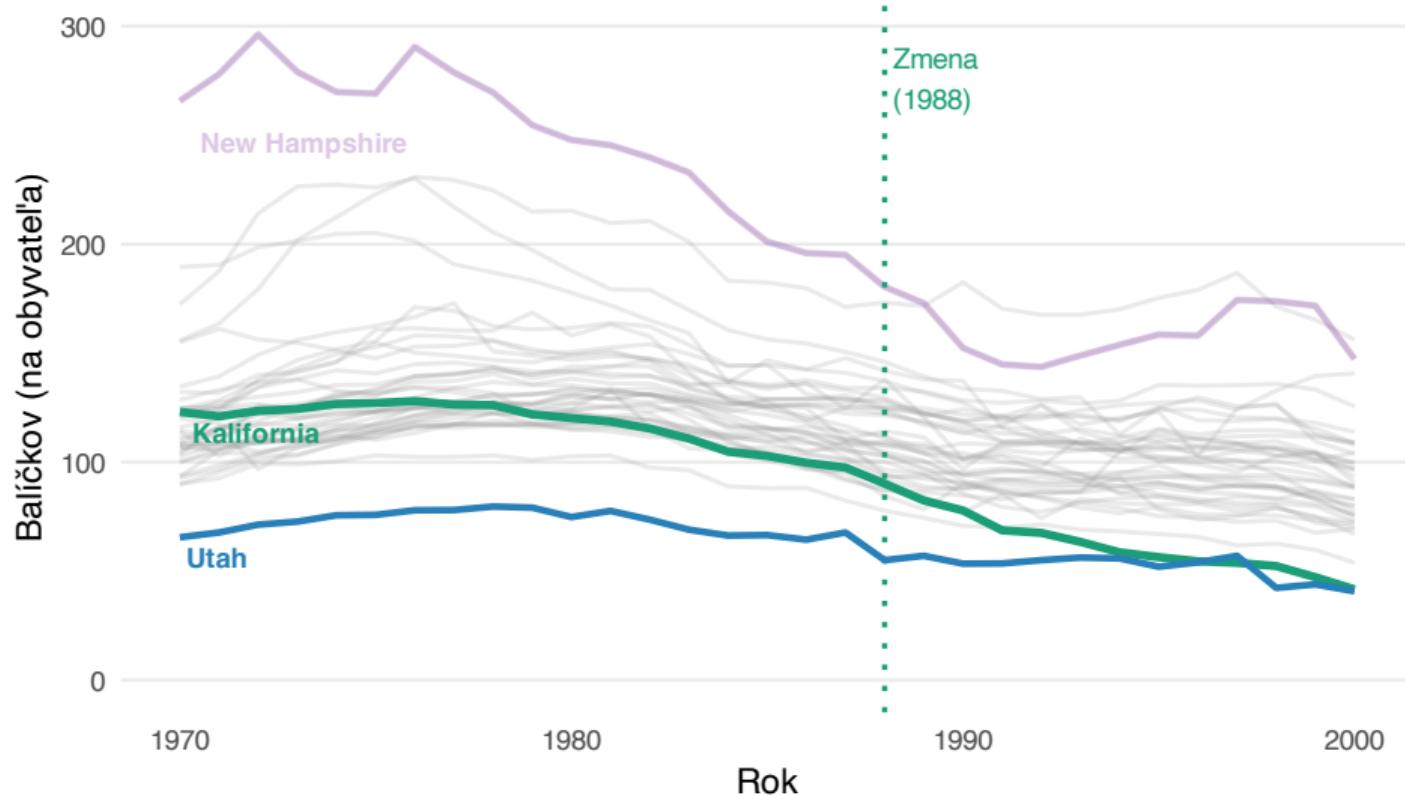
## Predaj cigariet Kalifornia vs ostatné štáty



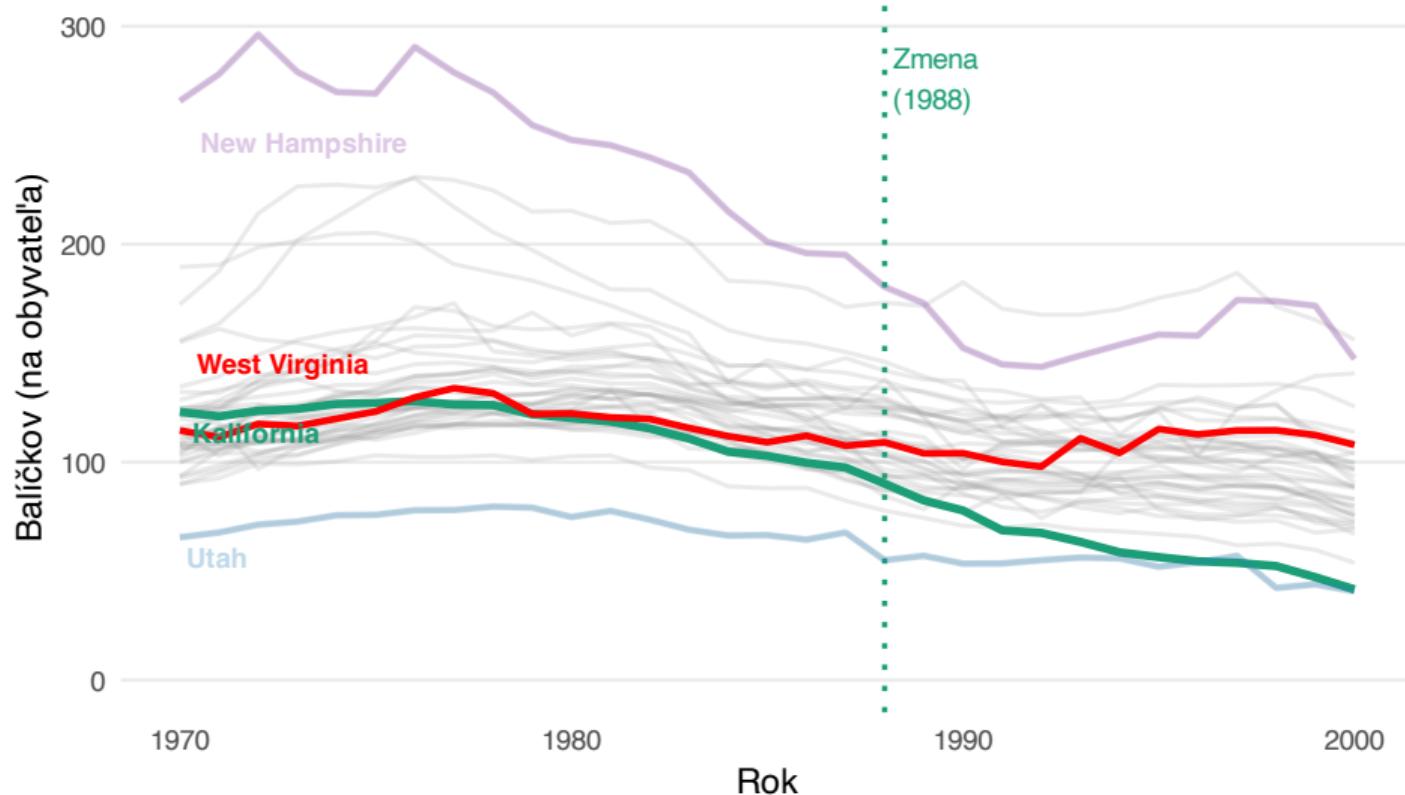
## Predaj cigariet Kalifornia vs ostatné štáty



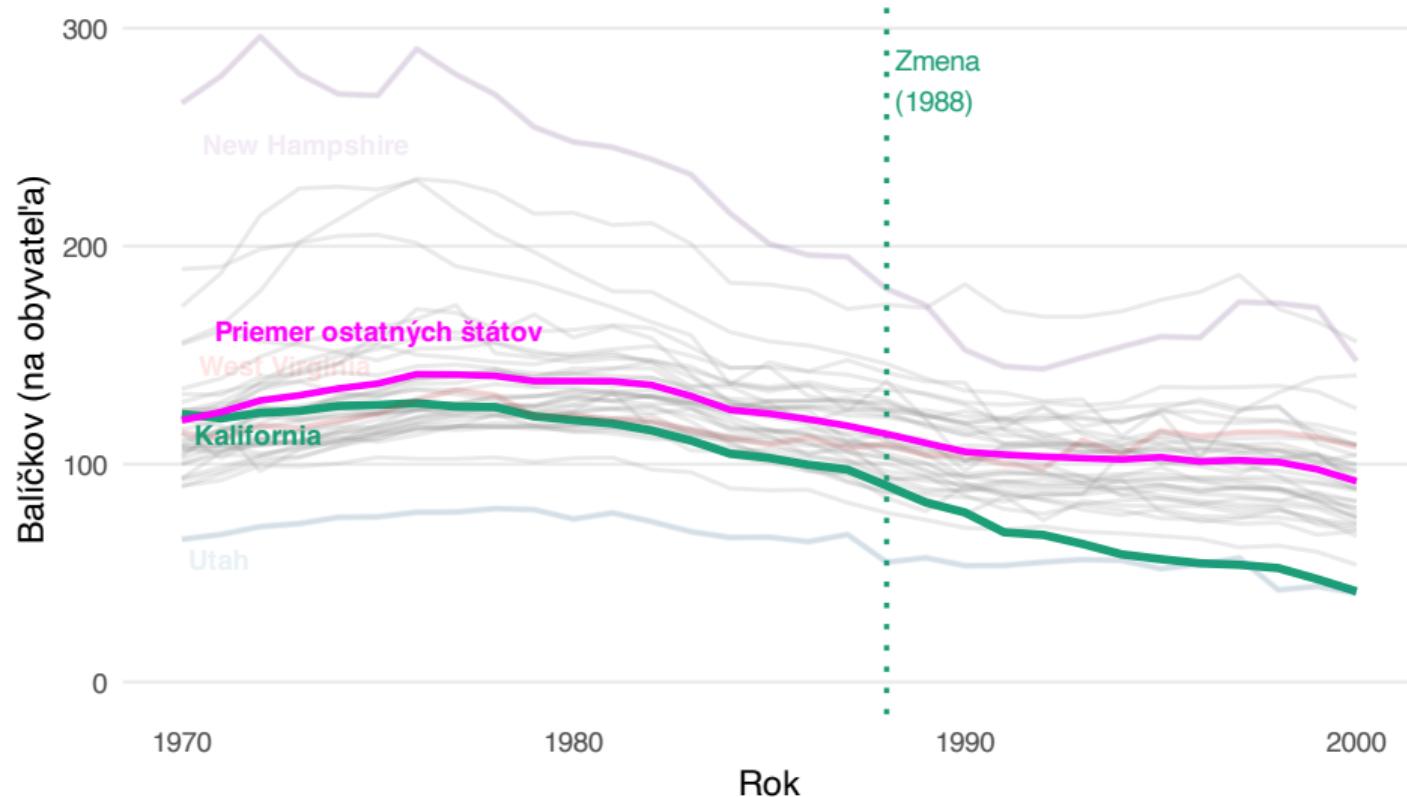
## Predaj cigariet Kalifornia vs ostatné štáty



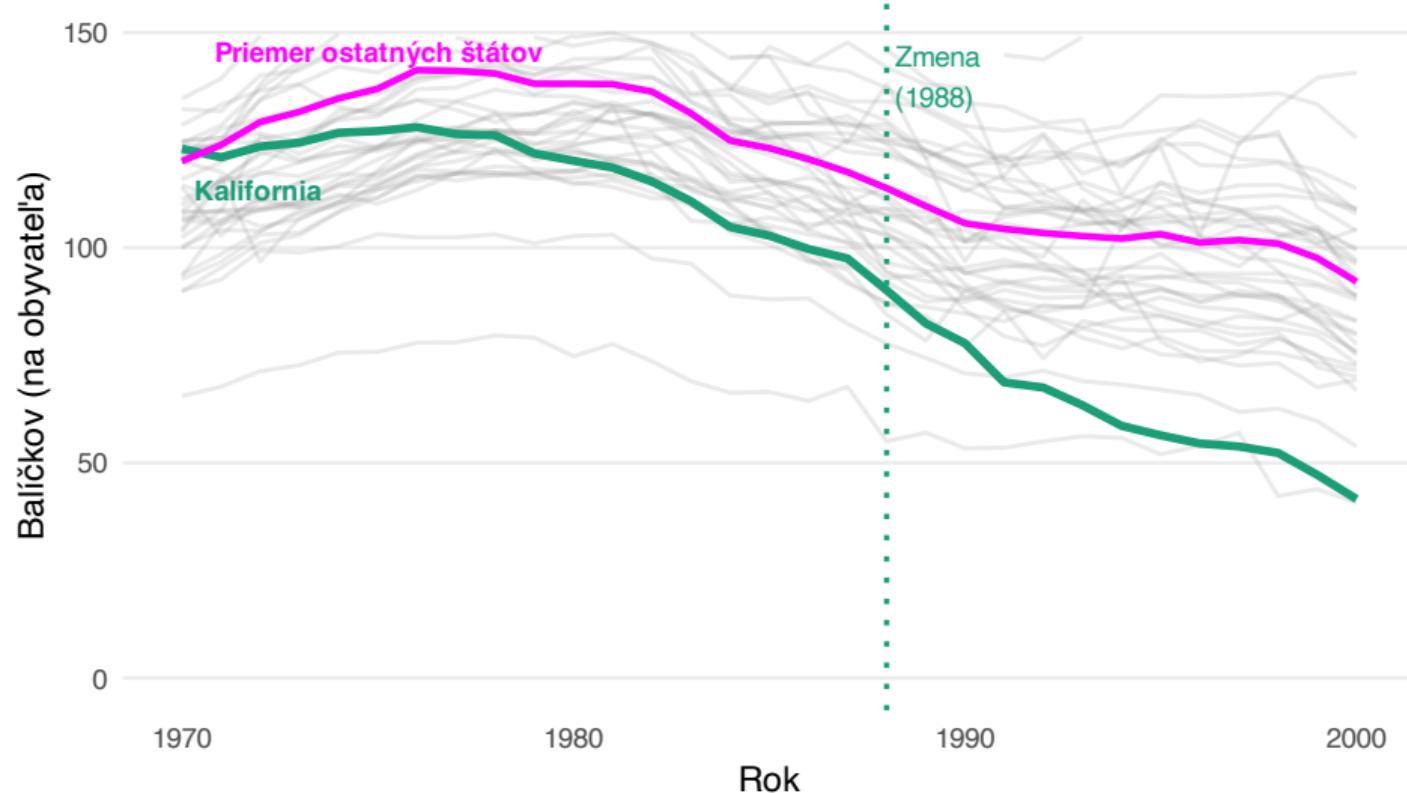
## Predaj cigariet Kalifornia vs ostatné štáty



## Predaj cigariet Kalifornia vs Priemer ostatných štátov

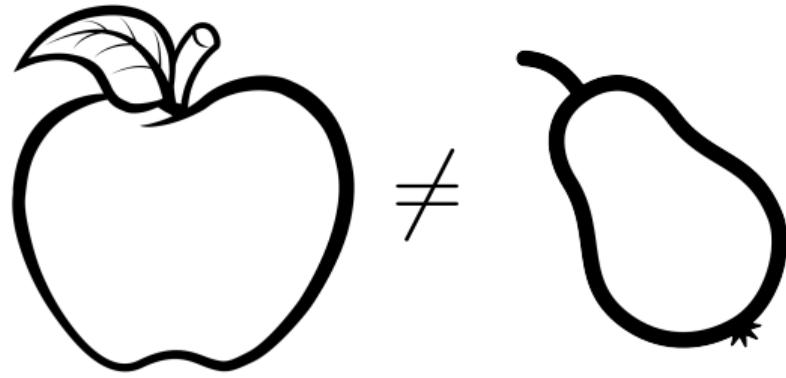


## Predaj cigariet Kalifornia vs Priemer ostatných štátov



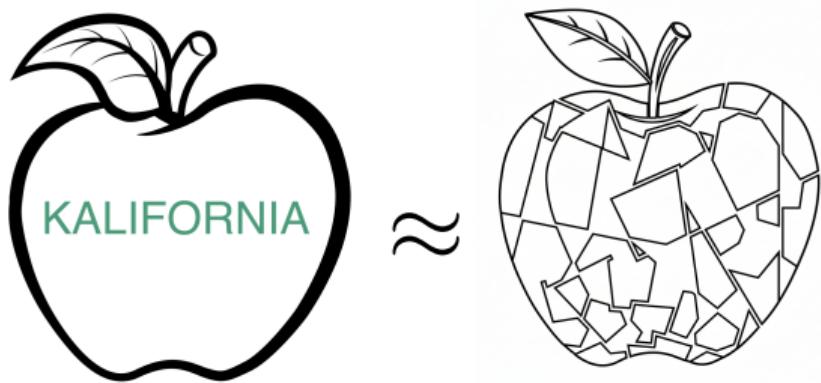
# Kalifornia je iná ako ostatné štáty

|          | California | New Hampshire | Utah  | West Virginia | Priemer ostatných štátov |
|----------|------------|---------------|-------|---------------|--------------------------|
| Cig      | 94.6       | 213.1         | 63.8  | 114.4         | 119.5                    |
| Príjem   | 10.1       | 10.0          | 9.7   | 9.7           | 9.9                      |
| Pivo     | 22.3       | 33.1          | 13.7  | 20.7          | 23.5                     |
| 15–24%   | 17.6%      | 17.1%         | 19.3% | 16.8%         | 17.5%                    |
| Cena     | 119.9      | 107.1         | 112.7 | 105.7         | 108.0                    |
| Cig 1975 | 127.1      | 269.1         | 75.8  | 123.2         | 136.9                    |
| Cig 1980 | 120.2      | 247.8         | 74.8  | 122.3         | 138.1                    |
| Cig 1988 | 90.1       | 180.4         | 55.0  | 109.1         | 113.8                    |



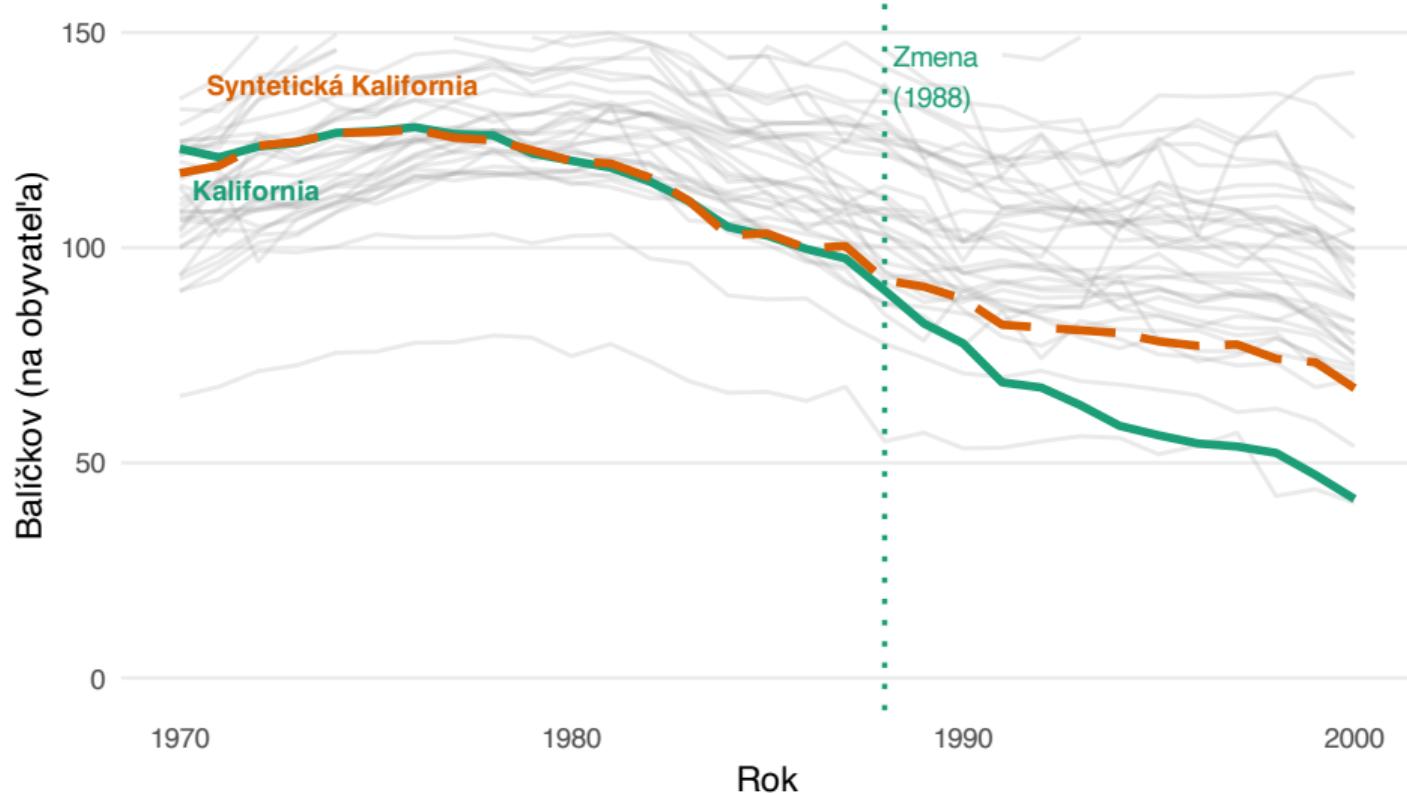




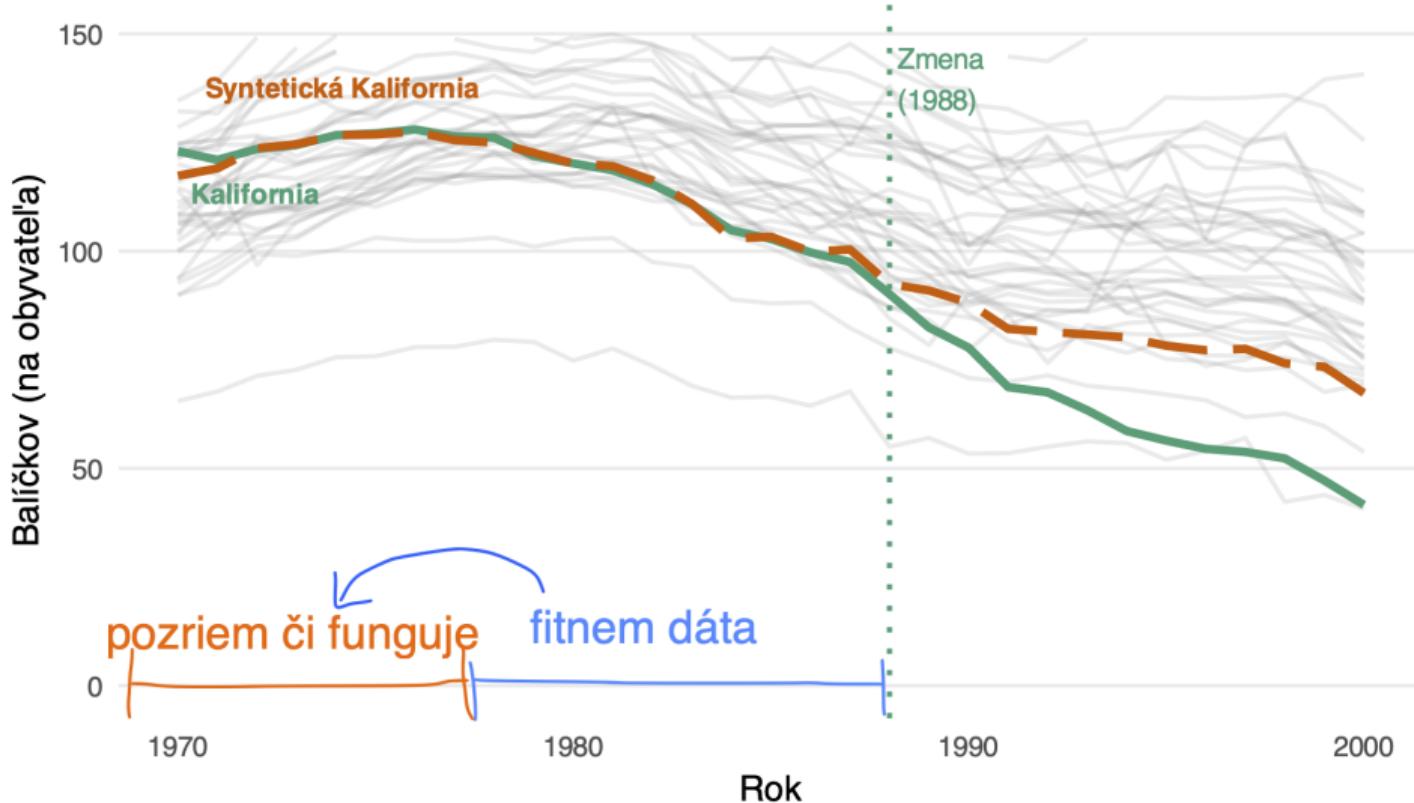


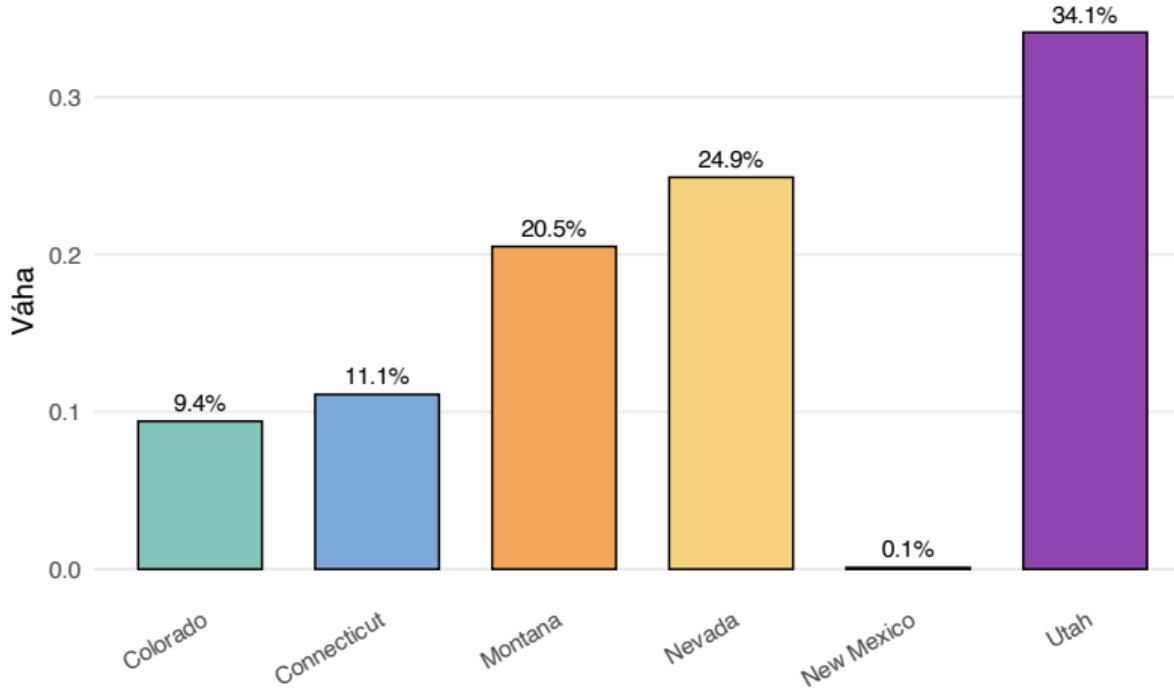
Umelá (syntetická) Kalifornia!

## Reálna vs syntetická Kalifornia

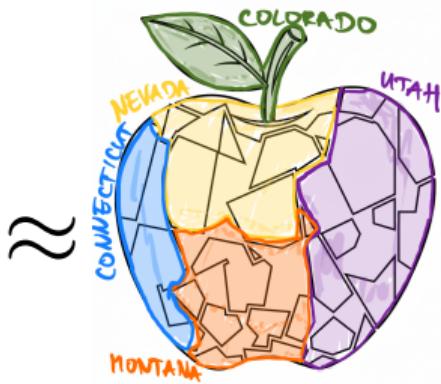


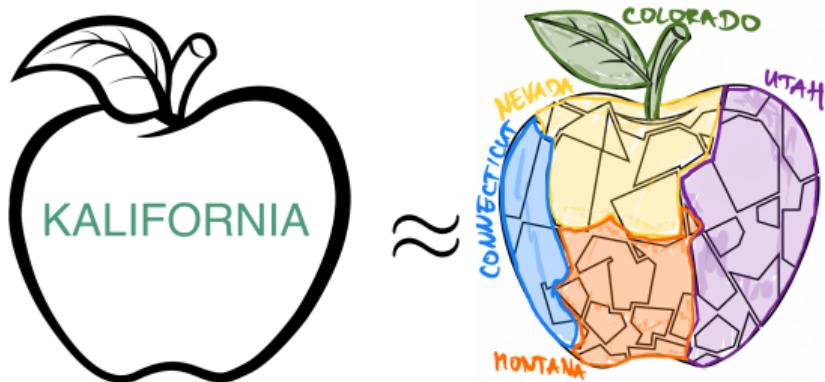
## Reálna vs syntetická Kalifornia



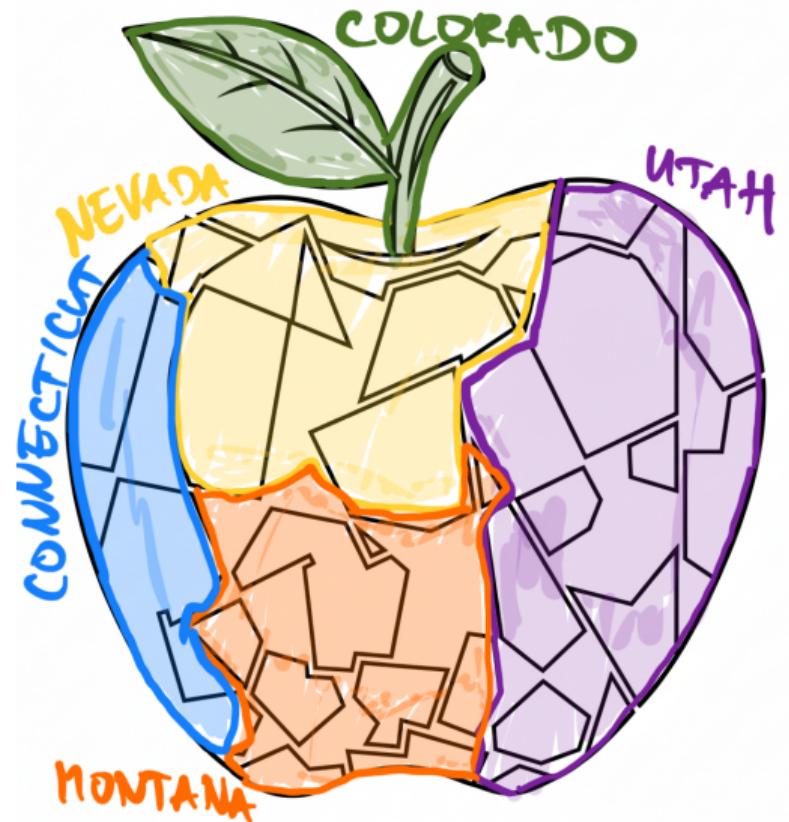


Syntetická Kalifornia =  $0.094 \cdot \text{Colorado} + 0.111 \cdot \text{Connecticut} +$   
 $0.205 \cdot \text{Montana} + 0.249 \cdot \text{Nevada} +$   
 $0.001 \cdot \text{New Mexico} + 0.341 \cdot \text{Utah}$





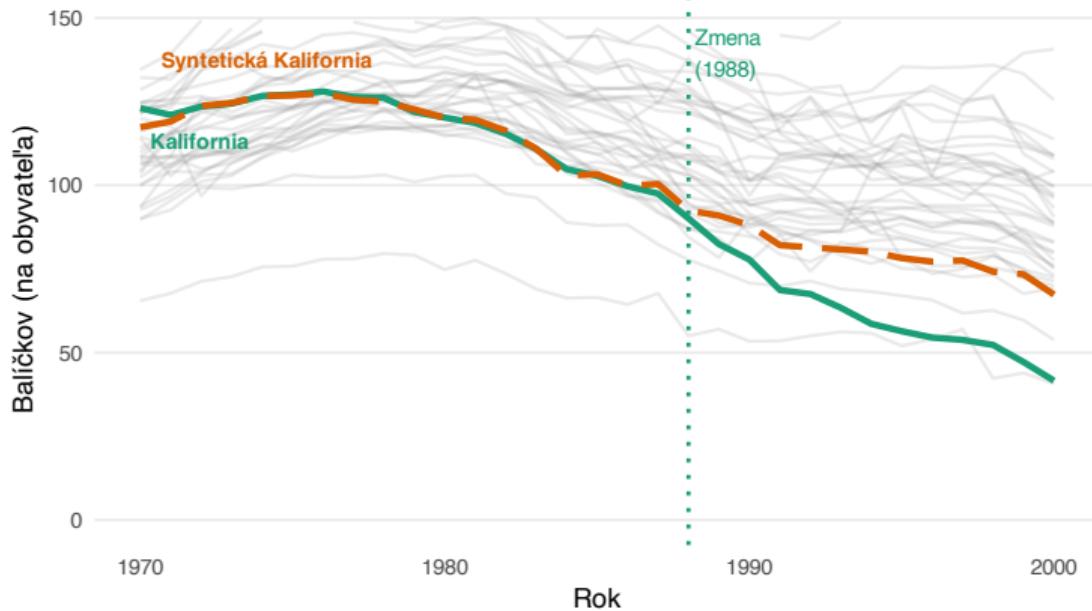
$$\text{Syntetická Kalifornia} = 0.094 \cdot \text{Colorado} + 0.111 \cdot \text{Connecticut} + \\ 0.205 \cdot \text{Montana} + 0.249 \cdot \text{Nevada} + \\ 0.001 \cdot \text{New Mexico} + 0.341 \cdot \text{Utah}$$



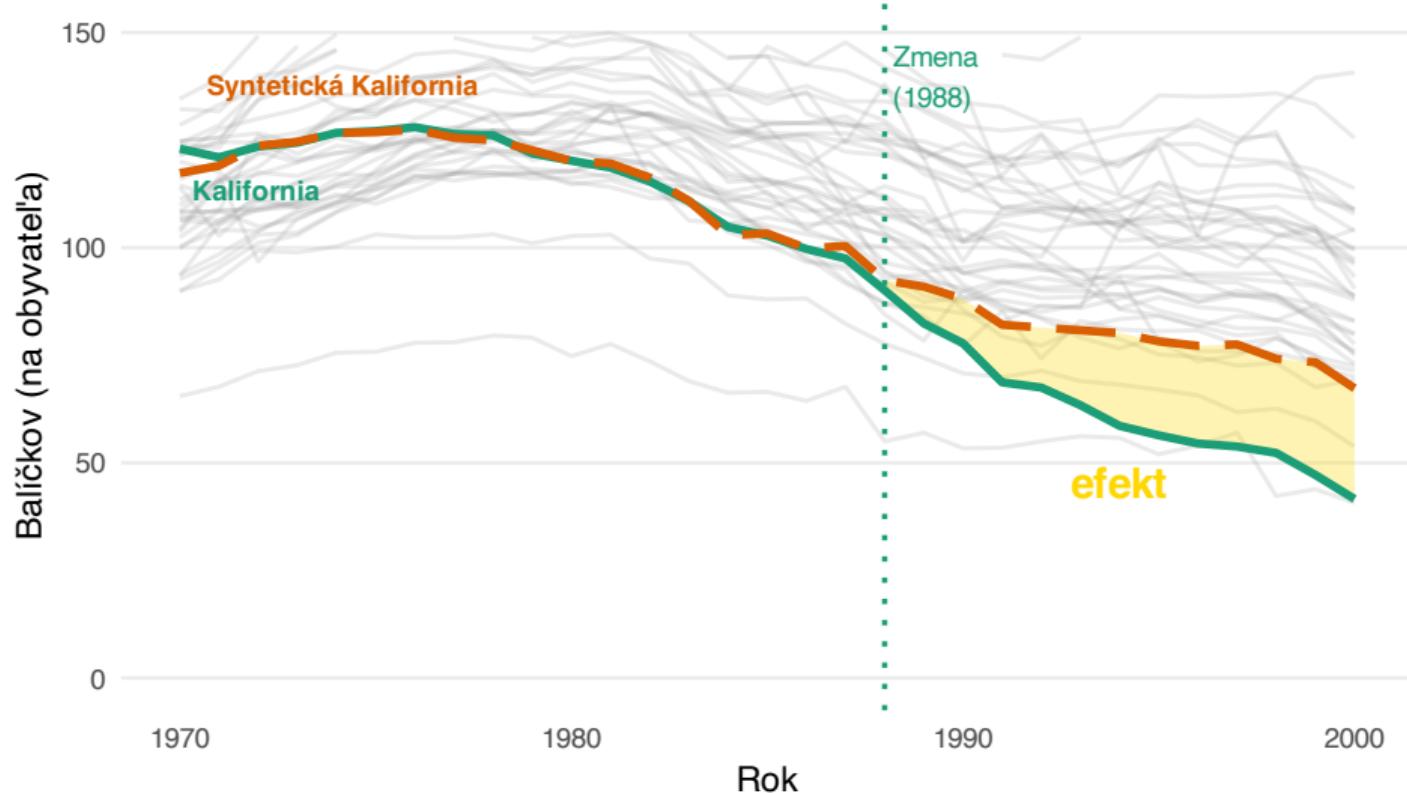
## Váhy syntetickej Kalifornie

| Štát        | Váha  | Štát           | Váha  |
|-------------|-------|----------------|-------|
| Alabama     | 0     | Nevada         | 0.249 |
| Arkansas    | 0     | New Hampshire  | 0     |
| Colorado    | 0.094 | New Mexico     | 0.001 |
| Connecticut | 0.111 | North Carolina | 0     |
| Delaware    | 0     | North Dakota   | 0     |
| Georgia     | 0     | Ohio           | 0     |
| Idaho       | 0     | Oklahoma       | 0     |
| Illinois    | 0     | Pennsylvania   | 0     |
| Indiana     | 0     | Rhode Island   | 0     |
| Iowa        | 0     | South Carolina | 0     |
| Kansas      | 0     | South Dakota   | 0     |
| Kentucky    | 0     | Tennessee      | 0     |
| Louisiana   | 0     | Texas          | 0     |
| Maine       | 0     | Utah           | 0.341 |
| Minnesota   | 0     | Vermont        | 0     |
| Mississippi | 0     | Virginia       | 0     |
| Missouri    | 0     | West Virginia  | 0     |
| Montana     | 0.205 | Wisconsin      | 0     |
| Nebraska    | 0     | Wyoming        | 0     |

## Reálna vs syntetická Kalifornia



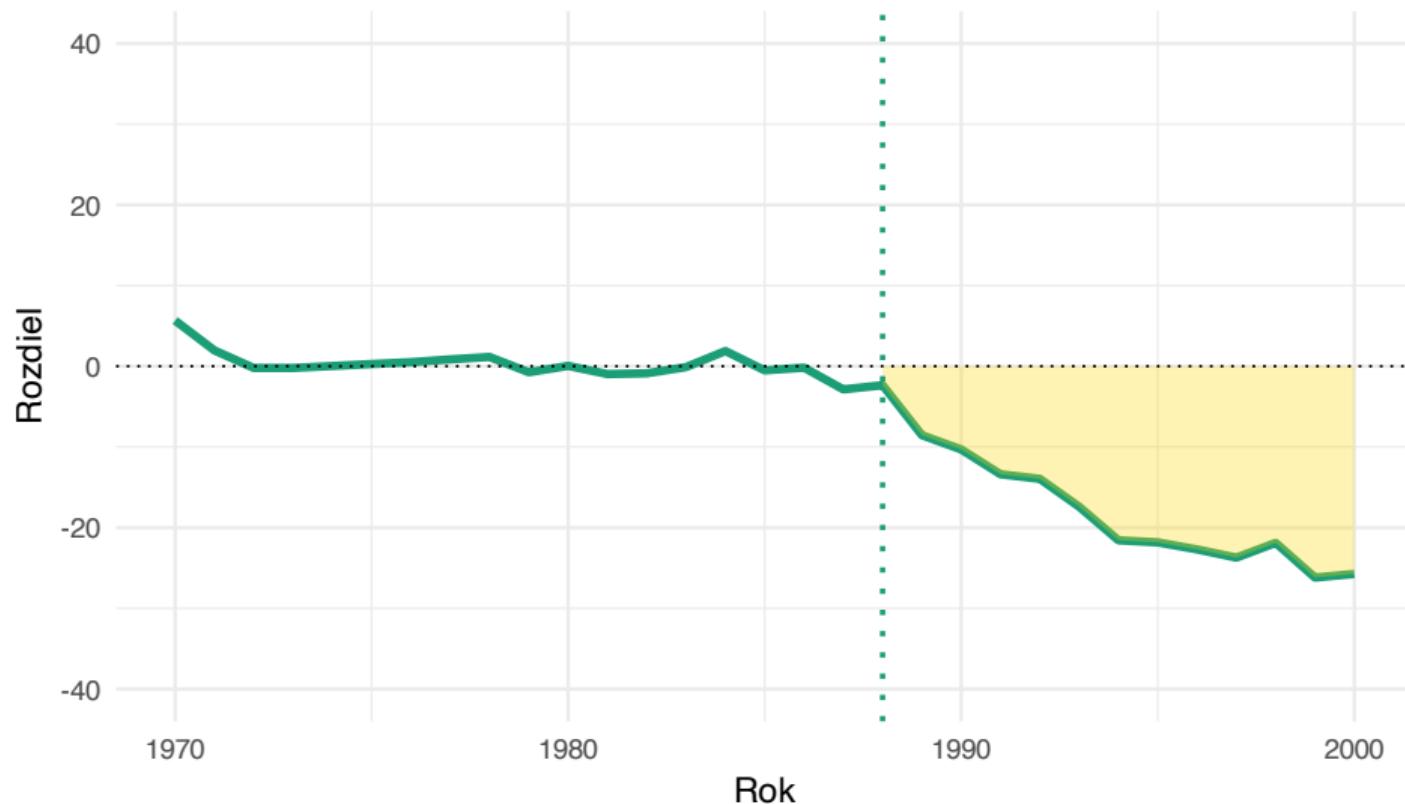
## Reálna vs syntetická Kalifornia

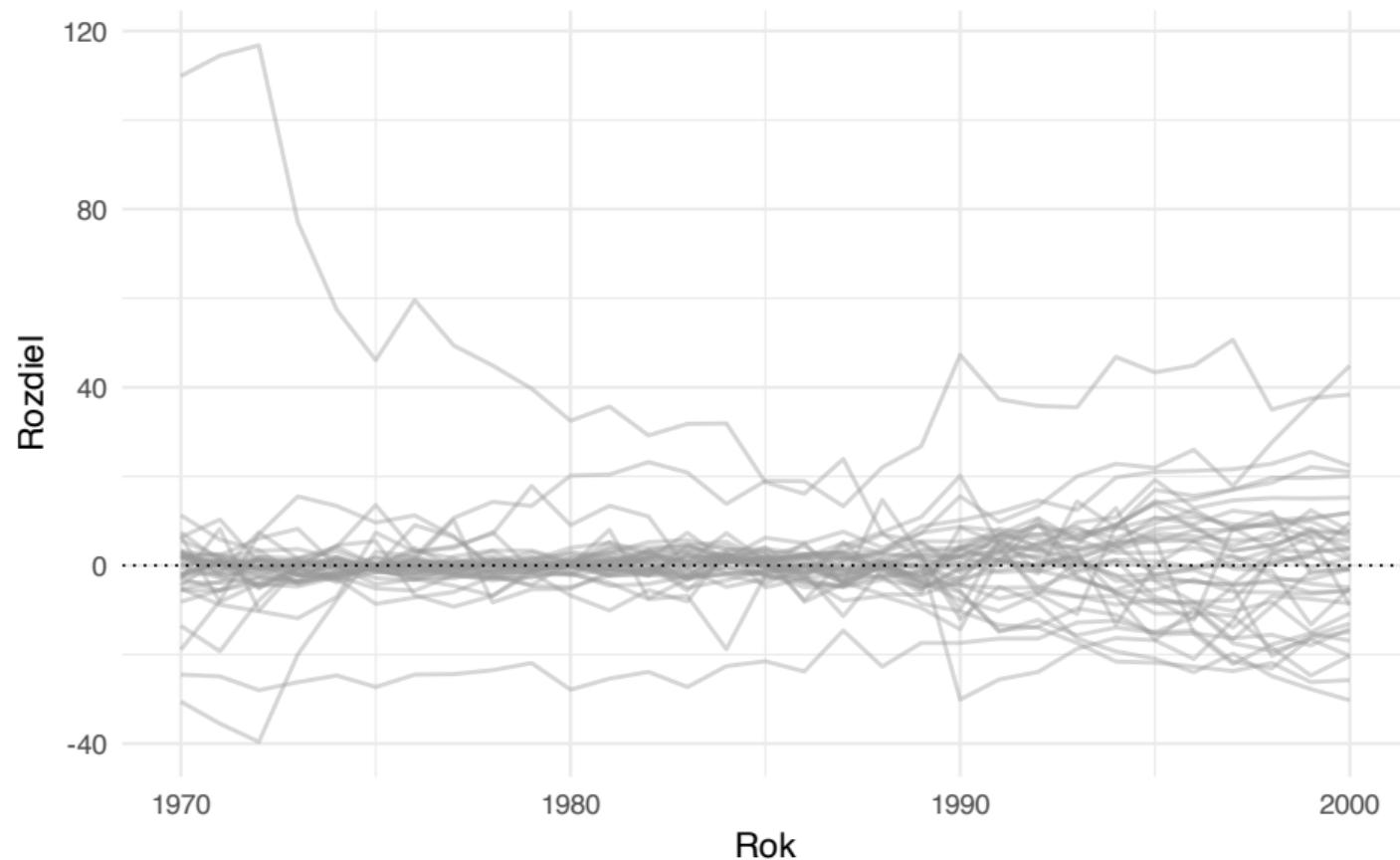


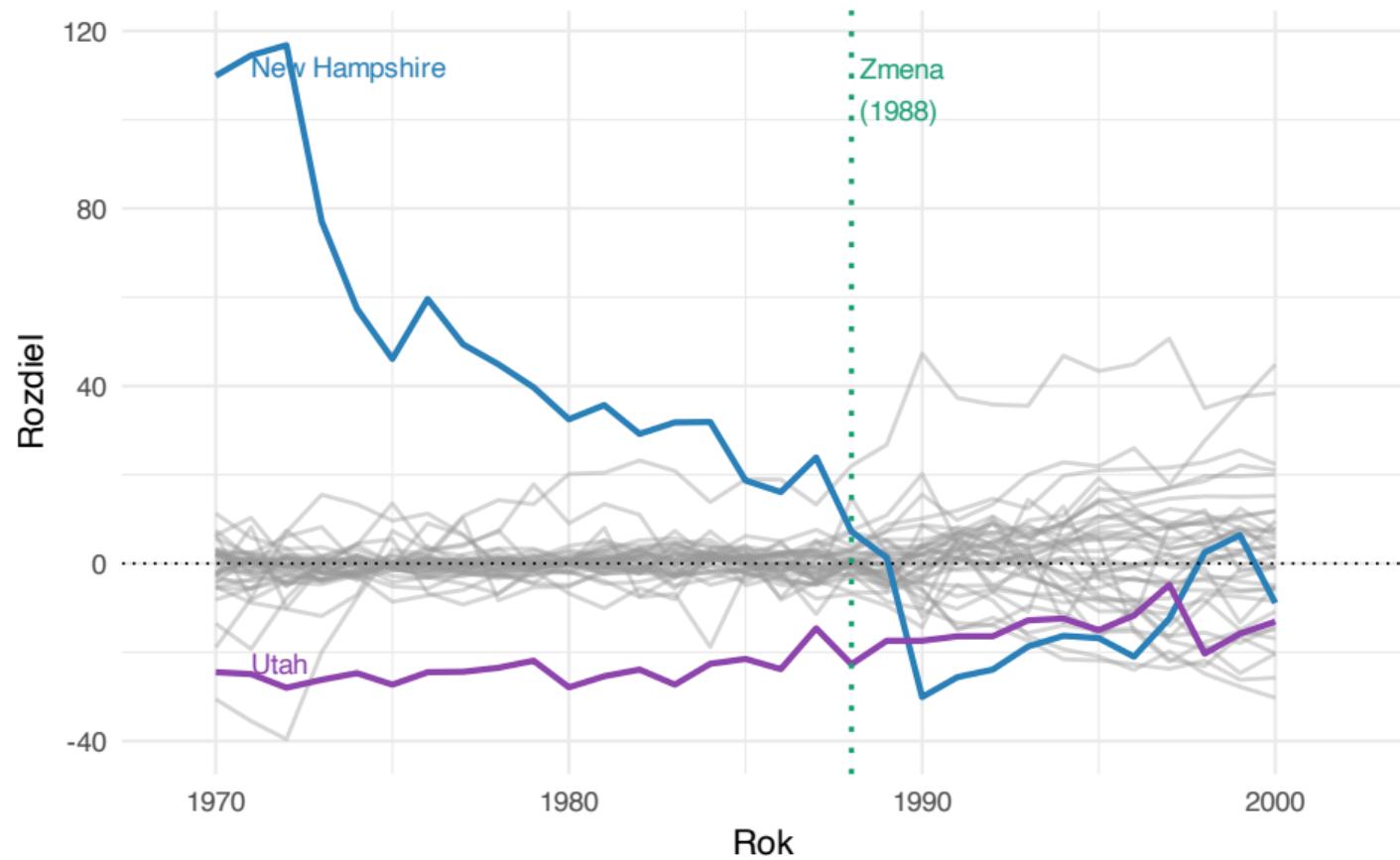
|          | California | New Hampshire | Utah  | West Virginia | Priemer ostatných štátov | Synthetic Unit |
|----------|------------|---------------|-------|---------------|--------------------------|----------------|
| Cig      | 116.2      | 247.6         | 71.5  | 118.3         | 130.6                    | 116.0          |
| Prijem   | 10.0       | 9.9           | 9.7   | 9.6           | 9.8                      | 9.8            |
| Pivo     | 24.3       | 35.0          | 13.3  | 19.8          | 23.7                     | 24.1           |
| 15–24%   | 17.9%      | 17.4%         | 19.5% | 17.0%         | 17.8%                    | 18.0%          |
| Cena     | 66.6       | 61.0          | 64.2  | 67.9          | 64.5                     | 66.1           |
| Cig 1975 | 127.1      | 269.1         | 75.8  | 123.2         | 136.9                    | 126.8          |
| Cig 1980 | 120.2      | 247.8         | 74.8  | 122.3         | 138.1                    | 120.2          |
| Cig 1988 | 90.1       | 180.4         | 55.0  | 109.1         | 113.8                    | 92.4           |

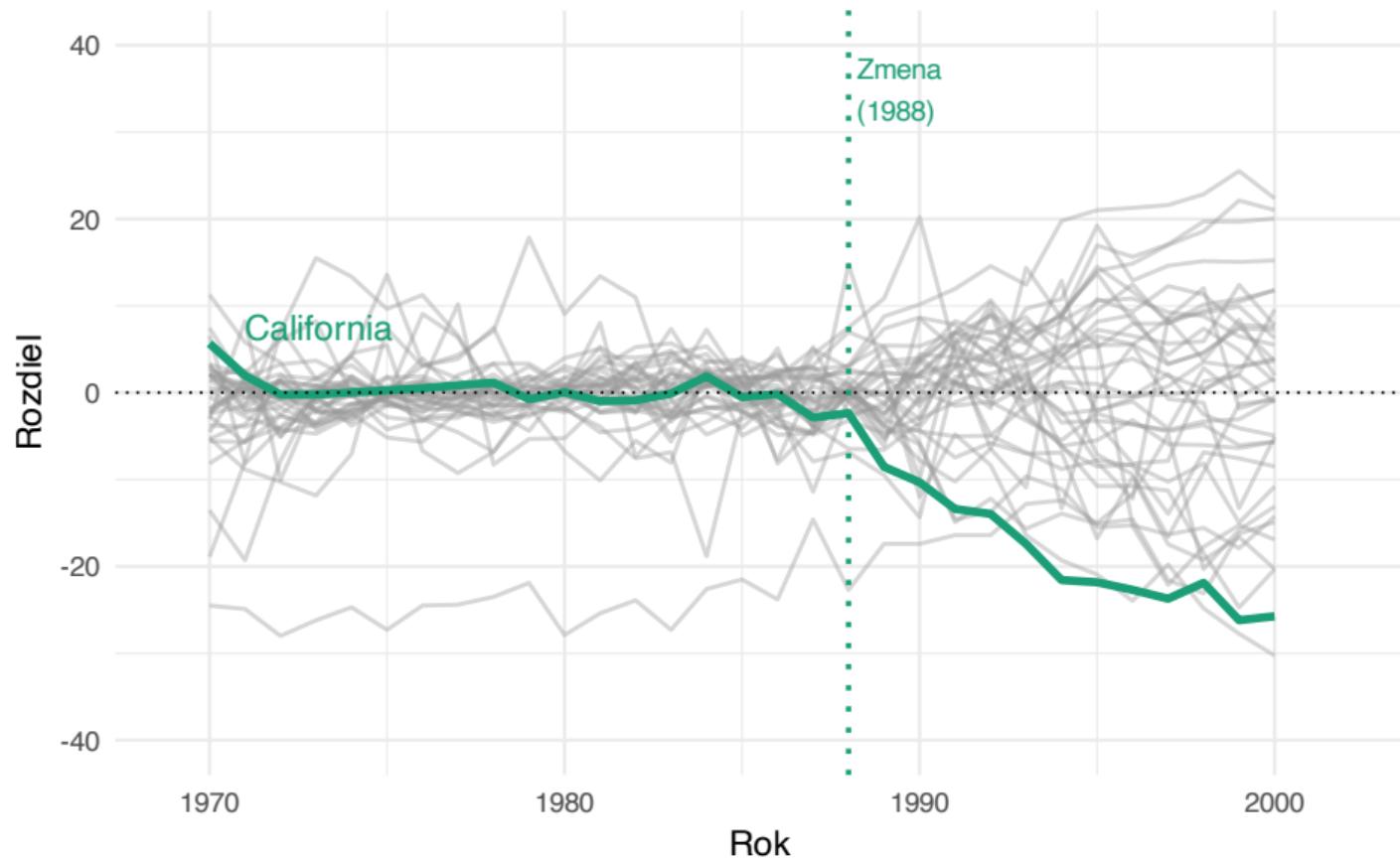
|          | <b>California</b> | New Hampshire | Utah  | West Virginia | Priemer ostatných štátov | <b>Synthetic Unit</b> |
|----------|-------------------|---------------|-------|---------------|--------------------------|-----------------------|
| Cig      | 116.2             | 247.6         | 71.5  | 118.3         | 130.6                    | 116.0                 |
| Príjem   | 10.0              | 9.9           | 9.7   | 9.6           | 9.8                      | 9.8                   |
| Pivo     | 24.3              | 35.0          | 13.3  | 19.8          | 23.7                     | 24.1                  |
| 15–24%   | 17.9%             | 17.4%         | 19.5% | 17.0%         | 17.8%                    | 18.0%                 |
| Cena     | 66.6              | 61.0          | 64.2  | 67.9          | 64.5                     | 66.1                  |
| Cig 1975 | 127.1             | 269.1         | 75.8  | 123.2         | 136.9                    | 126.8                 |
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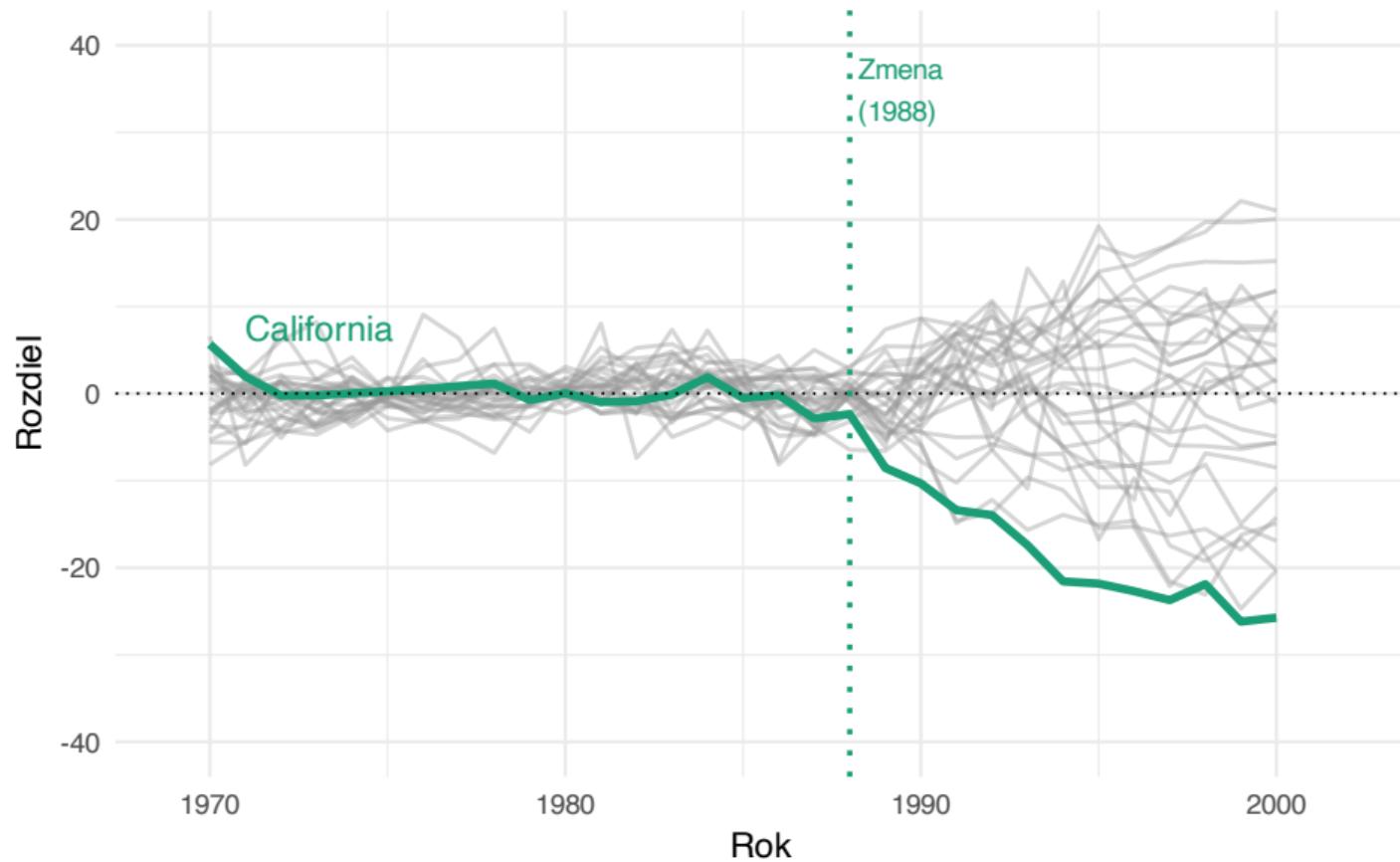
## Rozdiel medzi Reálnou a syntetickou Kaliforniou

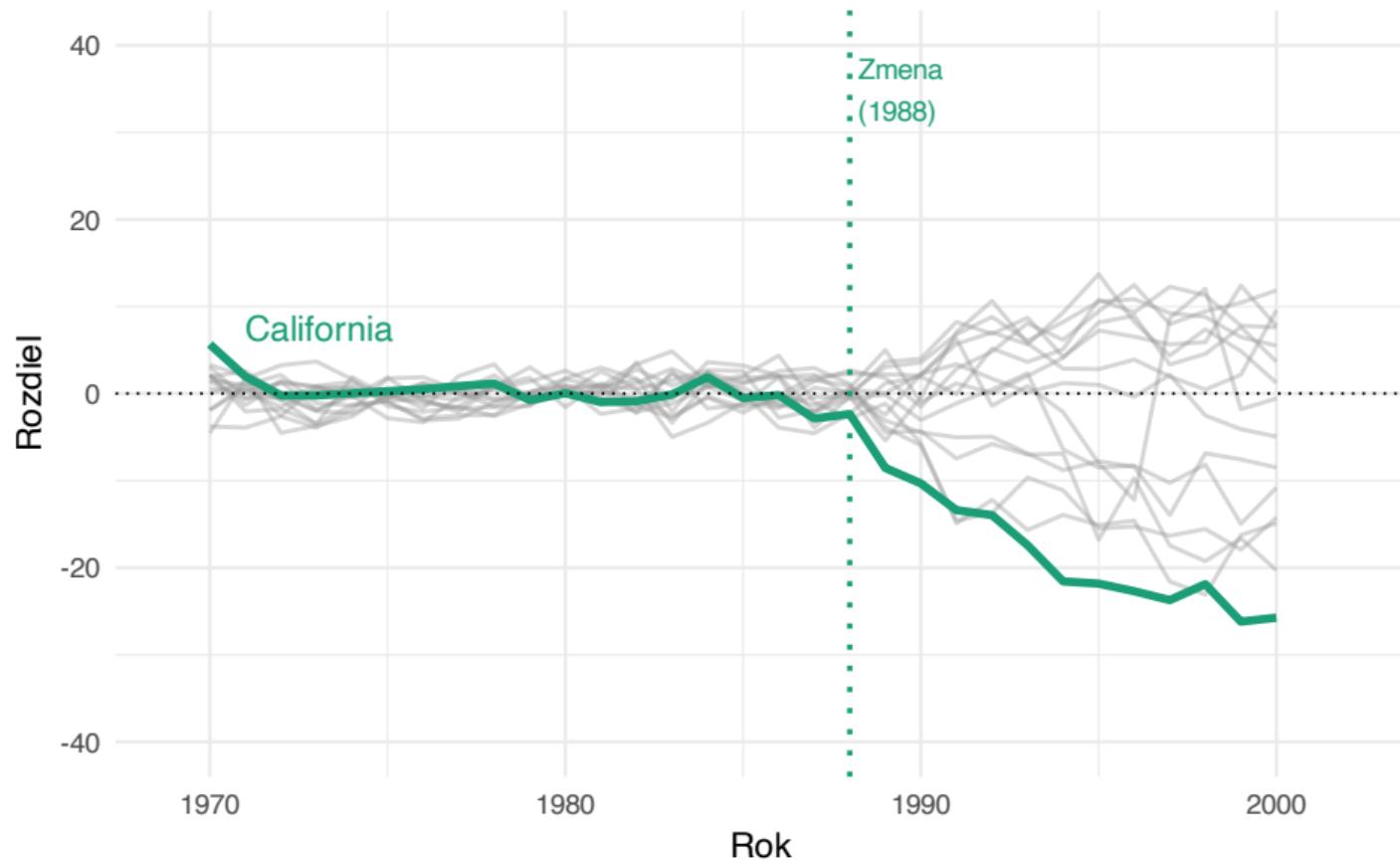


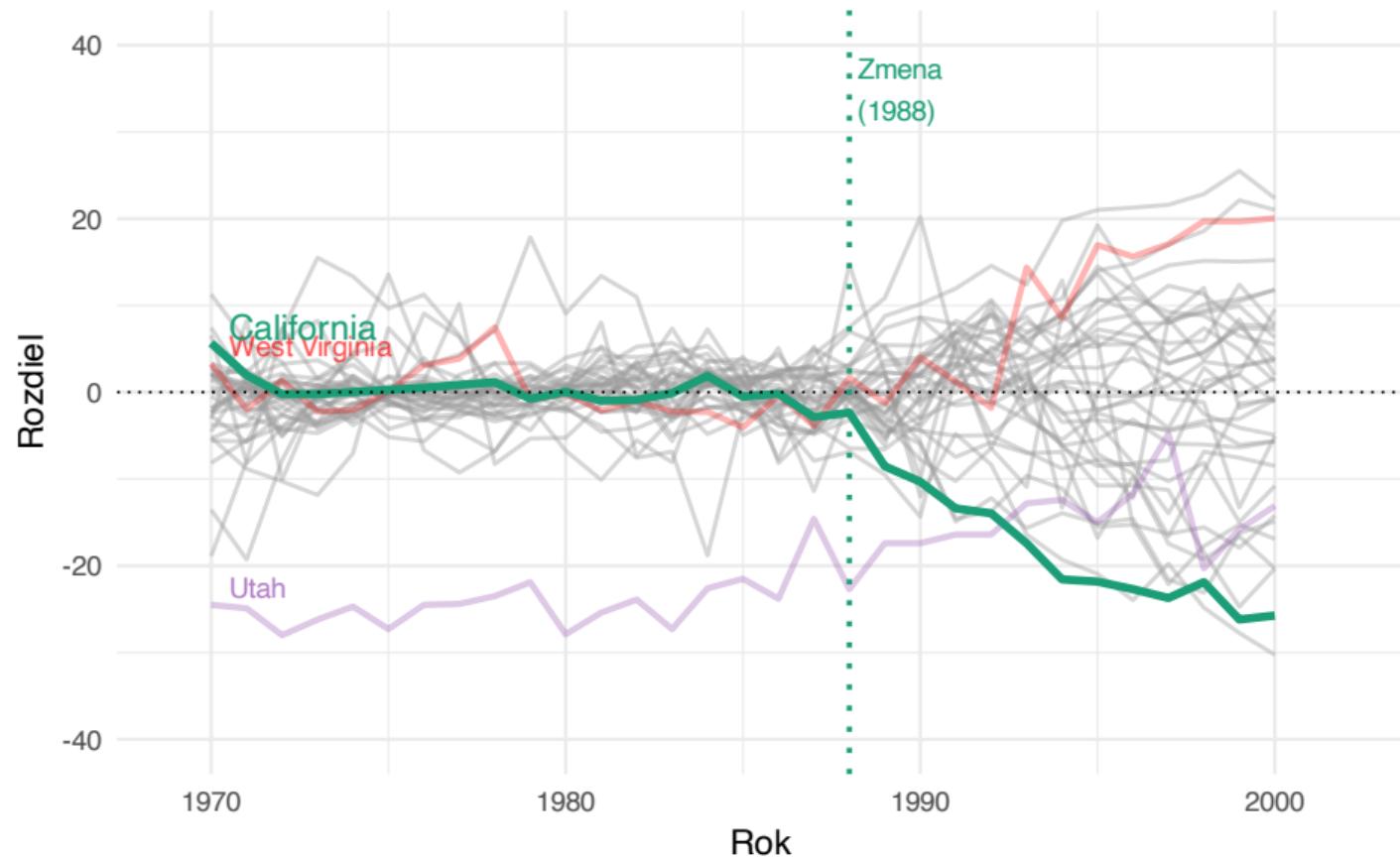




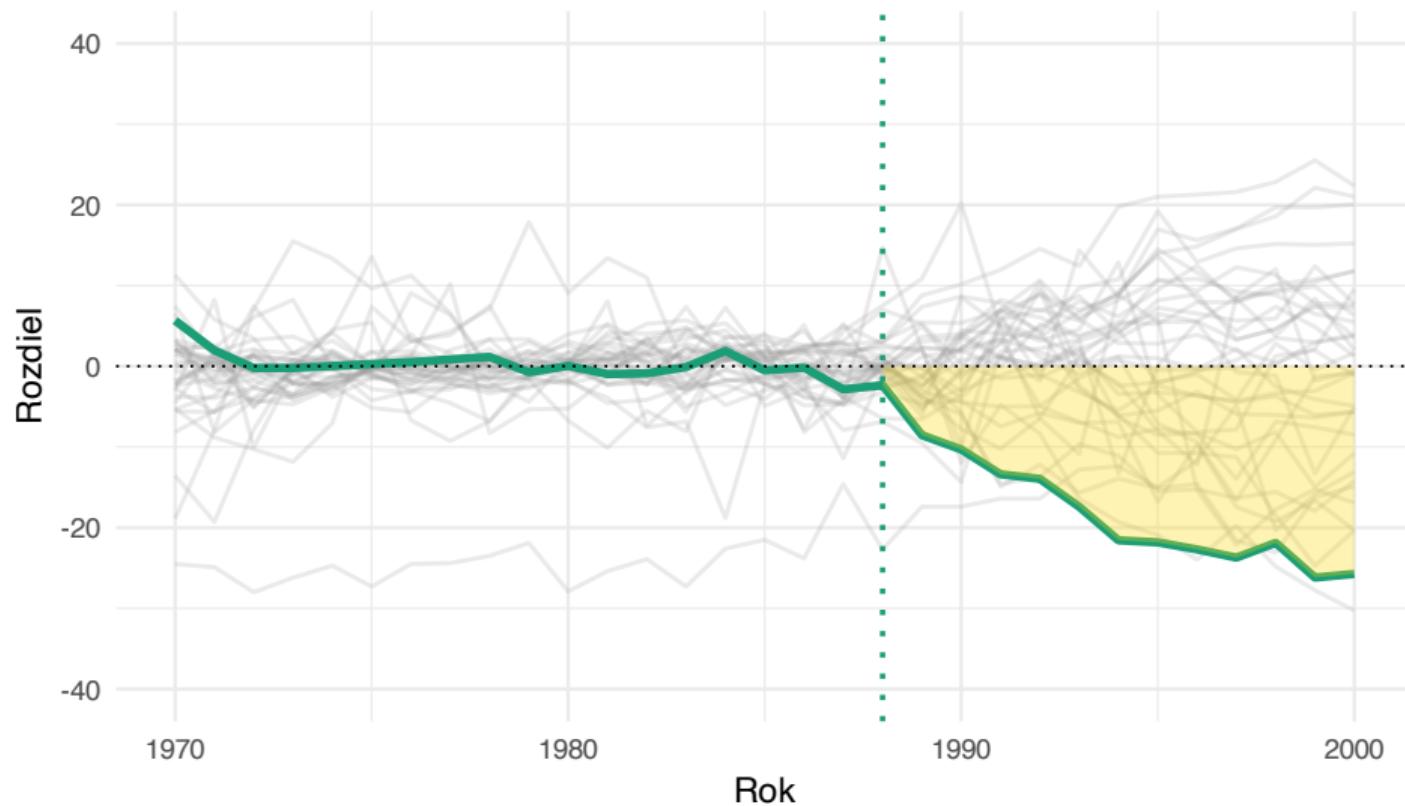








## Rozdiel medzi Reálnou a syntetickou Kaliforniou



# Ako nájsť váhy?

Ako nájsť váhy? Niečo, niečo, matematika.

Ako nájsť váhy? Niečo, niečo, matematika.

Chceme aby sa **Syntetická Kalifornia** podobala na **Ozajstnú Kaliforniu**.

Ako nájsť váhy? Niečo, niečo, matematika.

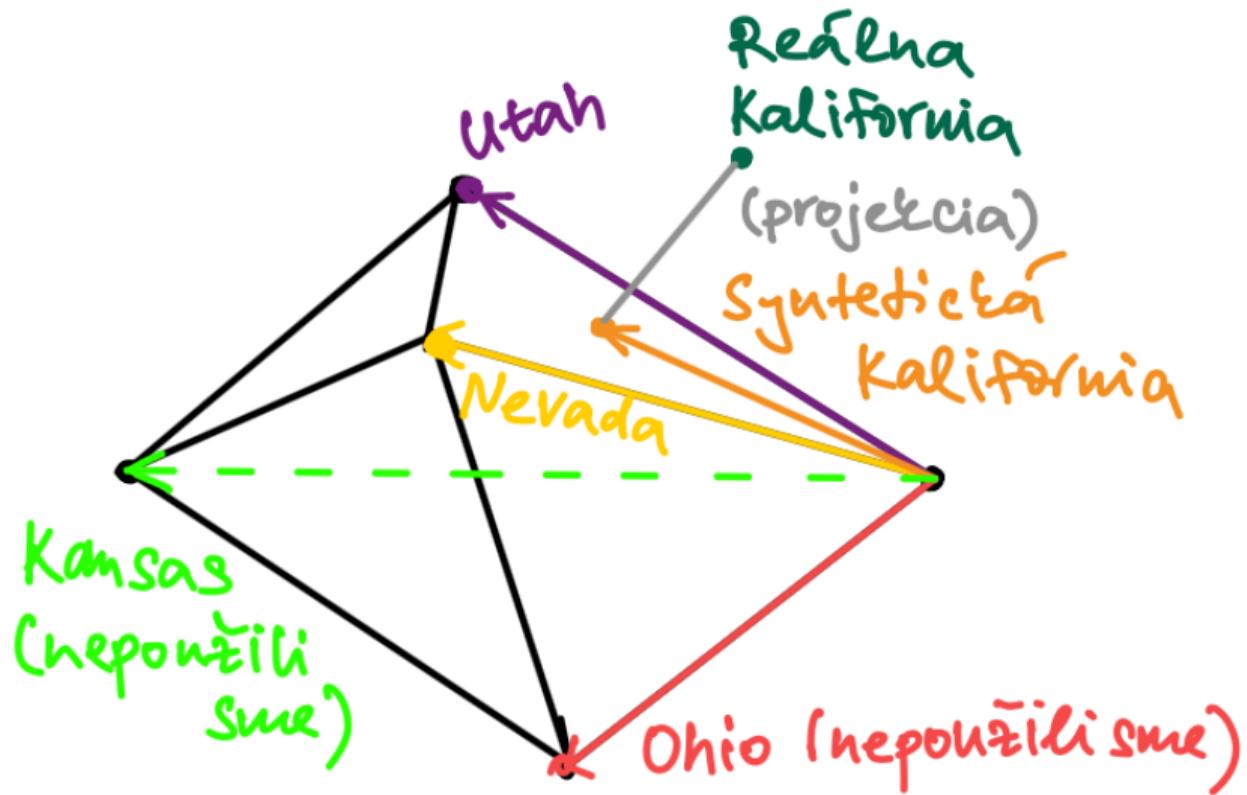
Chceme aby sa **Syntetická Kalifornia** podobala na **Ozajstnú Kaliforniu**.

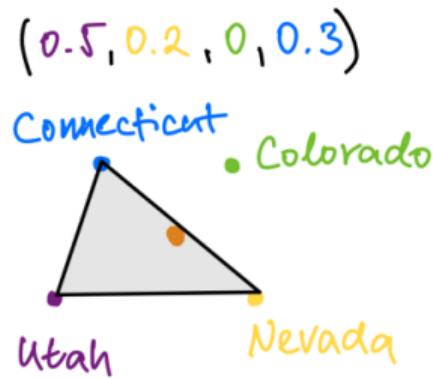
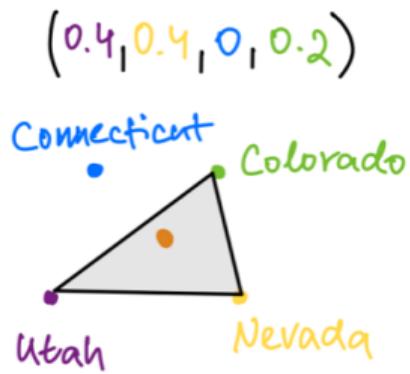
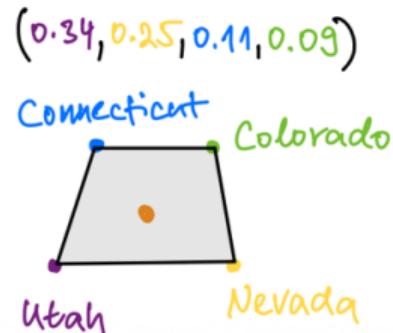
Nájdeme **váhy** tak, aby

$$\sum_{h=1}^k \text{dôležitosť}_h \cdot \left( \underbrace{X_{h1}}_{\text{Ozajská Kalifornia}} - \underbrace{\sum_{j=2}^{J+1} \text{váha}_j \cdot X_{hj}}_{\text{Syntetická Kalifornia}} \right)^2$$

bolo čo najmenšie.

- váha krajiny  $j$
- dôležitosť premennej  $h$





# Veľkosť efektu



- Aký efekt by sme očakávali?
- Ako presne meriame premennú, ktorá nás zaujíma?
- Efekt musí byť **veľký** takže ho nájdeme aj v zašumených dátach

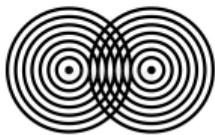
# Očakávania



- Čo ak je zmena očakávaná už skorej?
- Oznámenie zmeny je dôležité, nie implementácia

# Interferencia

- čo ak zmena ovplyvní aj okolité štáty?
- radšej z menšieho počtu ale rozumnejších jednotiek.



# Výhody



- žiadne divoké modelové predpoklady
- váhy sú zromumiteľné
- môžeme zafixovať váhy dopredu!
- sme blízko dát → metóda je jednoduchá!

Okrem toho

Okrem toho

[dramatická pauza]

Okrem toho

[dramatická pauza]

Táto metóda je veľmi vizuálna.

Okrem toho

[dramatická pauza]

Táto metóda je veľmi vizuálna.



Okrem toho

[dramatická pauza]

Táto metóda je veľmi vizuálna.



[pauza na smiech]

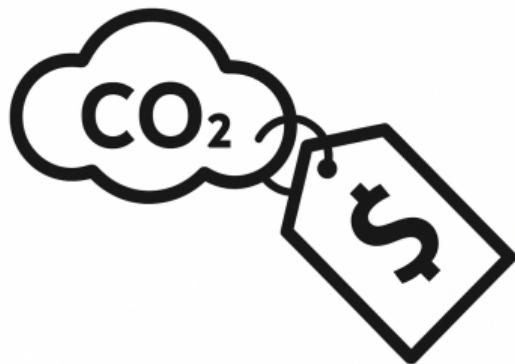
Vraciame sa k dôležitej otázke:

Vraciame sa k dôležitej otázke:

Ako urobiť **zmysluplné porovnanie?**

# Príklady

Uhlíková daň vo Švédsku



(Andreson, 2019)

Euro na Slovensku



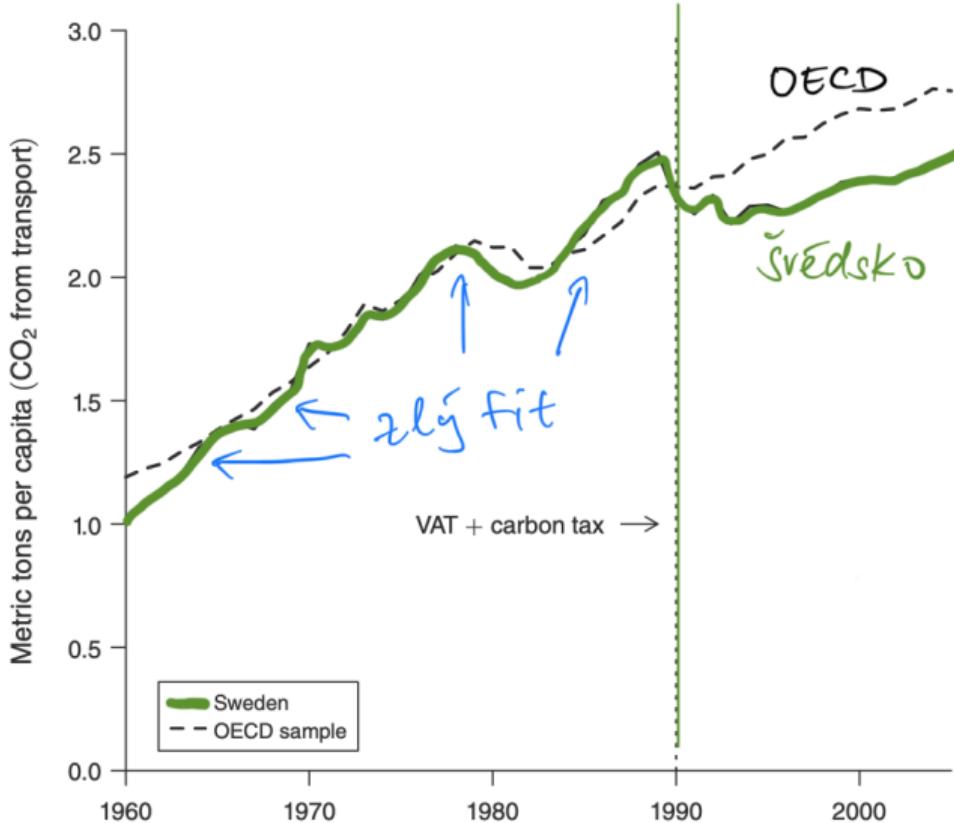
(Žúdel a Melioris, 2016)

Očkovacia lotéria v Ohio

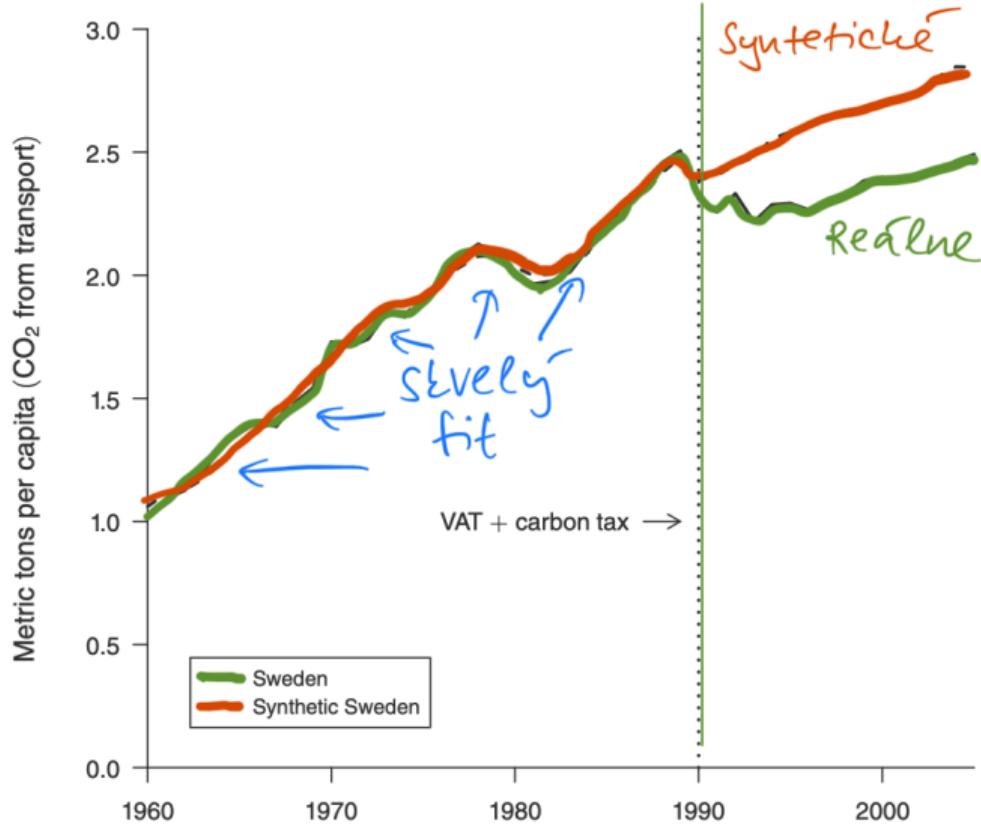


(Lang, Esbenshade a Willer, 2023)

# Príklad 1: Uhlíková daň vo Švédsku



# Umelohmotné Švédsko



# Skutočné Švédsko vs Umelohmotné Švédsko

| Variables                                      | Sweden   | Synth. Sweden | OECD sample |
|--|----------|---------------|-------------|
| GDP per capita                                 | 20,121.5 | 20,121.2      | 21,277.8    |
| Motor vehicles (per 1,000 people)              | 405.6    | 406.2         | 517.5       |
| Gasoline consumption per capita                | 456.2    | 406.8         | 678.9       |
| Urban population                               | 83.1     | 83.1          | 74.1        |
| CO <sub>2</sub> from transport per capita 1989 | 2.5      | 2.5           | 3.5         |
| CO <sub>2</sub> from transport per capita 1980 | 2.0      | 2.0           | 3.2         |
| CO <sub>2</sub> from transport per capita 1970 | 1.7      | 1.7           | 2.8         |

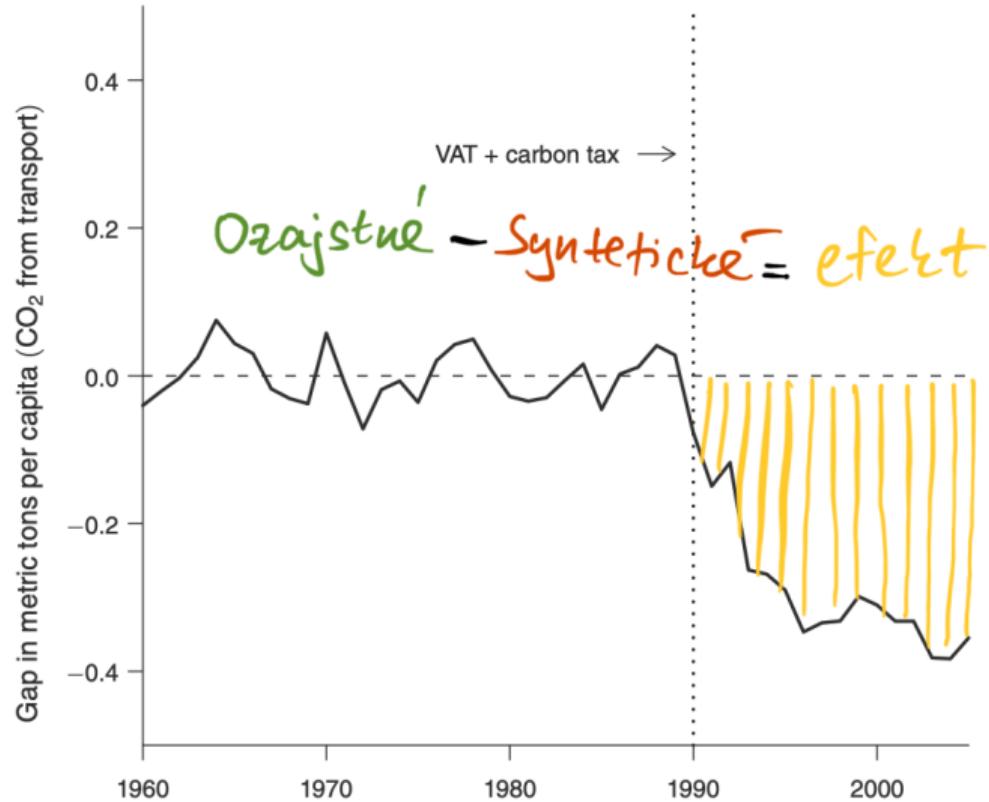
Andrersson (2019)

# Váhy

| Country   | Weight | Country       | Weight |
|-----------|--------|---------------|--------|
| Australia | 0.001  | Japan         | 0      |
| Belgium   | 0.195  | New Zealand   | 0.177  |
| Canada    | 0      | Poland        | 0.001  |
| Denmark   | 0.384  | Portugal      | 0      |
| France    | 0      | Spain         | 0      |
| Greece    | 0.090  | Switzerland   | 0.061  |
| Iceland   | 0.001  | United States | 0.088  |

Andrersson (2019)

# Efekty



# Placebo

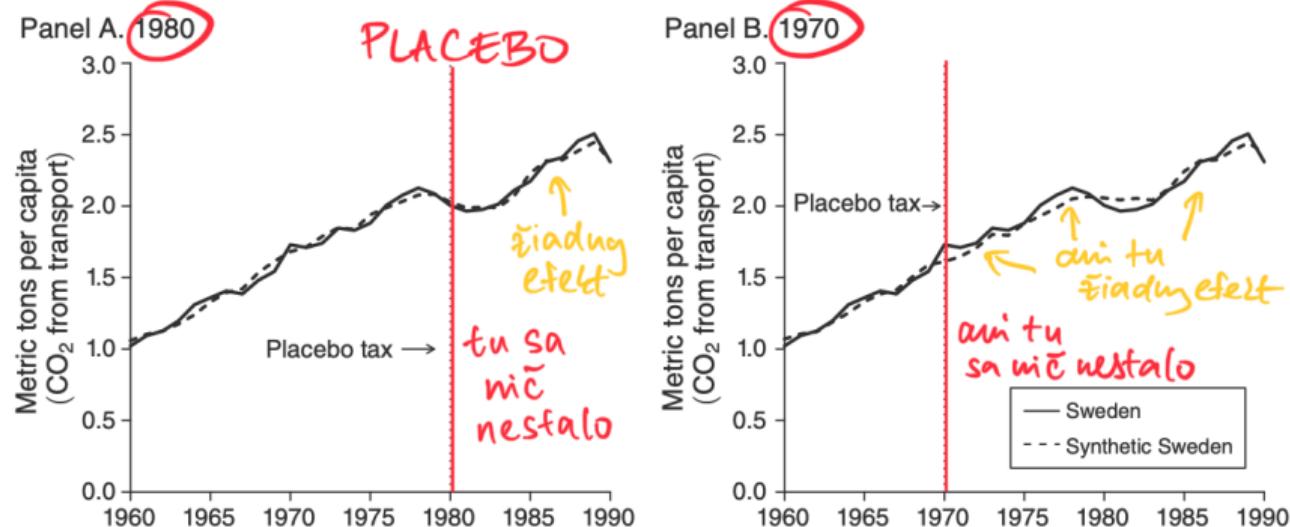
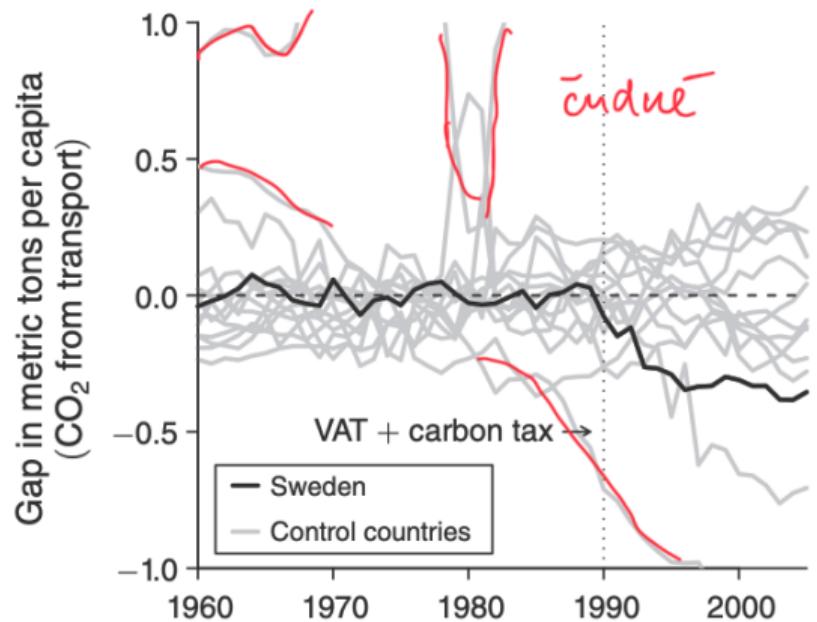
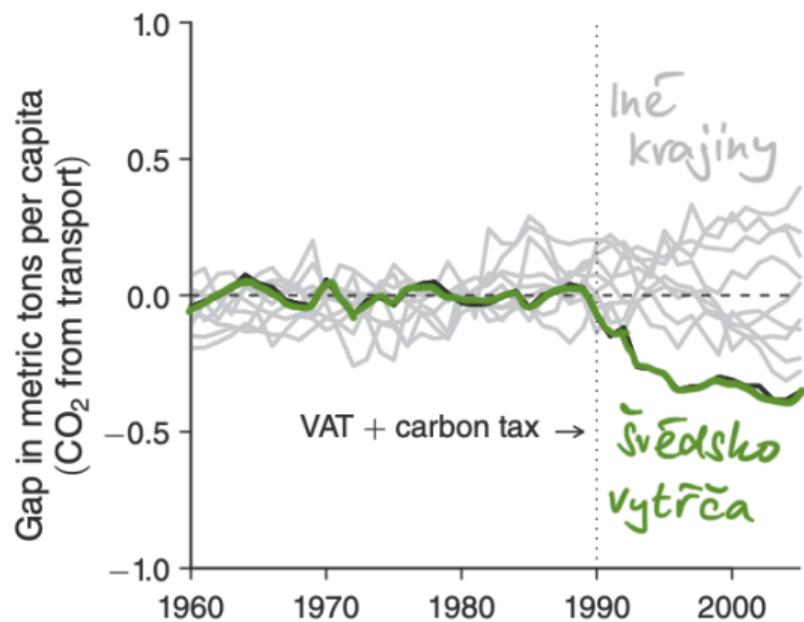


FIGURE 6. PLACEBO IN-TIME TESTS

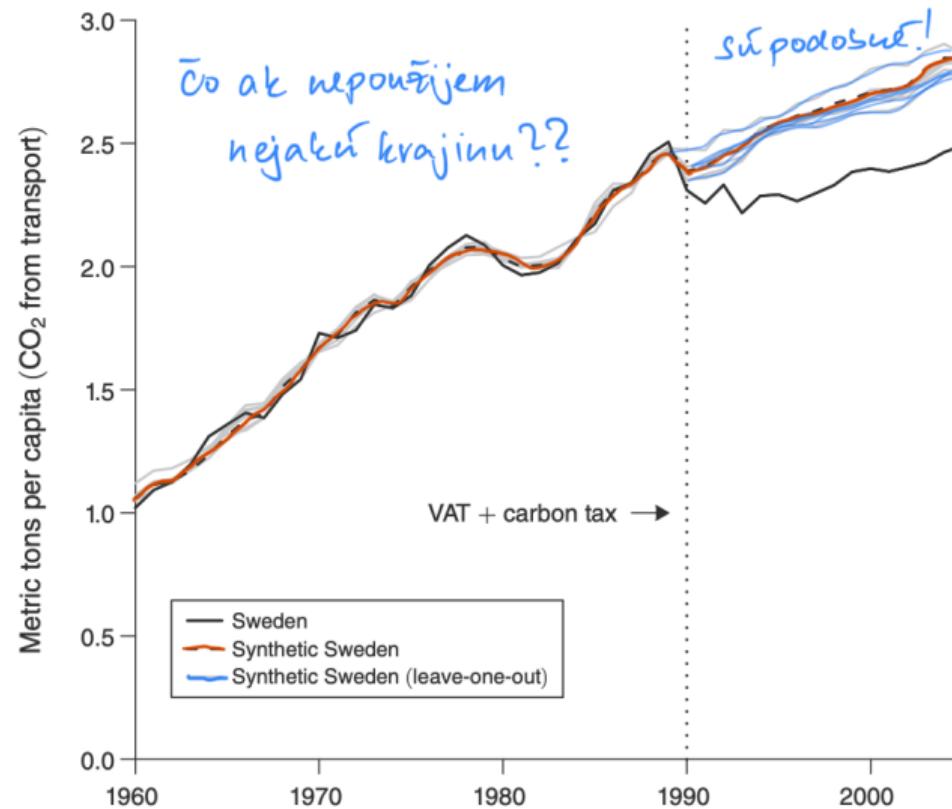
Panel A



Panel B

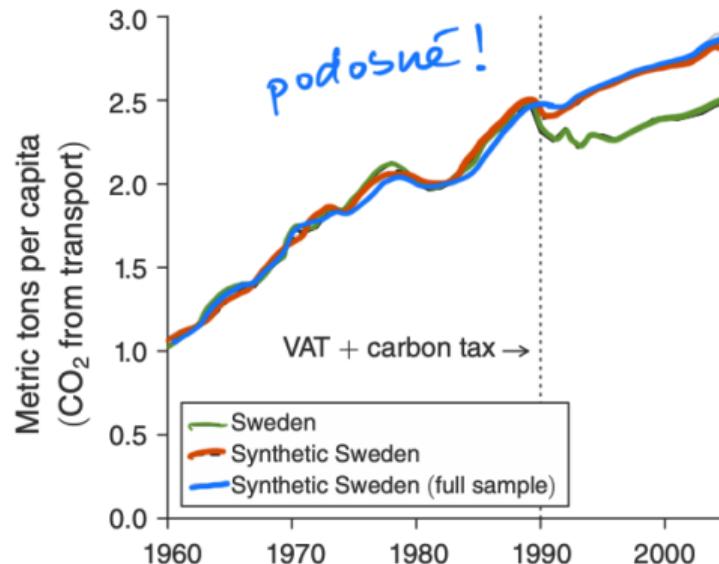


# Robustnost'

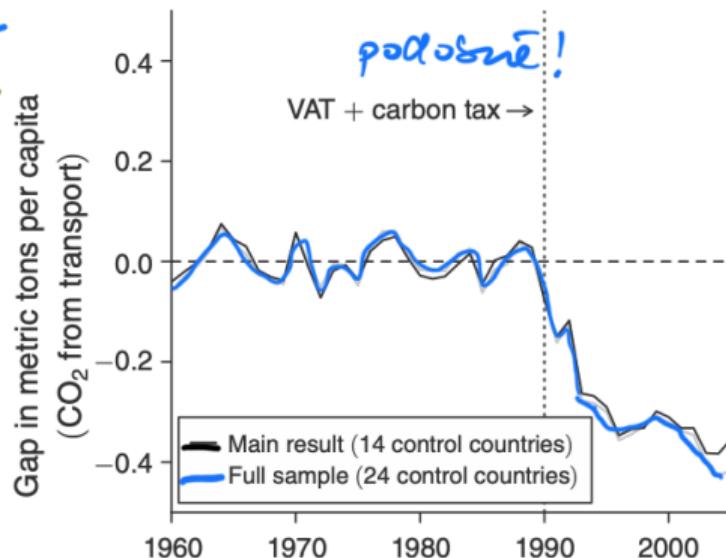


# Robustnost' (zasa)

Panel A

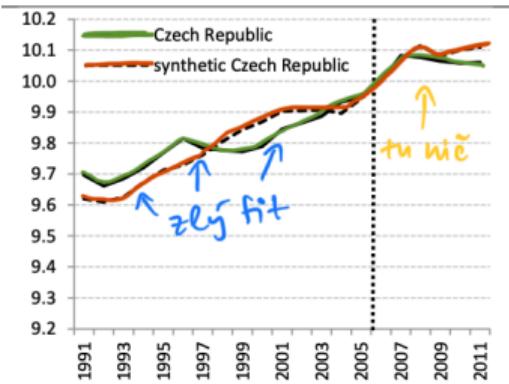
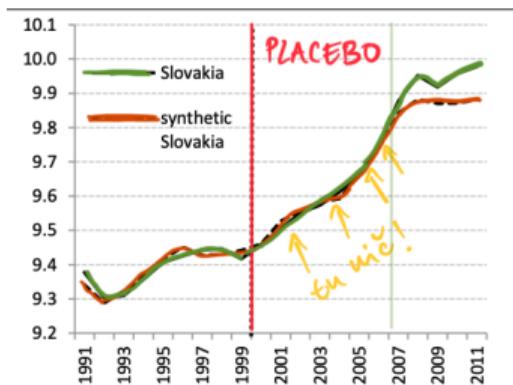
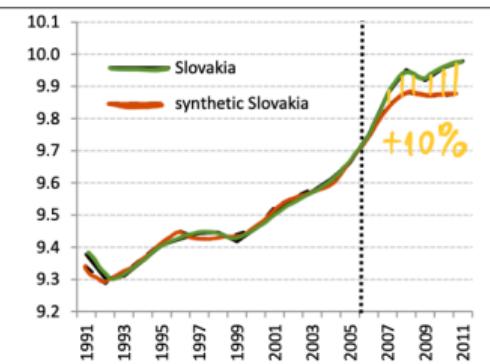


Panel B



# Euro na Slovensku

# Euro na Slovensku (2006 - vstup do ERM II)



# Ohio - vakcinačná lotéria

RESEARCH ARTICLE  

↙ !!!

## Did Ohio's Vaccine Lottery Increase Vaccination Rates? A Pre-Registered, Synthetic Control Study

David Lang<sup>1\*</sup> , Lief Esbenshade<sup>2</sup>  and Robb Willer<sup>3</sup> 

<sup>1</sup>Graduate School of Education, Stanford University, Stanford, CA, USA. Twitter: [@DavidnLang](#), <sup>2</sup>Graduate School of Education, Stanford University, Stanford, CA, USA. Twitter: [@liefEsbenshade](#) and <sup>3</sup>Stanford University, Stanford, CA, USA. Twitter: [@RobbWiller](#)

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RESEARCH ARTICLE  

Did Ohio's Vaccine Lottery Increase Vaccination Rates? A Pre-Registered, Synthetic Control Study

David Lang<sup>1\*</sup> , Lief Ebenshade<sup>2</sup>  and Robb Willer<sup>3</sup> 

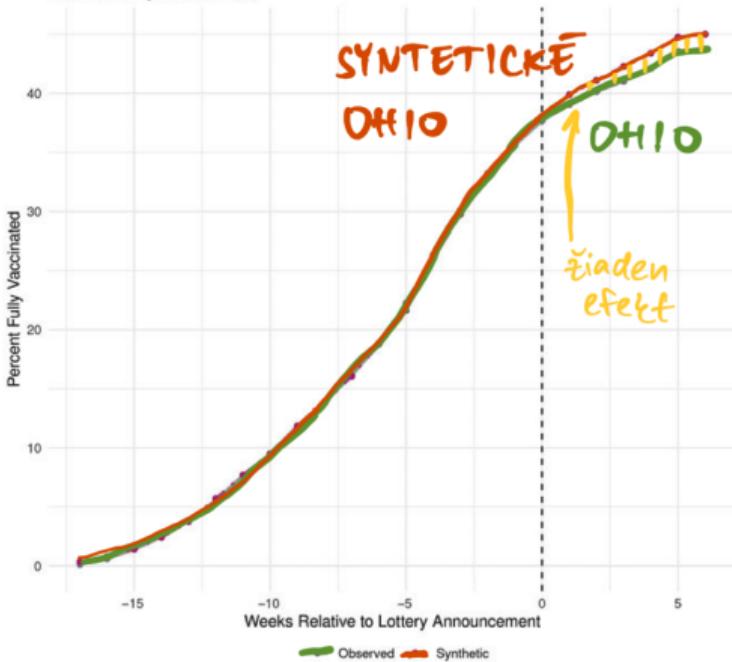
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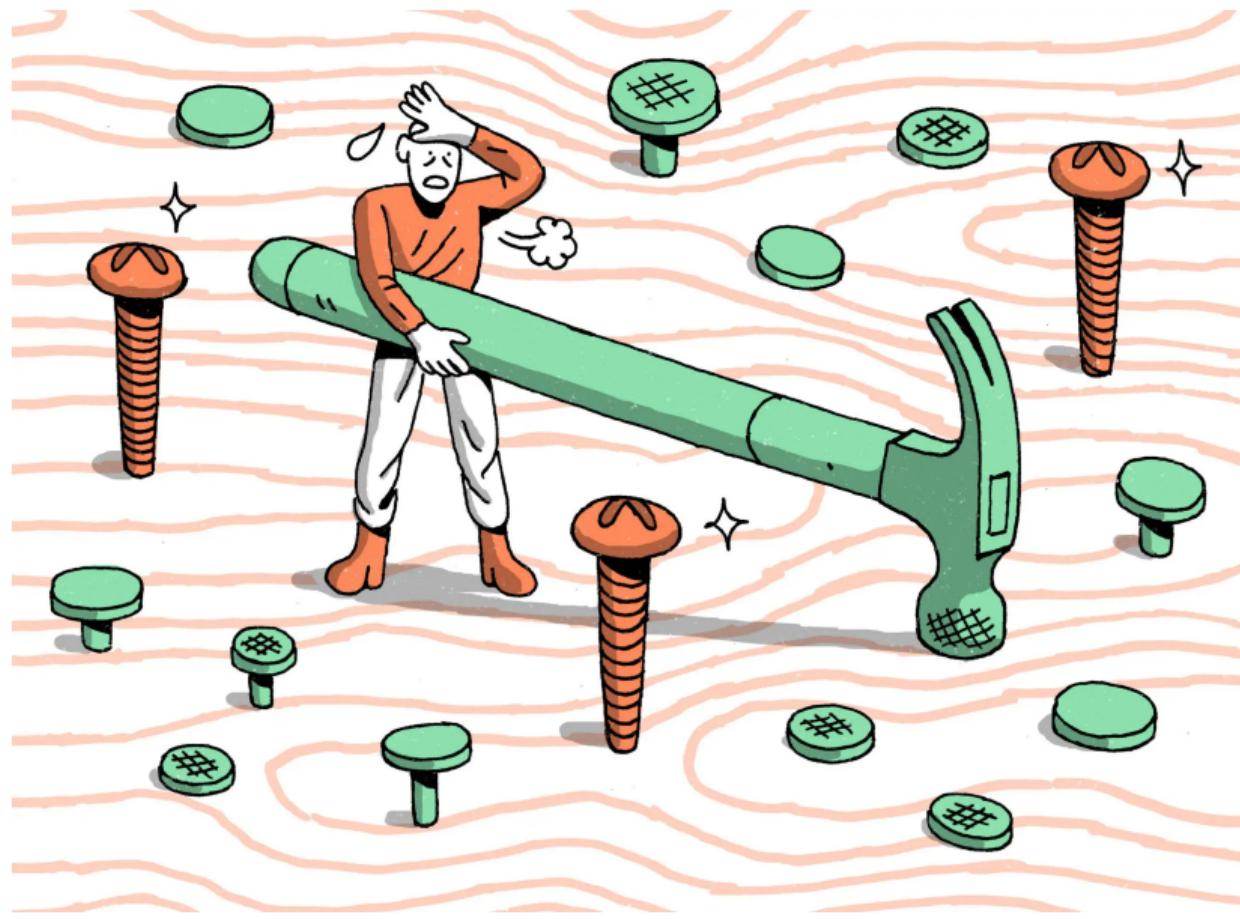
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### Abstract

Overcoming vaccine hesitancy is critical to containing the COVID-19 pandemic in the United States. To increase vaccination rates, the State of Ohio launched a million dollar lottery in May 2021. Following a pre-registered analysis, we estimate the effects of Ohio's lottery program *Vax-a-Million* on COVID-19 vaccination rates by comparing it to a "synthetic control" composed of eight other states. We find a statistically insignificant 1.3% decrease in the full vaccination rate in Ohio at the end of the lottery period. We investigate the robustness of our conclusion to model specifications through a multiverse analysis of 216 possible models, including longer time periods and alternative vaccination measures. The majority (88%) find small negative effects in line with the results of our pre-registered model. While our results are most consistent with a decrease in vaccination rate, they do not allow a firm conclusion on whether the lottery increased or decreased vaccine uptake.

Ohio and Synthetic Ohio





A = sibility  
E = tent

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# Synthetic Control Method



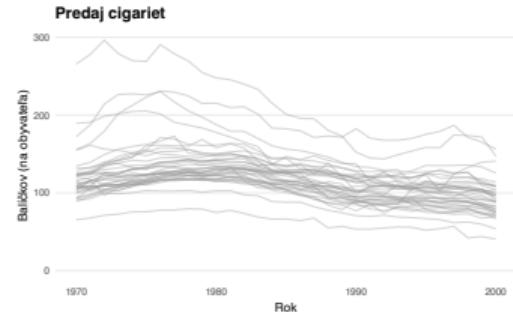
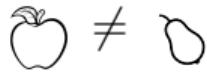
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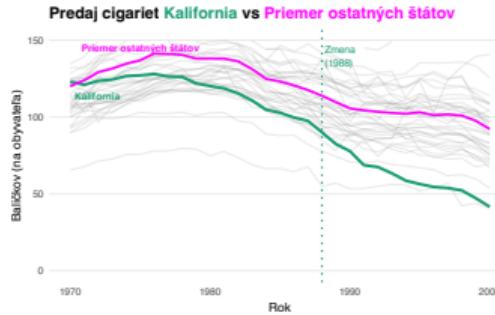
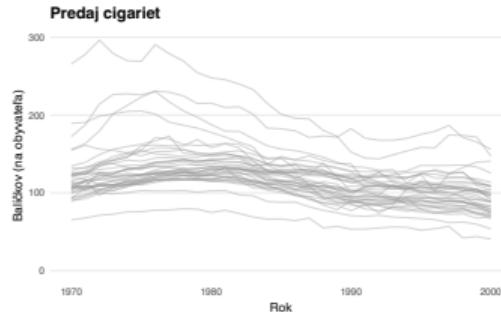
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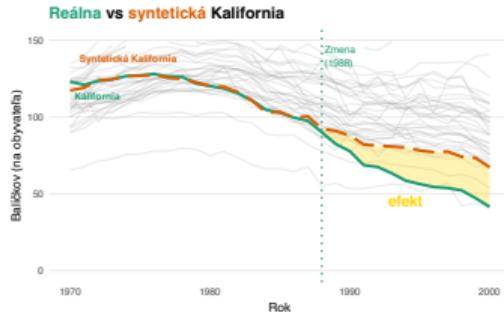
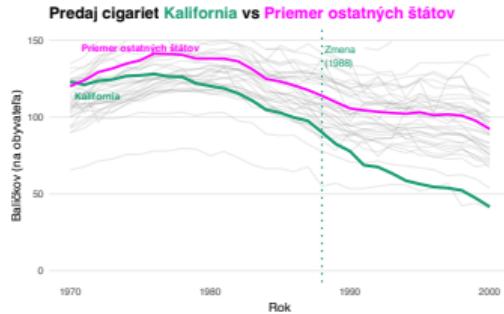
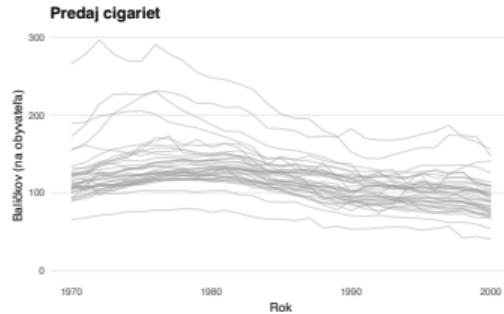
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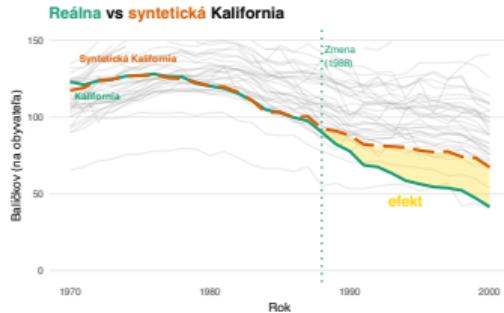
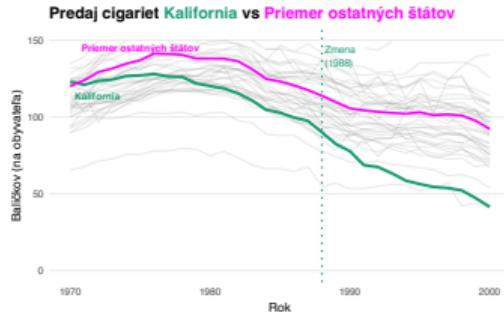
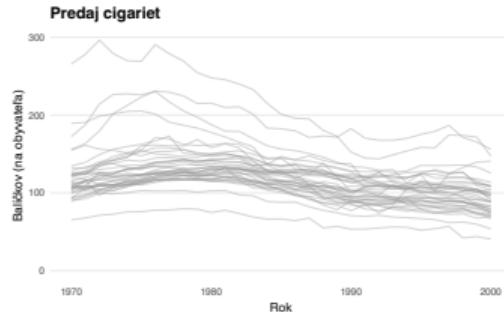
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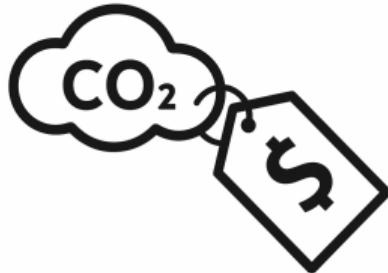
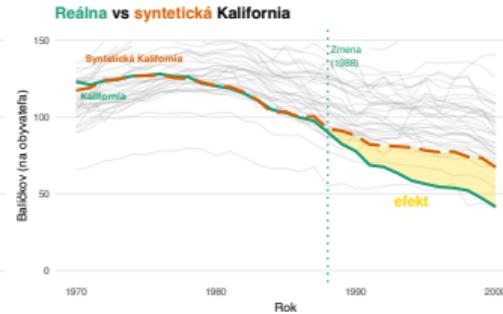
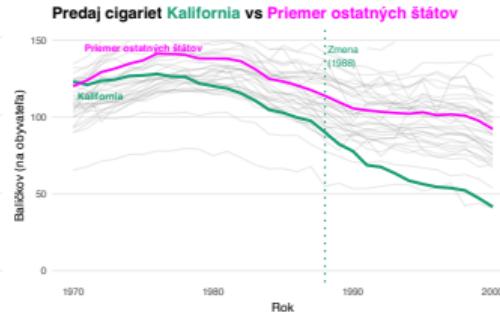
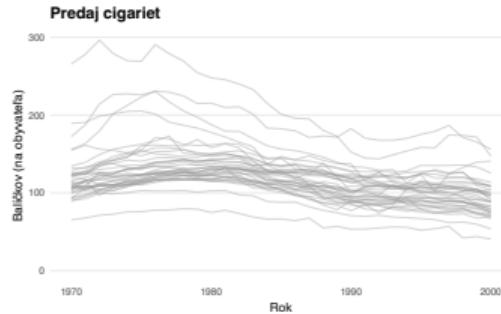
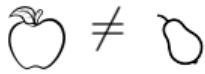
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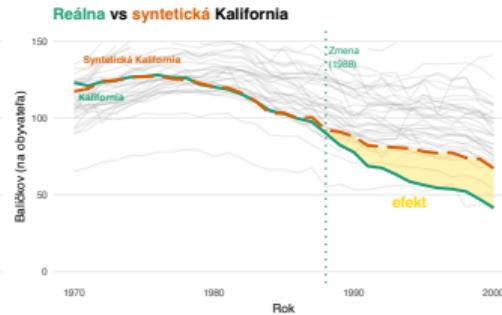
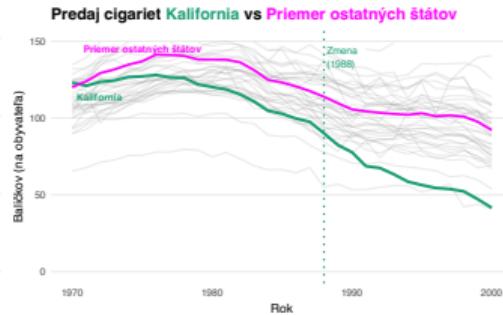
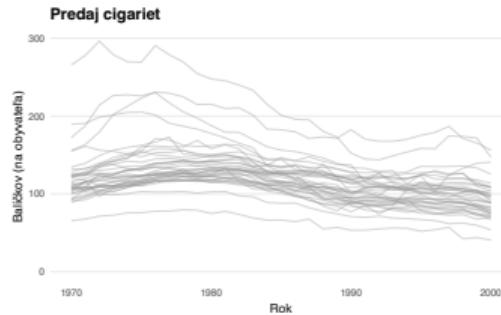
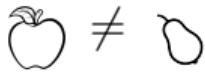


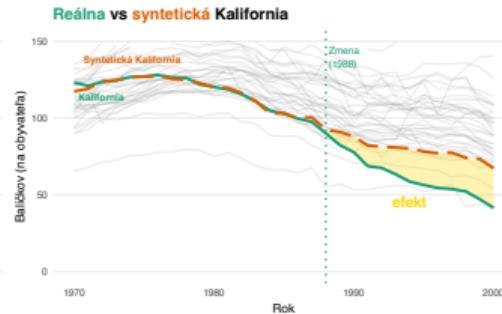
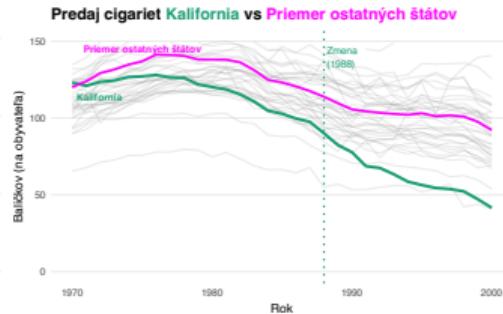
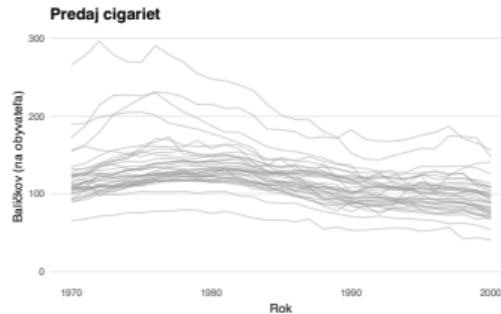
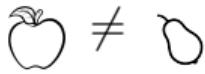


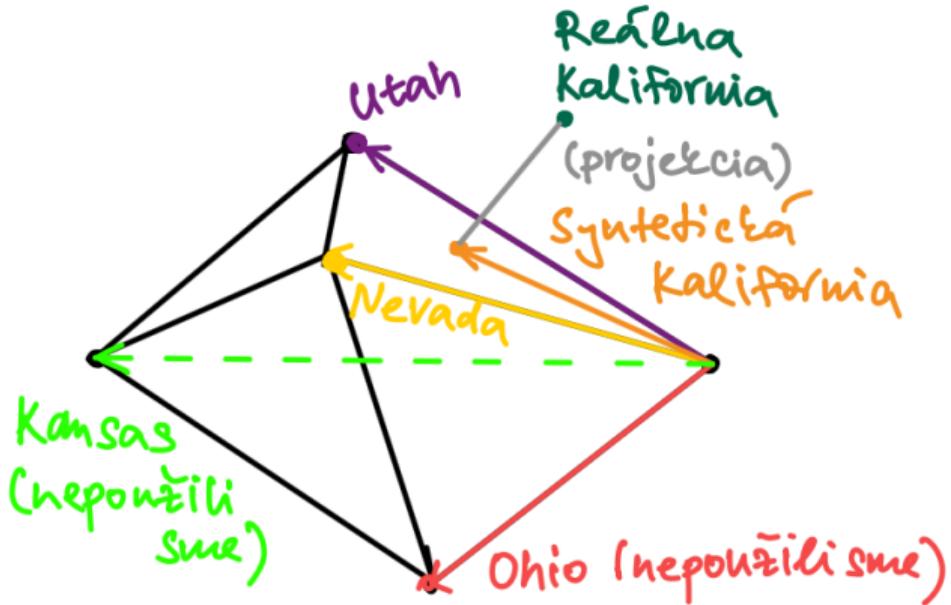
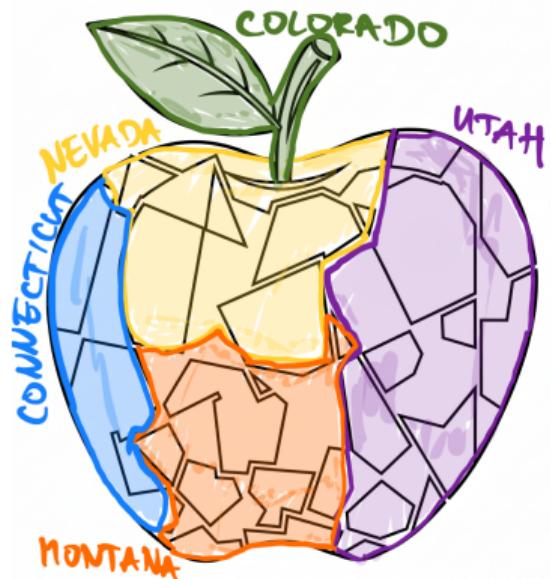












Ďakujem za pozornosť.

[lukaslaffers.github.io](https://lukaslaffers.github.io)

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