

**Maternal employment, time use, and overweight children:
A series of implications of legal marijuana sales**

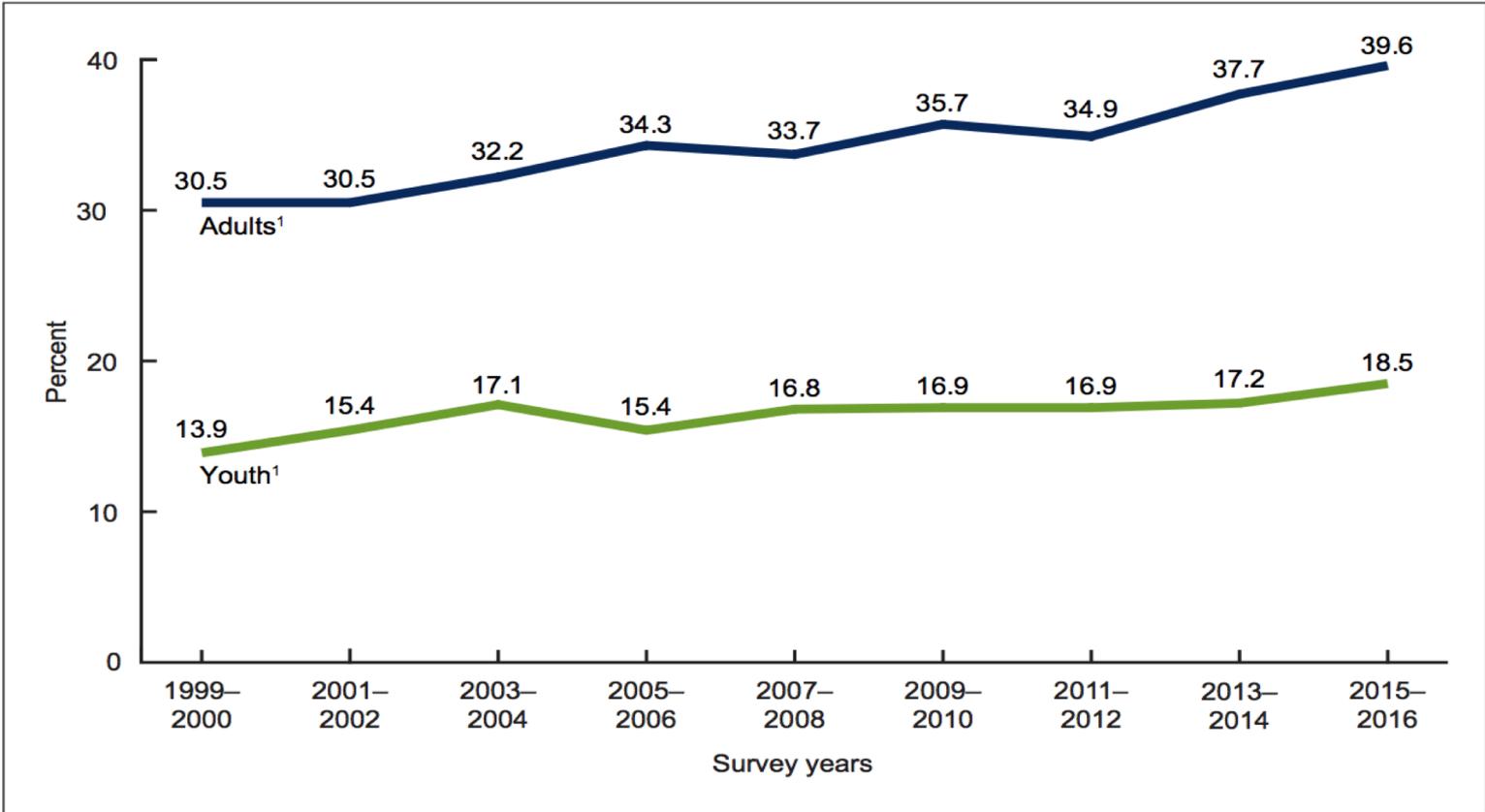
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**ASSA
January 2019**

Motivation

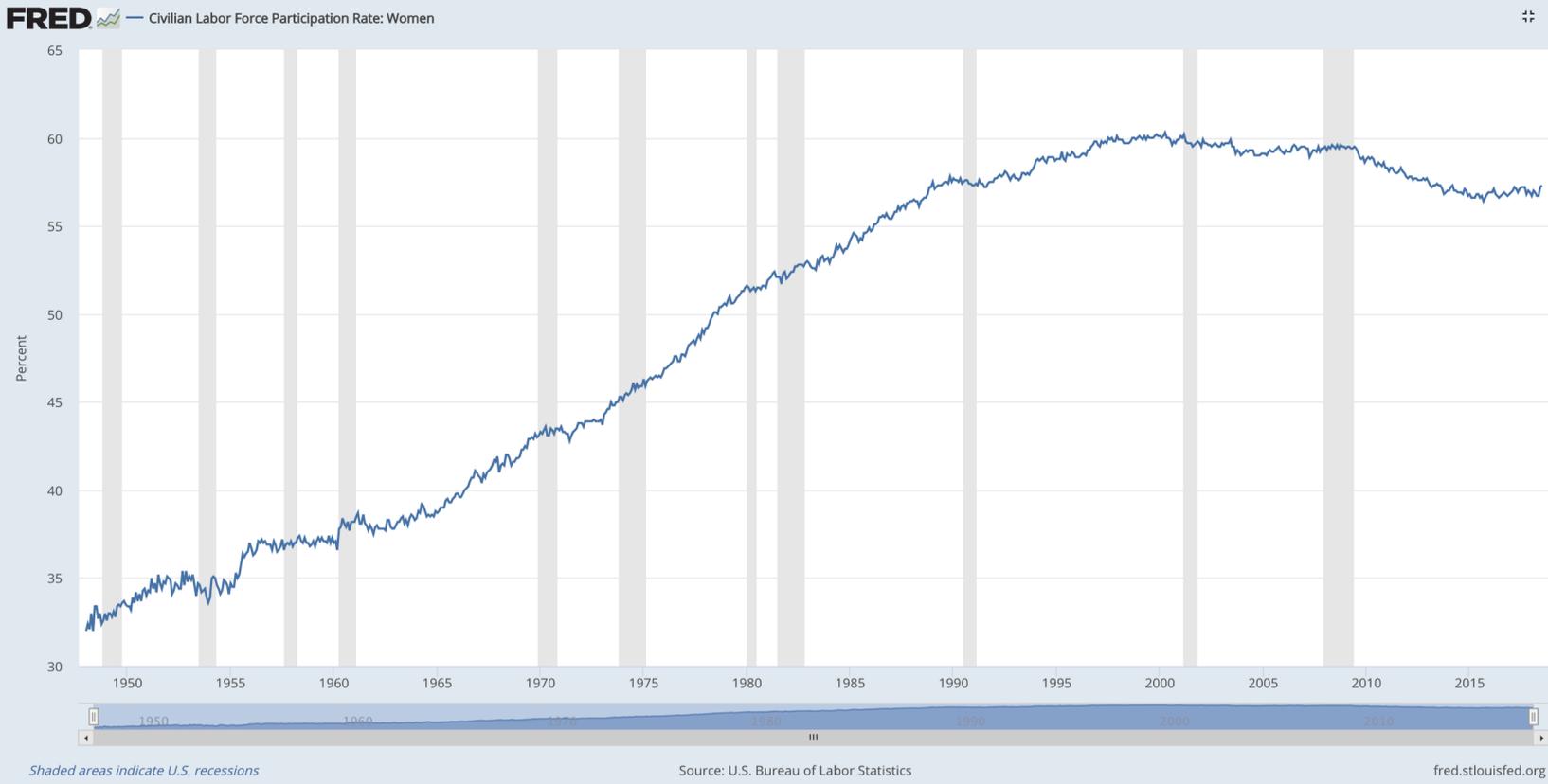
- Childhood obesity is a serious public health issue in US
- 20% of 6-19 year olds are obese, with an increasing trend
- Childhood obesity is linked to:
 - Adulthood obesity
 - Cardiovascular disease
 - Diabetes
 - Premature death
- \$315 billion annual cost, total healthcare costs: \$3.2 trillion

Trend in Obesity



¹Significant increasing linear trend from 1999–2000 through 2015–2016.
NOTES: All estimates for adults are age adjusted by the direct method to the 2000 U.S. census population using the age groups 20–39, 40–59, and 60 and over.
Access data table for Figure 5 at: https://www.cdc.gov/nchs/data/databriefs/db288_table.pdf#5.
SOURCE: NCHS, National Health and Nutrition Examination Survey, 1999–2016.

Women's Labor Force Participation



Parental Use of Time & Child Health

- Parental time, input to child well-being
- Lower cognitive abilities among kids whose mothers worked in years after birth (Ruhm 2004)
- Time spent by parents rather than money is important for child development
- Mothers working full time are more likely to have overweight kids (Anderson et al. 2003; Fertig et al. 2009)

What is the Mechanism?

- Cawley and Liu (2014)
 - American Time Use Study (ATUS)
 - Working mothers spend 17 and 10 fewer minutes cooking and eating with kids
 - Husbands do not make up for these time reductions
 - Limitation: Found no direct link to obesity due to changes in parenting behavior

- Anderson (2012)
 - ECLS-K, Class of 1998–1999
 - Maternal employment and family routine affect childhood obesity
 - Even after including family routines (*e.g.* bedtime and eating family meals) the link between maternal employment and childhood weight holds
 - Limitation: It was unknown whether the food was home-cooked or not

What is the Mechanism?

- Gillis and Bar-Or (2003), Ayala et al. (2008)
 - More meals eaten away from home leads to greater risk of a child being overweight or obese
- Powell and Nguyen (2013)
 - Food away from home leads to more energy-dense and caloric consumption
- Altman et al. (2015)
 - Randomized clinical trial
 - Meals eaten away from home ↓ → Quality of diet ↑ → BMI in treatment group ↓

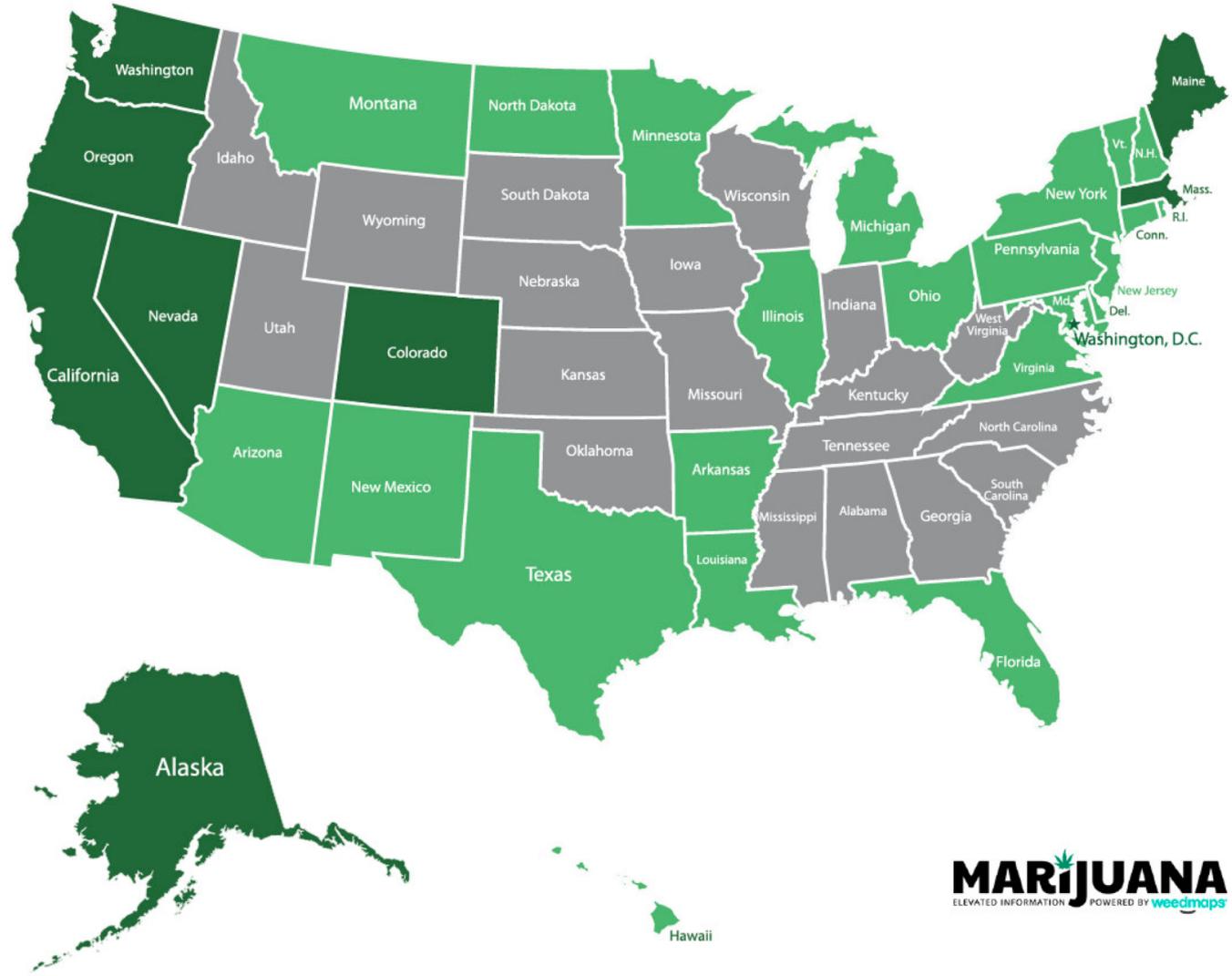
Endogeneity of Maternal Employment

- Maternal employment status might be linked to unobservable factors affecting childhood weight (endogeneity)

- Solution: IV estimation
 - Exogenous
 - Strongly correlated with maternal employment status

IV: Recreational Marijuana Legalization

Where in the US is Marijuana Legal?



- Recreational
- Medical
- No legal access

Method

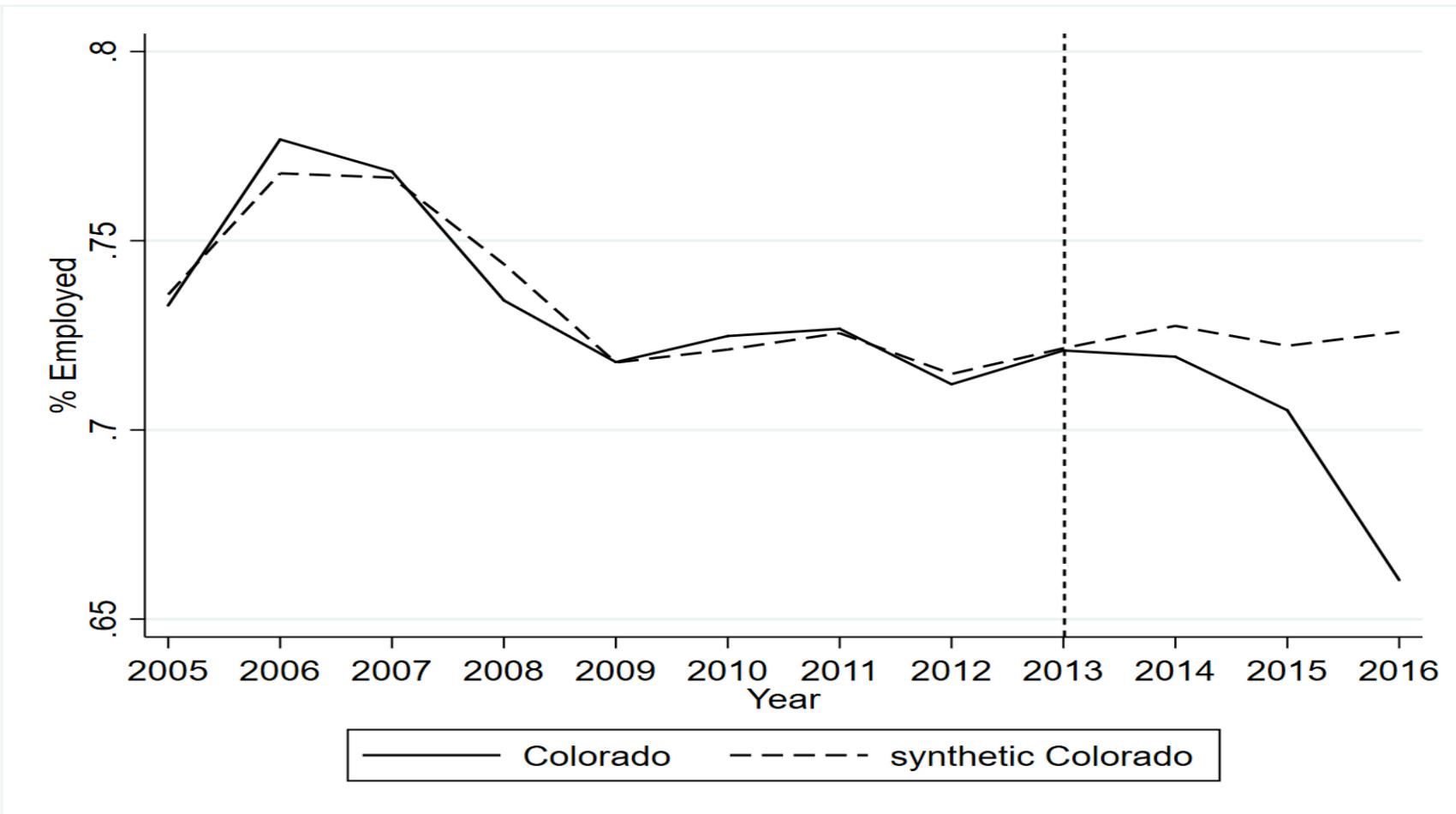
- Difference-in-Differences
 - Clustered standard errors
 - Wild bootstrapped standard errors
- Synthetic control approach
- Instrumental variable model

Data sources

- Four states we can study as a treatment group:

Colorado (1/1/14)	Washington (7/8/14)
Oregon (10/1/15)	Alaska (10/29/16)
- **CPS monthly data from 2005-2016**
 - Outcomes: out of labor force, employed
- **Early Childhood Longitudinal Study-Kindergarten: 2011 (ECLS-K)**
 - Outcome: Obesity
- **American Time Use Survey (ATUS) form 2005-2016**
 - Outcome: Time spent preparing meals at home, time spent eating outside of home with children, and other uses of time

Key finding: Employment rate for women with children ages 6-12



Three questions:

1. How robust is this finding?
2. What is the most plausible explanation?
3. What are some implications?

Employment results

Approach 1: DD with mothers in 4 states as treatment and residents of all other states as control groups with control variables (medical cannabis laws, minimum wage, various alcohol/tobacco tax rates, race, education)

	Not in labor force		Employed	
	Mothers 21-55	Mothers 21-55 with kids 6-12	Mothers 21-55	Mothers 21-55 with kids 6-12
Recreational marijuana	0.013*	0.029***	-0.011**	-0.026***
	(0.007)	(0.005)	(0.005)	(0.007)
Wild bootstrap p-value	[0.104]	[0.021]	[0.111]	[0.042]

Approach 2: DD with states allowing for medical cannabis as control group

Recreational marijuana	0.016**	0.024**	-0.013**	-0.021**
	(0.007)	(0.008)	(0.005)	(0.008)
Wild bootstrap p-value	[0.127]	[0.086]	[0.103]	[0.210]

Why the reduction in employment?

1. Mothers are negatively affected by cannabis consumption

Evidence: They actually use less

2. Mothers choose not to work in burgeoning cannabis sector

Evidence: Though growing, sector is comparatively small

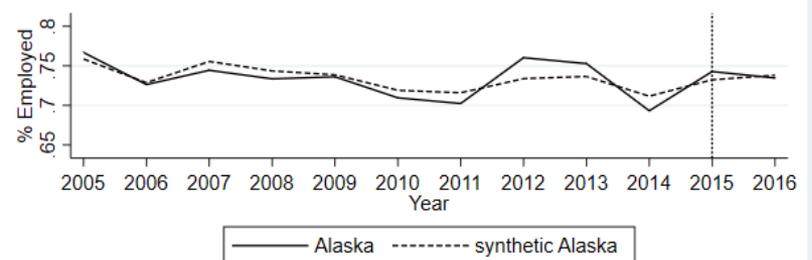
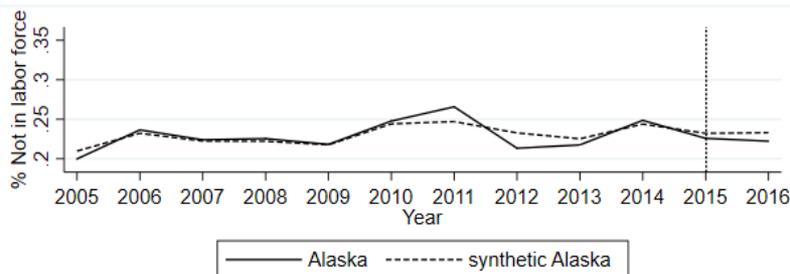
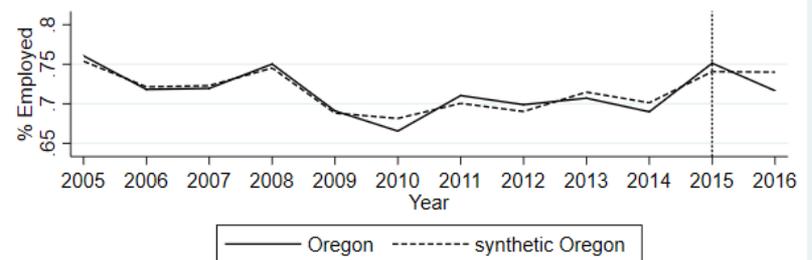
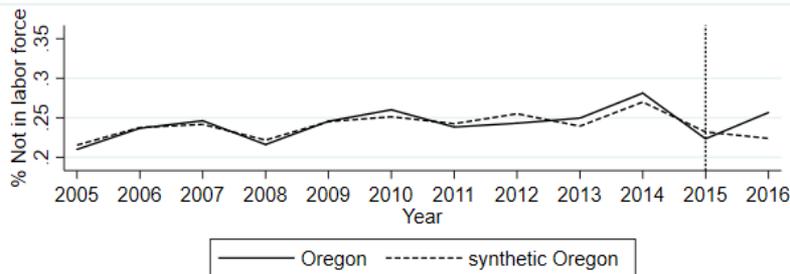
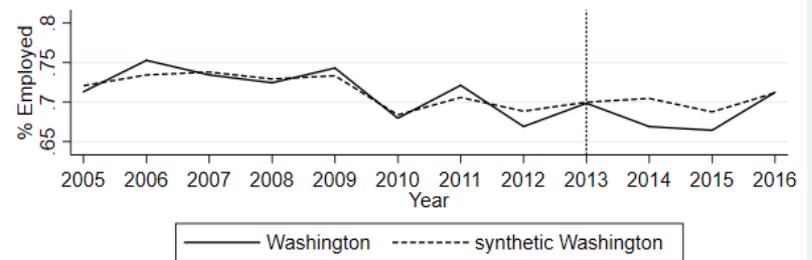
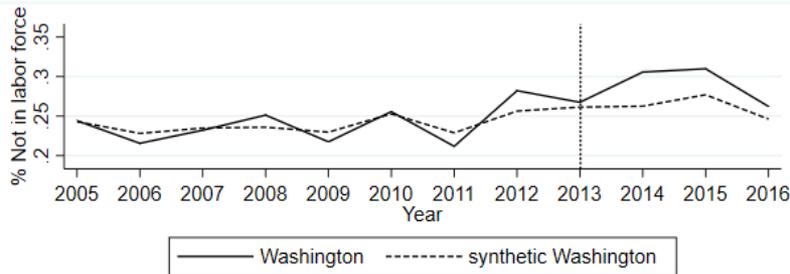
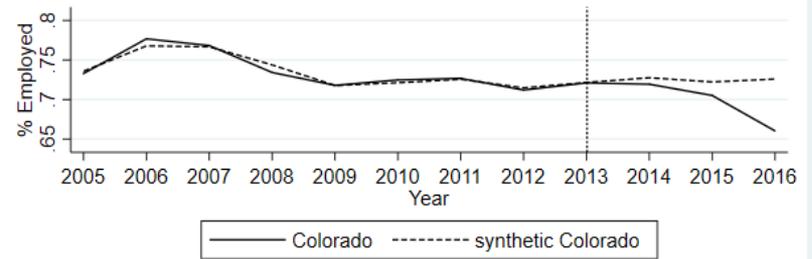
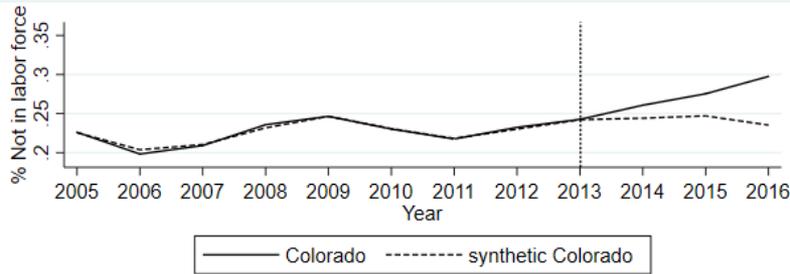
3. Mothers leave labor force to parent more vigilantly given increased cannabis availability

Evidence: Employment effects concentrated on mothers with young children

4. Increased labor supply of older workers pushing wages below younger mothers' reservation wages.

	Men & women 56-64 with no kids	
	Not in LF force	Employed
Recreational marijuana	-0.017** (0.006)	0.021** (0.008)
Wild bootstrap p-value	[0.109]	[0.086]

Synthetic control approach, Women 21-55 with kids 6-12

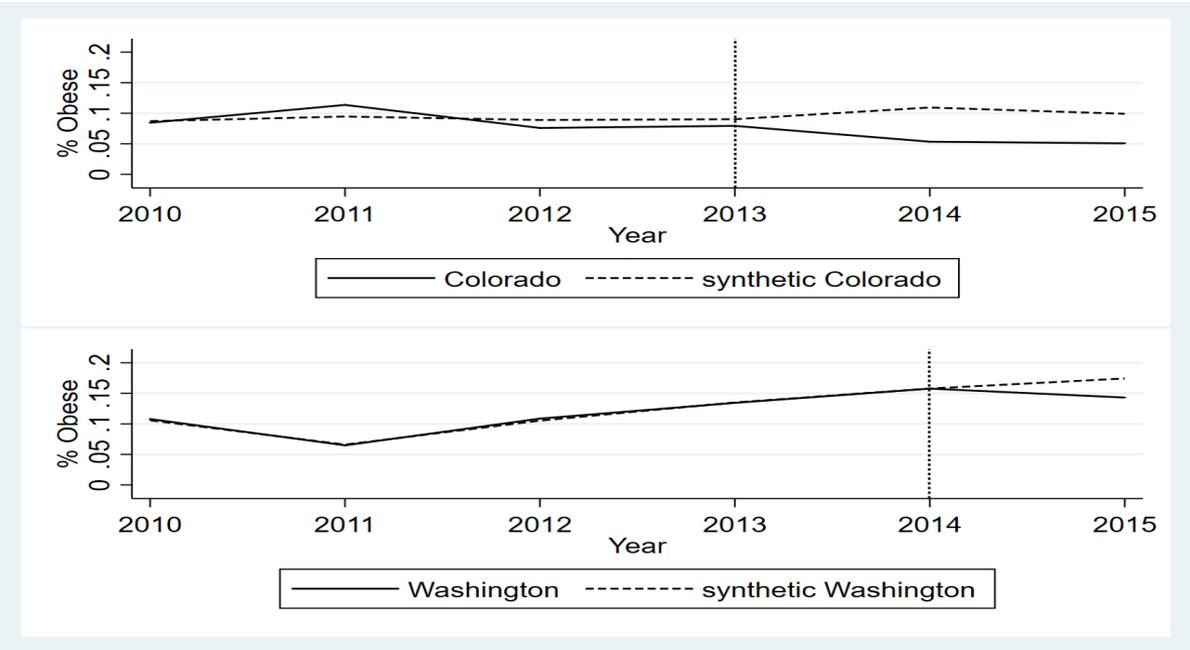


Obesity results (OLS)

Approach 1: Reduced form DD with school and child fixed effects

Panel A: All states	Basic model	School FEs	Child FEs
Recreational marijuana	-0.042*	-0.042**	-0.042*
	(0.022)	(0.020)	(0.025)
Panel B: States with medical cannabis laws			
Recreational marijuana	-0.041**	-0.036*	-0.041*
	(0.019)	(0.019)	(0.020)

Approach 2: Synthetic control



Obesity results (IV)

Approach 3: Two-stage least squares

States with Medical cannabis laws			
<u>First Stage</u>			
Effect of recreational marijuana sales on employment	-0.035** (0.011)	-0.068** (0.024)	-0.035** (0.012)
F-statistic of significance of excluded IV	10.04	7.90	8.25
<u>Second stage</u>			
Effect of employment on obesity	1.195*** (0.371)	0.547*** (0.168)	1.157*** (0.380)

Time Use

Effects on main parenting tasks related to obesity

Mothers 21-45		Women 21-45 with no child
Cooking Food	Dine out with kids	Cooking Food
18.854	-2.336	-0.027
(5.065)***	(0.616)***	(4.632)

Effects on other parenting tasks

Activities related to family/ child care					
childcare	Child at home	Child health	Child medical care	Eat at home	Grocery shopping
-9.361	9.886	-2.627*	-1.678*	2.028	4.442**
(6.828)	(12.514)	(1.544)	(0.967)	(1.918)	(2.168)
Activities related to one's self					
Tobacco and alcohol use	Personal care	Socializing	Sports	Television	Sleep
-0.268***	3.429	6.685	1.338	14.046***	2.664
(0.090)	(13.247)	(12.983)	(2.326)	(5.075)	(11.950)

Conclusions

- Recreational marijuana legalization reduces maternal labor force participation and employment
- Leads to a decline in childhood obesity by four percentage points
- Could be explained by mothers spending more time on cooking at home and less time dining out with kids