

經濟學研究些什麼？

(應用個體篇)

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Self-introduction

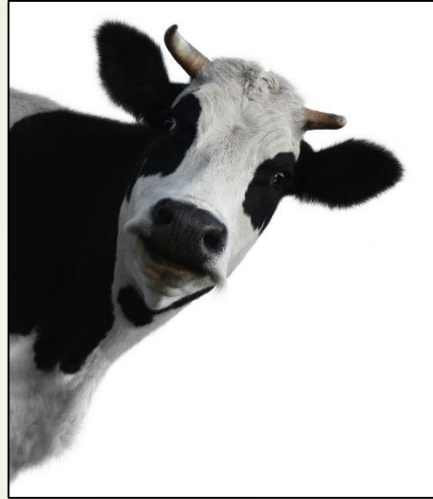
Elliott Fan (樊家忠)

Research interest:

- Applied microeconomics
- Economic history
- Family economics
- Labor economics



Causation and Correlation

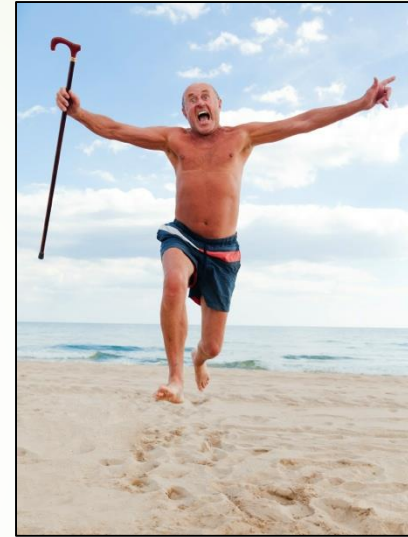


Buttercup



One study, from England, showed that cows who were named gave more milk than unnamed cows.

Causation and Correlation



The second study found that gamblers over 65 years of age are healthier than non-gamblers of the same age group.

Causation and Correlation

Causation: When one thing directly affects another

Example: pulling an all-nighter will make you tired

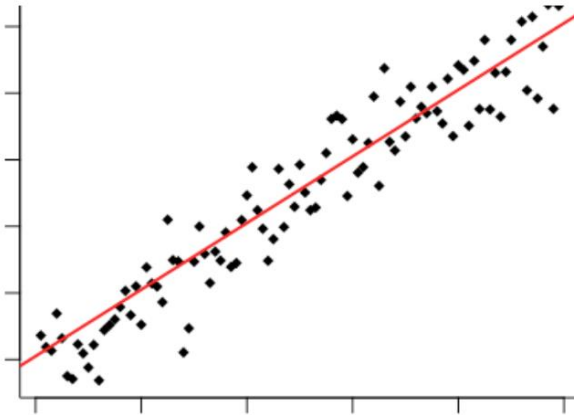
Definition of correlation

- Correlation describes the relationship between two or more **variables**
- A variable is a set of numbers

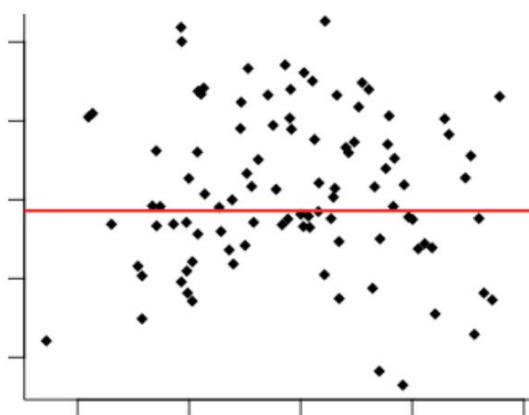
Correlation

For any two variables, the correlation can be:

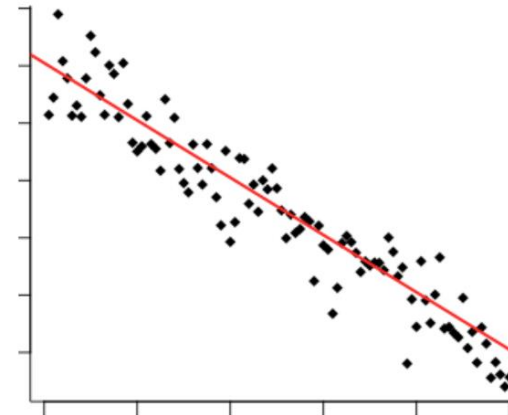
Positive



Neutral



Negative



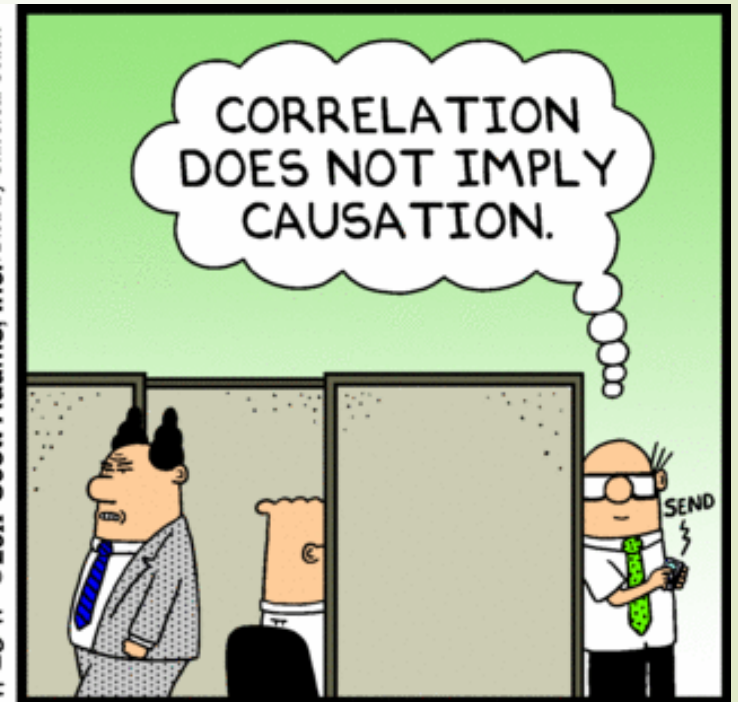
Correlation and causality



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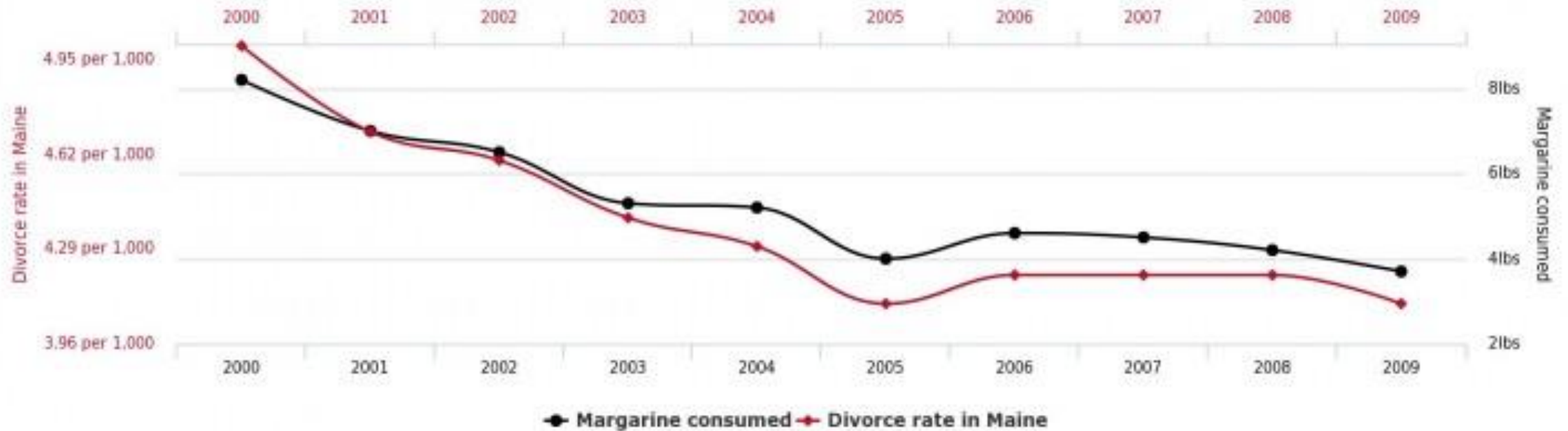
Correlation and causality



Some funny cases



Divorce rate in Maine correlates with Per capita consumption of margarine

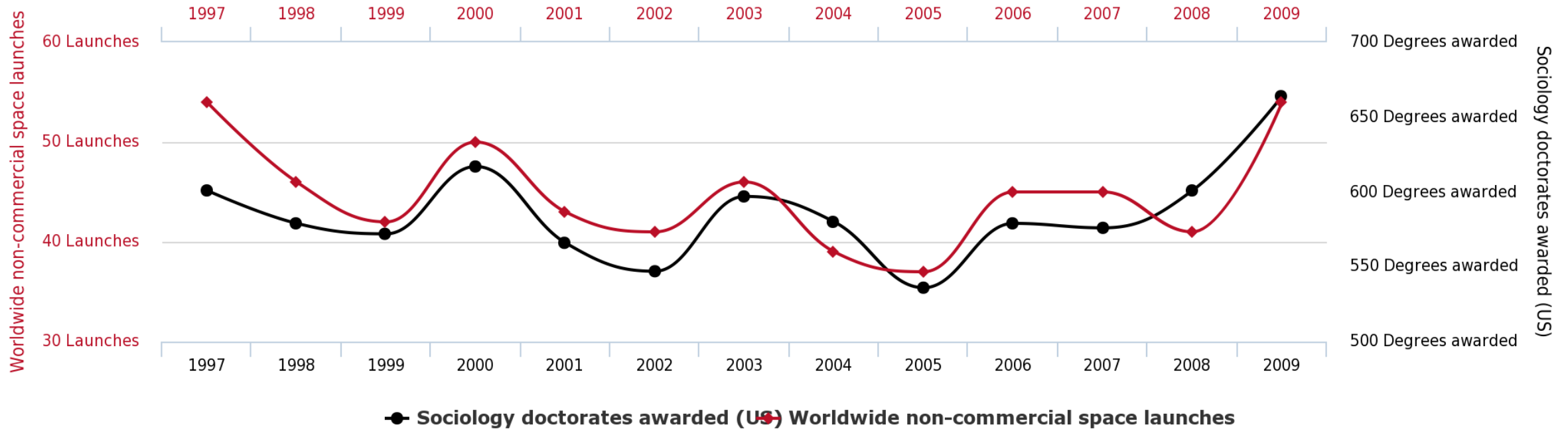


Some funny cases

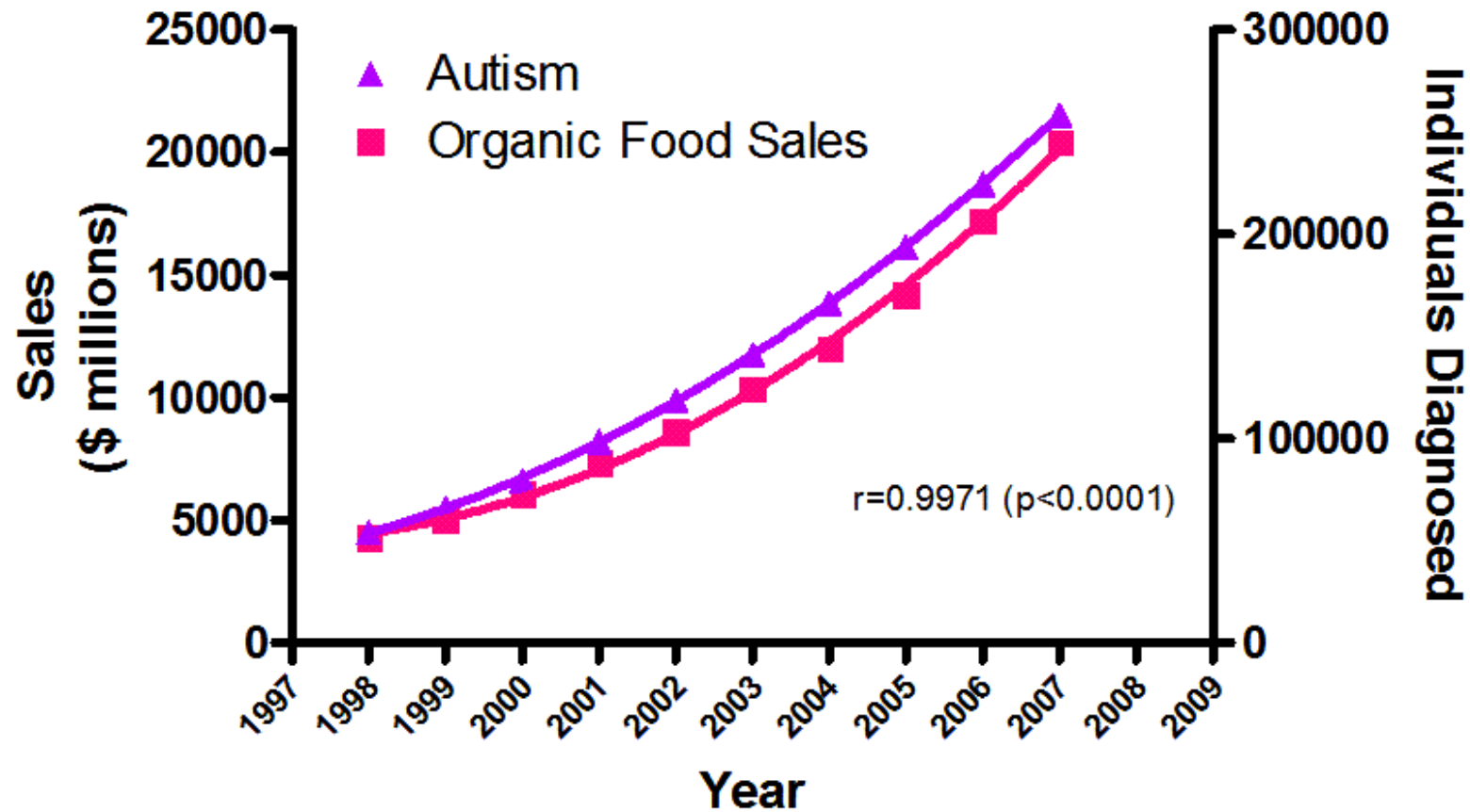
Worldwide non-commercial space launches

correlates with

Sociology doctorates awarded (US)



A tricky case



Sources: Organic Trade Association, 2011 Organic Industry Survey; U.S. Department of Education, Office of Special Education Programs, Data Analysis System (DANS), OMB# 1820-0043: "Children with Disabilities Receiving Special Education Under Part B of the Individuals with Disabilities Education Act"

Correlation and causality

Conclusion:

1. **Correlation does not imply causality**
2. **Third factor (omitted variable) that drives the correlation between the two variables**
3. **Reverse causality**

Causal inference

Why is causal inference more important than correlation?

1. For policy makers

- **Need to predict the outcomes**
- **Need to find out what went wrong**
- **Need to know how to adjust and by how much**

接種疫苗後死亡個案

- 直到2021.7.14，台灣接種 covid19 疫苗後死亡個案破400例 指揮中心：378例打AZ，24例打莫德納
- Is there causal relation?
- Time sequence does not imply causation

Causal inference

Why is causal inference more important than correlation?

2. For individuals

- **Need to predict outcomes of important decisions**
- **Dancers need to control weight**
- **Need to know how to adjust and by how much**

Difficulty in estimating causation

- Estimating the causal effect of A on B is generally difficult
- The main goal of **applied microeconomics**
- One important field of economic research focused on evaluation of **policy effectiveness**

Policy effectiveness

- **Intended effects (希望得到的效果)**
- **Unintended effects (意外效過)**

Intended effects of policies

- **The impacts of a policy depend on how private entities respond to it**
- **In some extreme cases, policies are 100% neutralized due to private responses**

Unintended consequences of policies

- **Unintended consequences are not uncommon**
- **Evaluating policy effects is in general NOT straightforward**

Case I: Strategic Divorce in Spain



Case I: Strategic Divorce in Spain

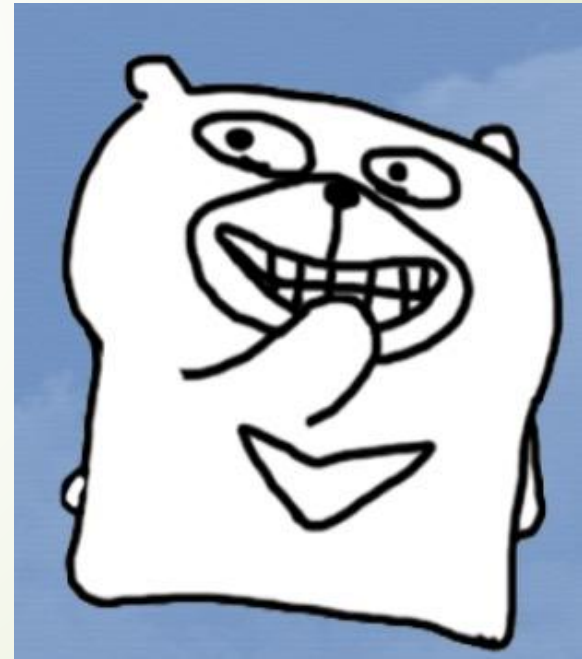
- **The 2004 changes in Spanish divorce law require only a six-month waiting period in uncontested cases and no separation of living arrangements before the divorce becomes final**
- **Preference for a place in good public schools has been given to children of divorced parents**

Case I: Strategic Divorce in Spain

- **Some parents are filing for divorce in January and February.**
- **The parents re-marry shortly after the child is safely in a desirable school in September.**

Case I: Strategic Divorce in Spain

- Even worse, some couples ended up with *actual* divorce.....
- A false trick becomes true (假戲真做)



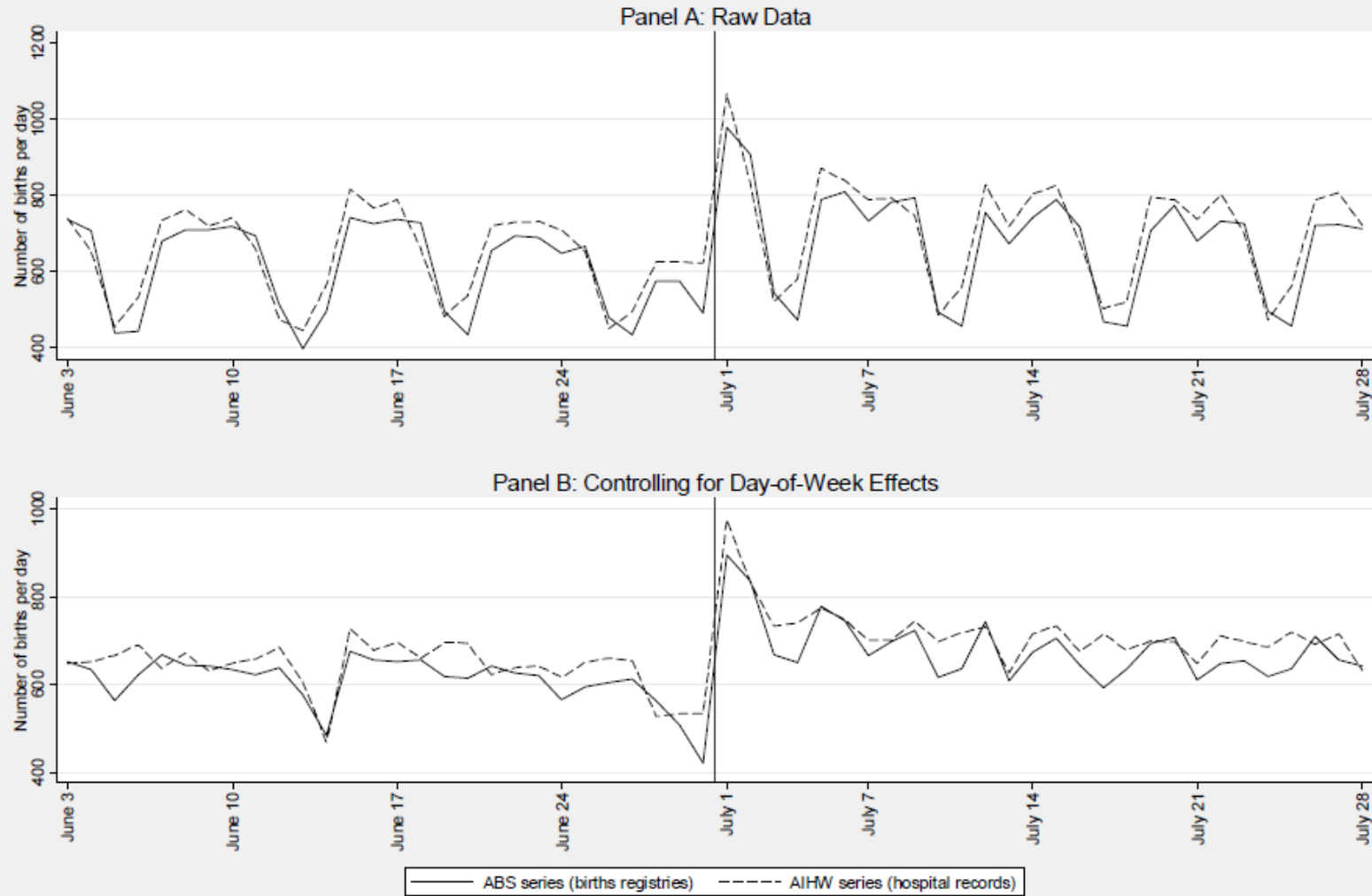
Finally!

Case II: Born on the 1st of July

- In May 2004, Australian government announced the Baby Bonus plan to be implemented on 01/07/2004.
- Children born on or after that day are entitled to AU\$3,000.



Figure 2: Comparing ABS and AIHW Births Data (2004)



Case II: Born on the 1st of July

- **The cash transfer induced hundreds of parents to schedule planned births from days before 01/07 to days after.**
- **The same phenomenon happened again on 01/07/2006 when the benefit was raised to \$4,000.**

Case III: Paternal leave in Spain

**What would happen if you leave
the kid with father?**



Outcome #1



Outcome #2



Outcome #3



Outcome #4



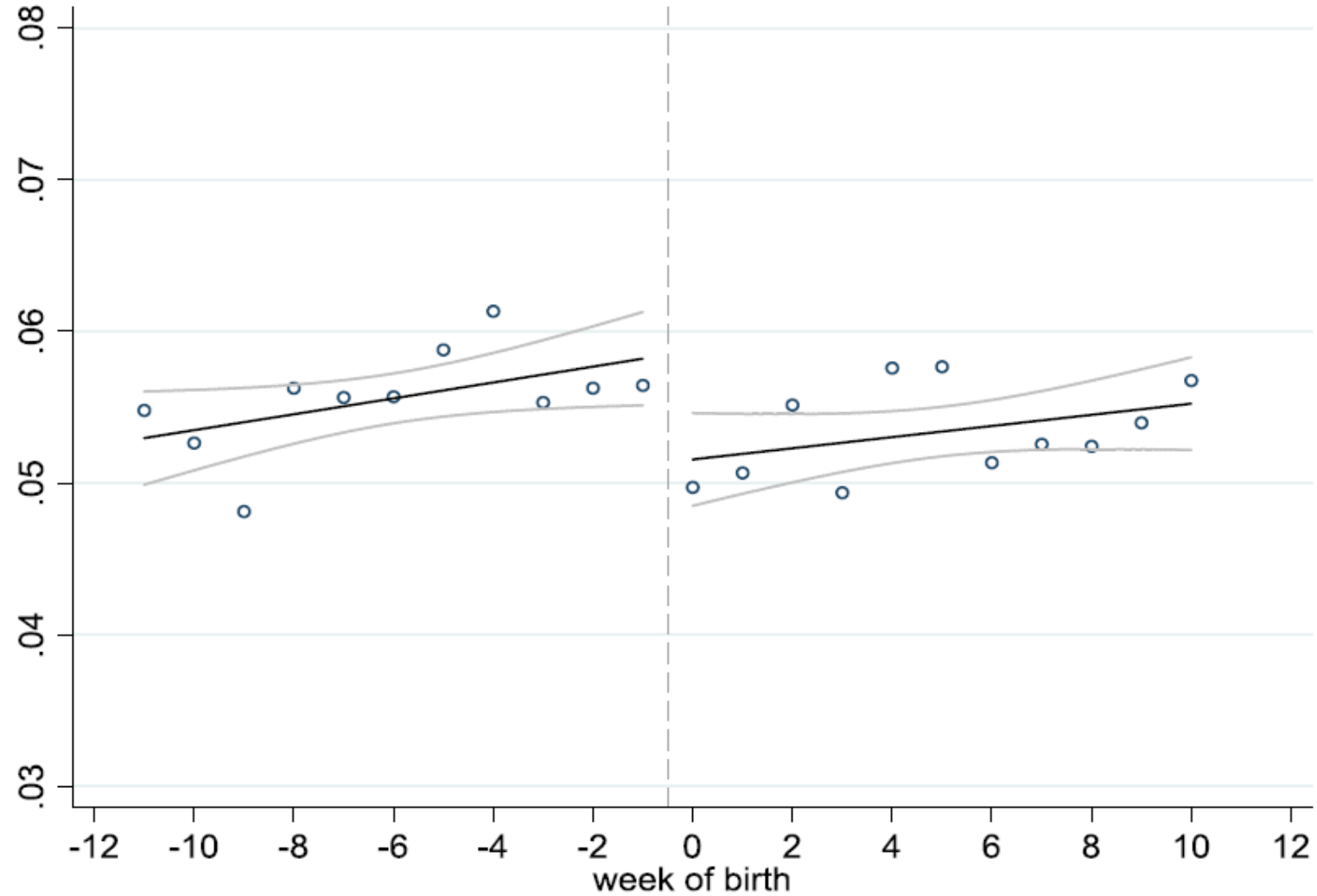
Outcome #5



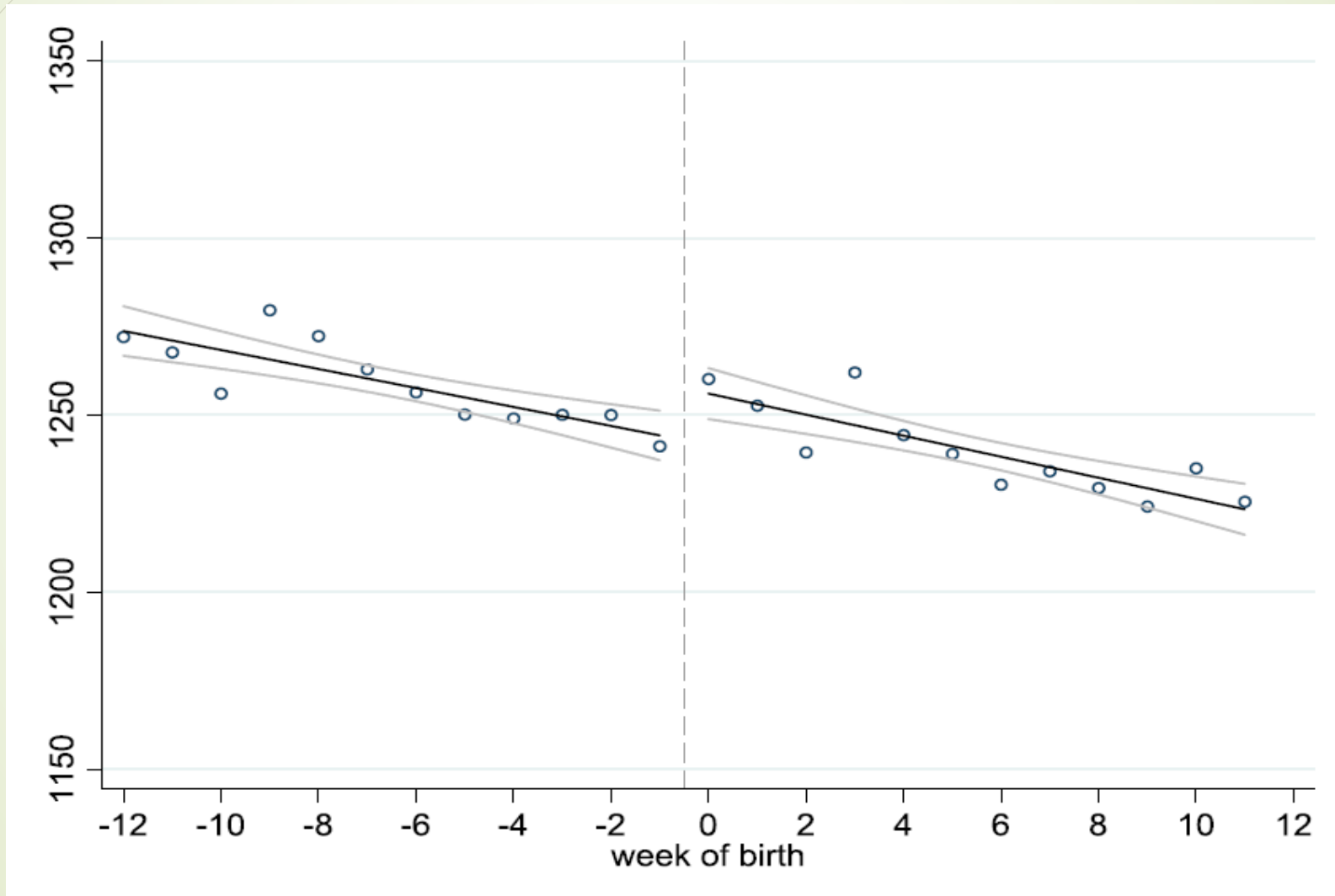
The actual outcomes

- **In 2007, Spain expanded paternal leave from 1-2 days to 13 days.**
- **The goal is to (1) offer more welfare to labors; (2) gender equity**

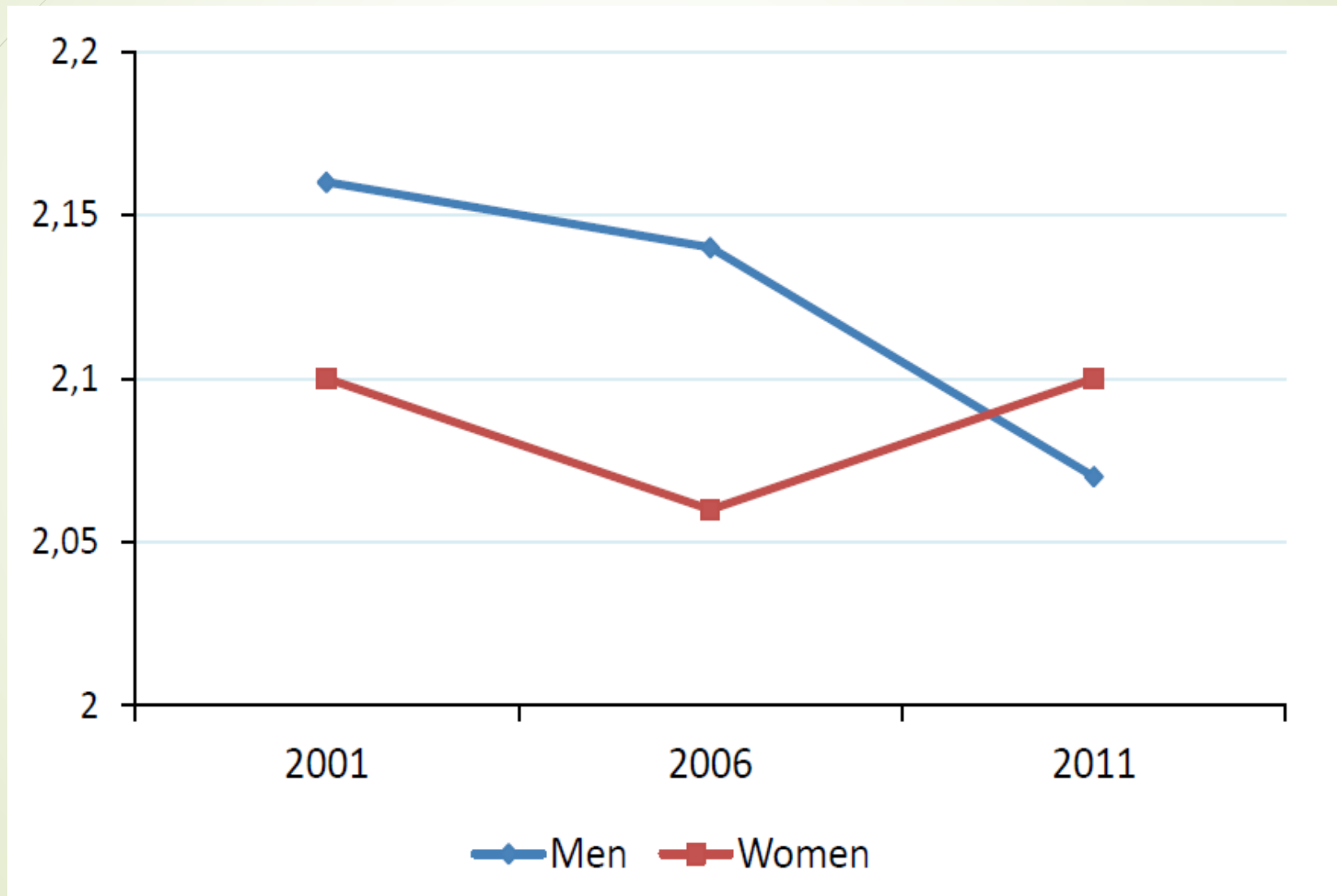
% having another child in 2 years



Days to next birth



Expected births



Main findings

- **Fathers might be scared by taking care of the new born child**
- **Well-intended policies may lead to negative consequences**

Lessons learned from these cases

- **Understanding causal effects of a police is highly important**
- **All programs are benevolence-motivated, but being so guarantees no planned goal.**
- **Incentives should serve as the most important considerations for policy makers.**
- **Sometimes it takes time for individuals to realize where the loopholes are.**

Causal inference

- **If correlation does not implies causality, how do we identify causality, or the causal effect of one factor on the other factor?**
- **Let's examine the following example:**

Iron and cereal

- **Students like you often eat cereal as breakfast**
- **Kellogg, for example, is a big brand**



Iron and cereal

- **Cereal is nutrition rich, as suggested by Kellogg Original's ingredients**
- **But there is something interesting in the ingredient table:**

Kellogg's Special K Original

Serving Size		(31g) (1cup)
Servings Per Container		35
<hr/>		
Amount Per Serving		
Calories		160
Calories from Fat		5
<hr/>		
Total Fat		0.5g
Saturated Fat		0g
Trans Fat		0g
Cholesterol		0mg
Sodium		210mg
Potassium		15mg
Total Carbs		23g
Dietary Fiber		0g
Sugars		4g
Protein		6g
<hr/>		
Vitamin A	15%	Vitamin C 35%
Calcium	15%	Iron 45%

What?



Iron and cereal

Have you ever thought about the question: Is the iron in cereal the same as the iron in nail?



Iron and cereal

Economics Professor Gary King at Harvard University designed a method to find out the answer to the question. He taught his method to:

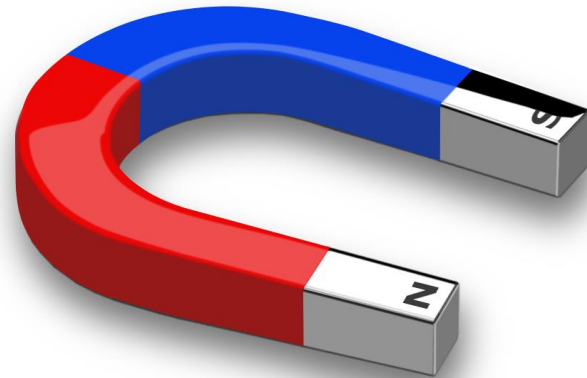
- 1. Kindergarten kids**
- 2. Economics PhD students**



King's method

Step 1:

He handed out a little magnet to everyone, and asked the class to find out what it sticks to and what it doesn't stick to.



King's method

Step 2:

He then spread out some Kellogg cereal to each student and asked them to smash it into small pieces, then try if any pieces stuck to the magnet – it did.



Iron and cereal

Prof. King then asked the students again: Are you now convinced that the irons are the same?

- All kindergarten kids say **YES**



- All econ PhD students say **YES**



Here we go...

BUT.....

Iron and cereal

Critical thinking:

Prof. King then asked: But how do you know the cereal stuck to the magnet because it had iron in it? Is there any other possibility?

Iron and cereal

Two other possible explanations:

1. **Maybe it was just sticky, like gum or tape? Or,**
2. **Maybe it is another metal, say copper, which also reacts to magnet?**



Iron and cereal

It is important to rule out other possibilities. How can we do this?

Iron and cereal

King's idea



Kellogg's Special K Original

Serving Size	(31g) (1cup)	
Servings Per Container	35	
Amount Per Serving		
Calories	160	
Calories from Fat	5	
Total Fat	0.5g	
Saturated Fat	0g	
Trans Fat	0g	
Cholesterol	0mg	
Sodium	210mg	
Potassium	15mg	
Total Carbs	23g	
Dietary Fiber	0g	
Sugars	4g	
Protein	6g	
Vitamin A	15%	Vitamin C 35%
Calcium	15%	

No iron!



Iron and cereal

Step 3:

**Repeating the experiment using Kellogg's
Rice Krispies**

Finding:

Nothing stuck to the magnet!

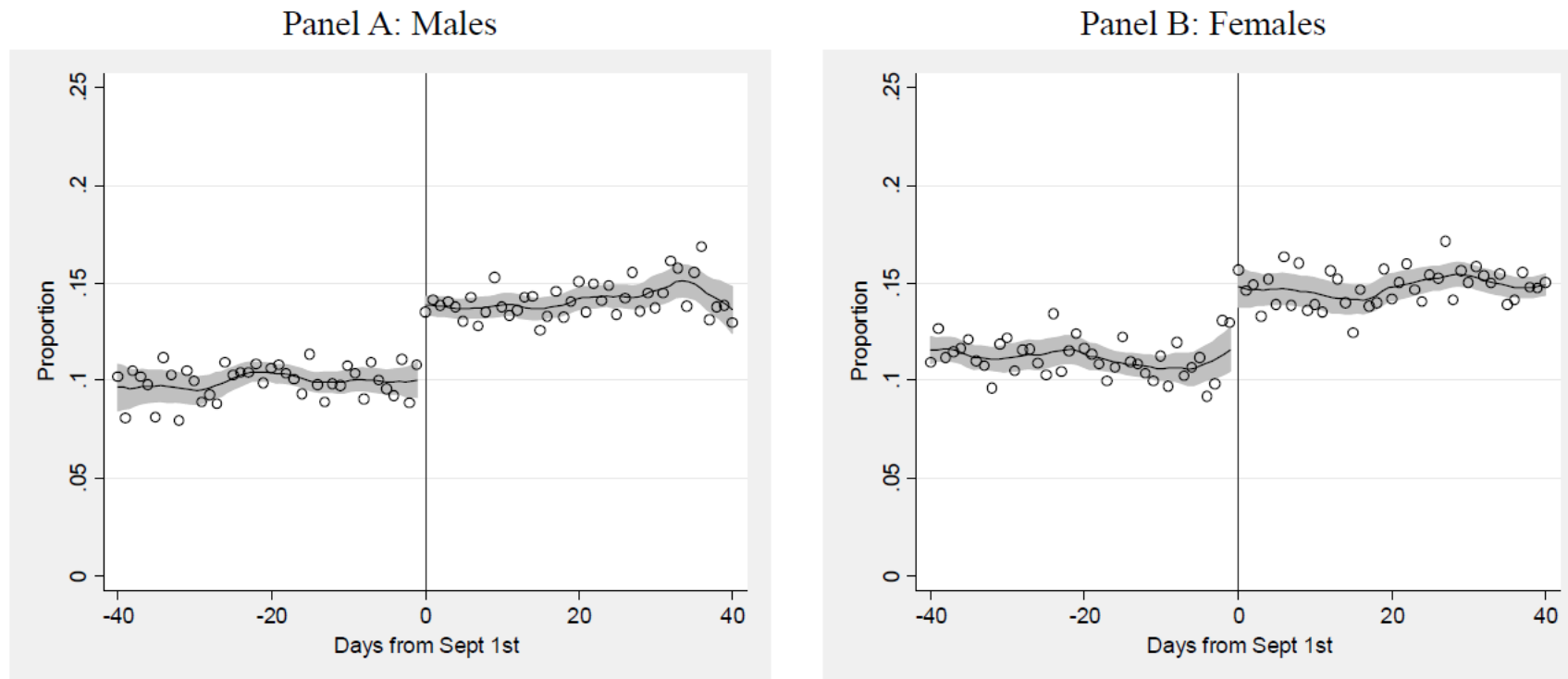
Iron and cereal

Lessons:

1. The importance of “control group”
2. Critical thinking (be rational and skeptical)
3. Most importantly, you can eat nails

The secret of month of birth

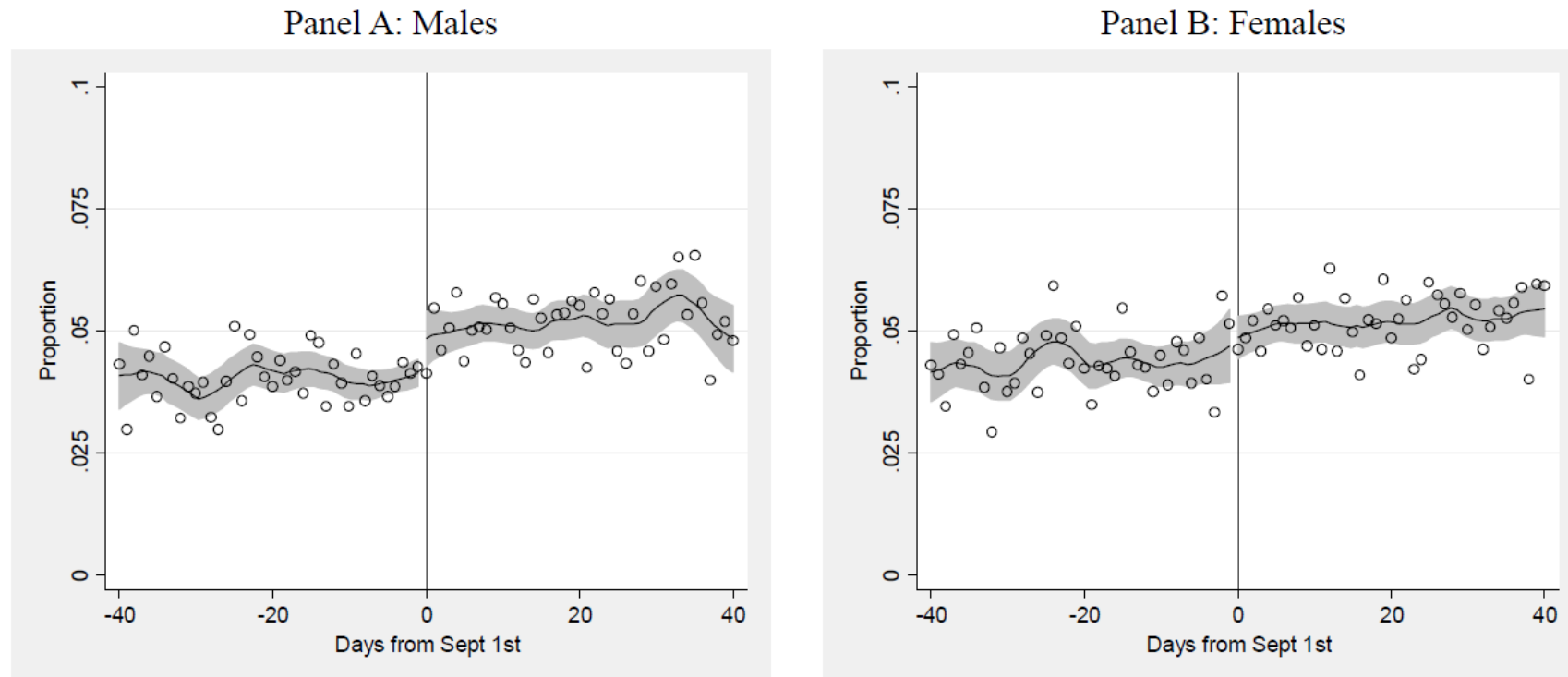
Figure 4: Probability of university admission by birthdate



Notes: Observations within the optimal bandwidth are selected for graphing. The optimal bandwidths are 39 days for males and 37 days for females, both determined using the method proposed by Imbens and Kalyanaraman (2012).

The secret of month of birth

Figure 5: Hazard of public university admission by birthdate

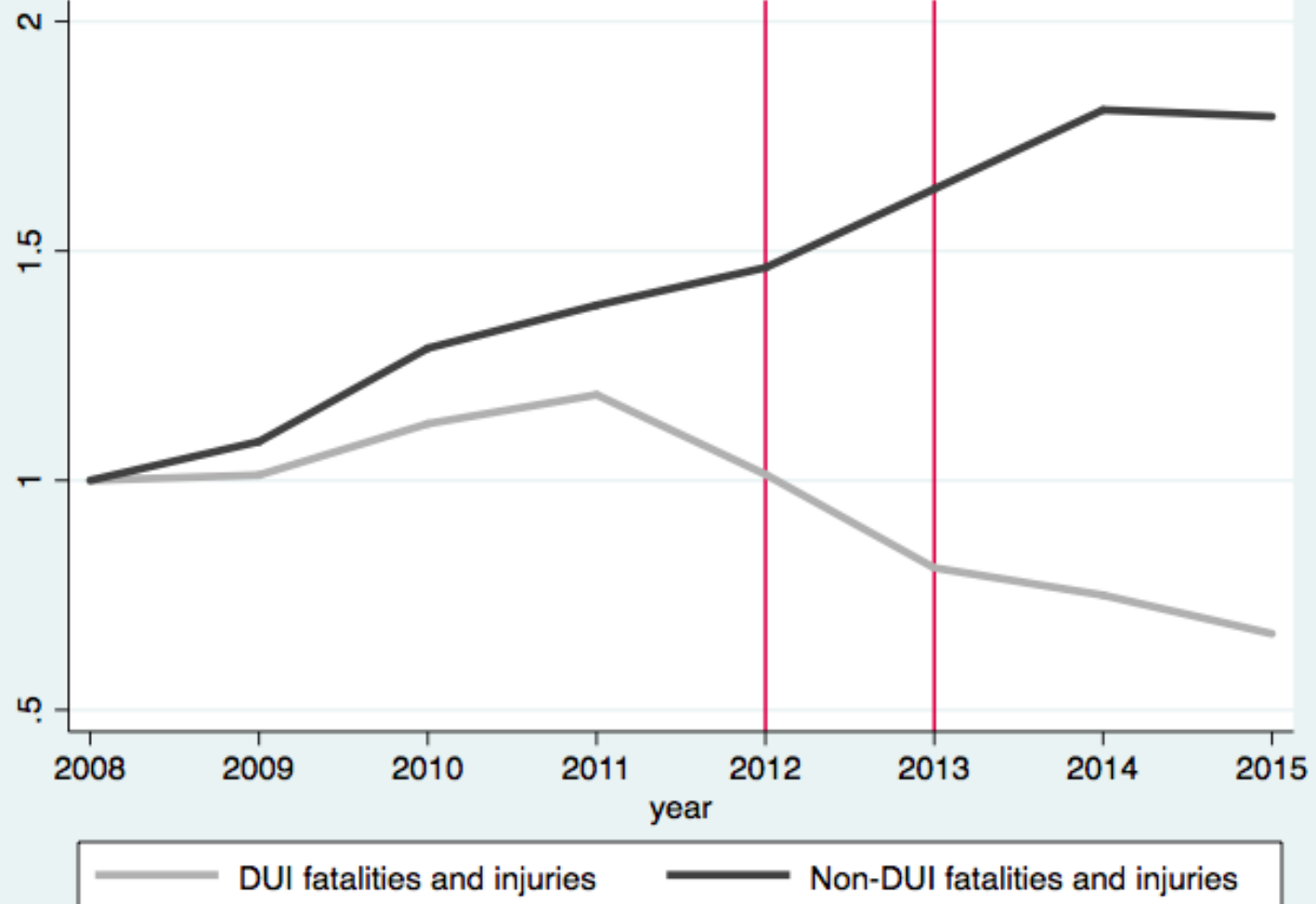


Notes: Observations within the optimal bandwidth are selected for graphing. The optimal bandwidths are 39 days for males and 37 days for females, both determined using the method proposed by Imbens and Kalyanaraman (2012).

Why is MOB so important?

- **Absolute age effect**
- **Relative age effect**
- **Length of education effect**
- **Age at the test effect**

DUI (酒駕)



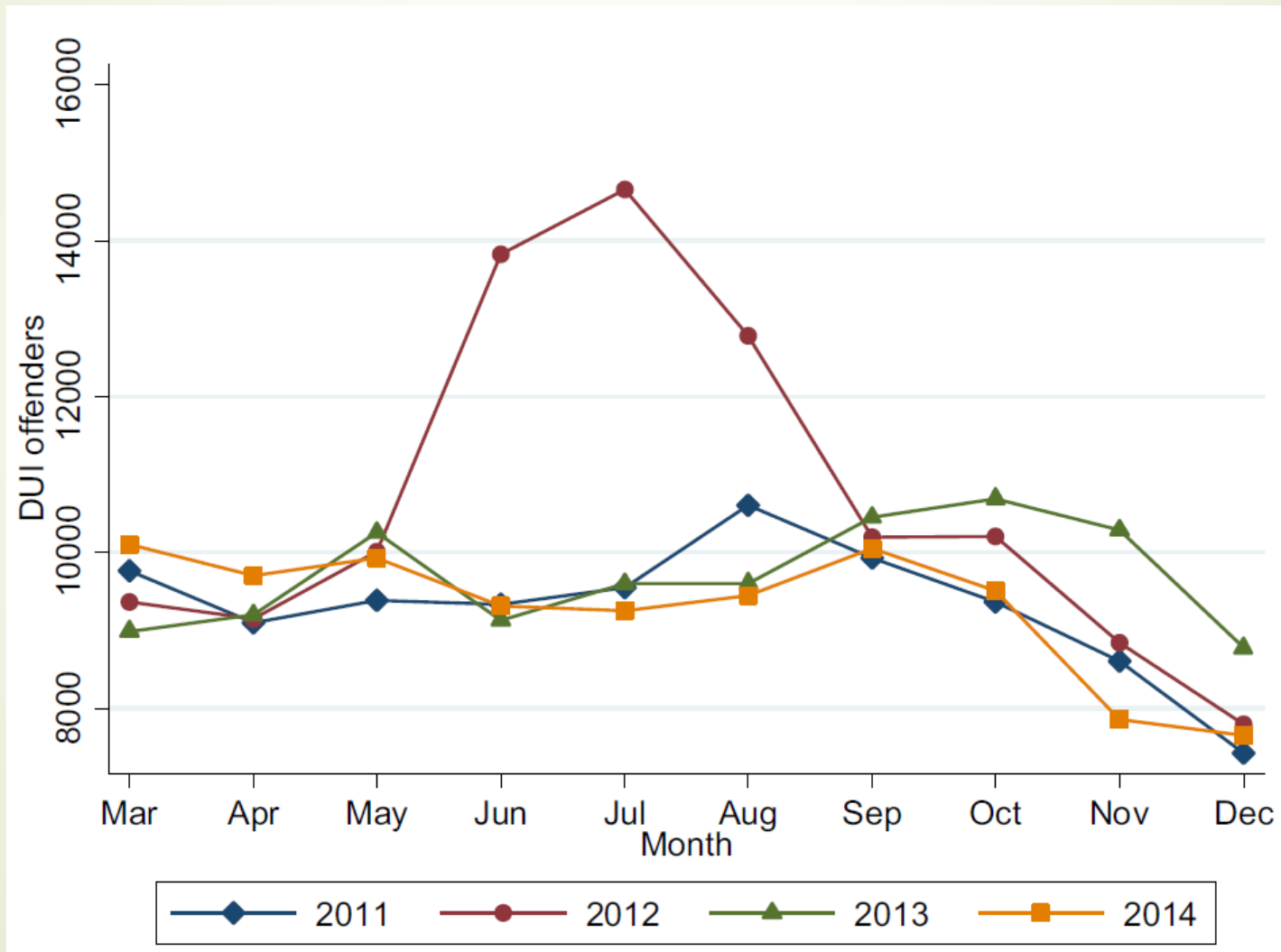
Two major anti-DUI interventions

1. **2012** - An intensive sobriety checkpoint operation running from June 1 to July 31.
2. **2013** Law reform implemented on June 13
 - Introduced **criminal charge**
 - Increased fine
 - More stringent DUI limits
 - Combined with a short period of intensified sobriety checkpoints

Sobriety checkpoint campaign in 2012

- **Operating from June 1 to July 31**
- **Nationwide operation**
- **Deployment of checkpoints in June 2012 was 11.6 times as much as in June 2011**
- **There was no change in law in June or July, 2012**

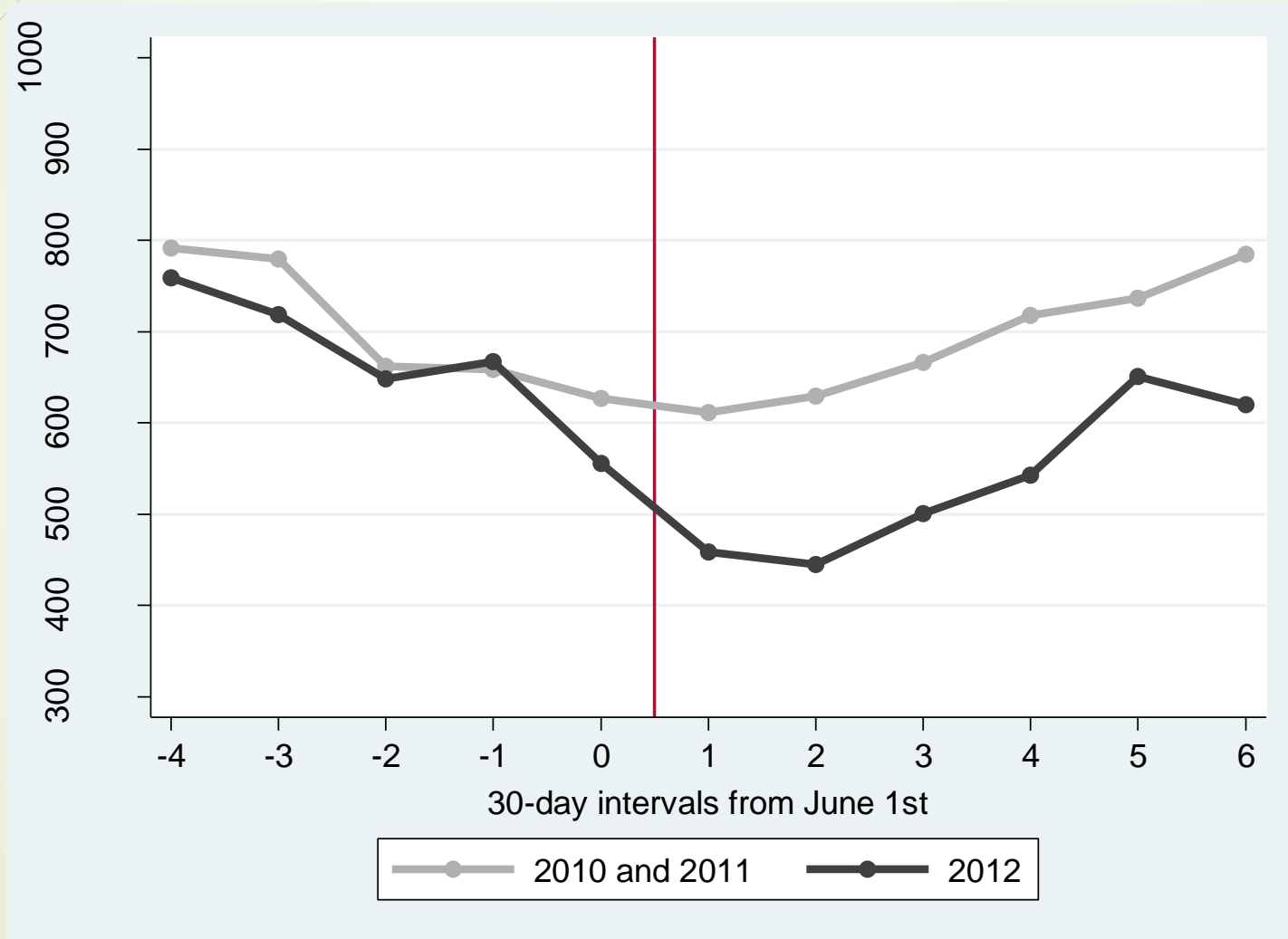
2012酒駕大執法



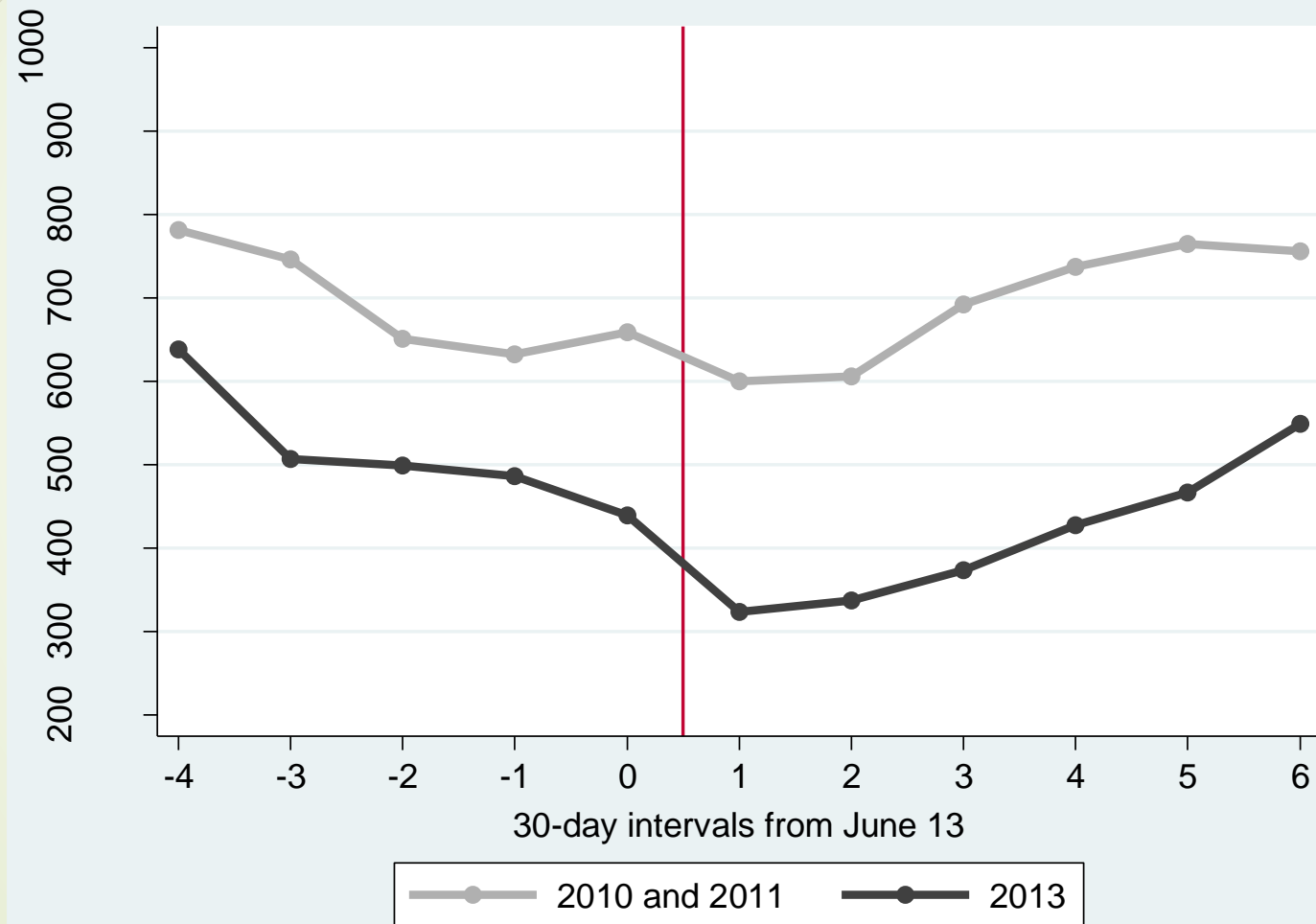
Law reform in 2013

- Drunk driving was **criminalized** with breath alcohol concentration (BrAC) over 0.25 mg/L and BAC over 0.05 g/dl without causing any traffic accident. Offenders could be imprisoned up to two years.
- Penalty was enhanced from an imprisonment of 1-7 years to 3-10 years for offenders causing death and from 0.5-5 years to 1-7 years for offenders causing severe injury
- BrAC (and BAC) limit for fine penalty was reduced from 0.25 to 0.15 mg/L (and from 0.05 to 0.03 g/dl)
- Implemented on June 13 with intensified checkpoints

DUI (酒駕)



DUI (酒駕)



Main findings

The sobriety checkpoints worked tremendously well.

2012

- The 2012 operation decreased nighttime DUI fatalities and injuries by **26%** in the first month.
- Effect persisted, yet weakened as enforcement went back normal

2013

- The 2013 law reform decreased nighttime DUI fatalities and injuries by another **18%** in the first month.
- Effect persisted, fluctuated with a margin of roughly 10%

Foot binding

- A Chinese custom of binding young girls' feet
- Usually starting at the age of 4 or 5, young girls' feet were tightly wrapped in bandages for over 10 years
- Lifelong deform of feet
- Leading to difficulties in long distance walking and activities that require physical strength



Foot binding

Puzzles regarding foot-binding as a self-harming practice:

- **Prevalence: Common in both upper and lower classes**
- **Time persistence: Lasted for over 1,000 years**
- **Disappearance: Abandoned within a generation**
- **Local diversity: Hoklo (70%+); Hakka (1%)**

Sugarcane cultivation

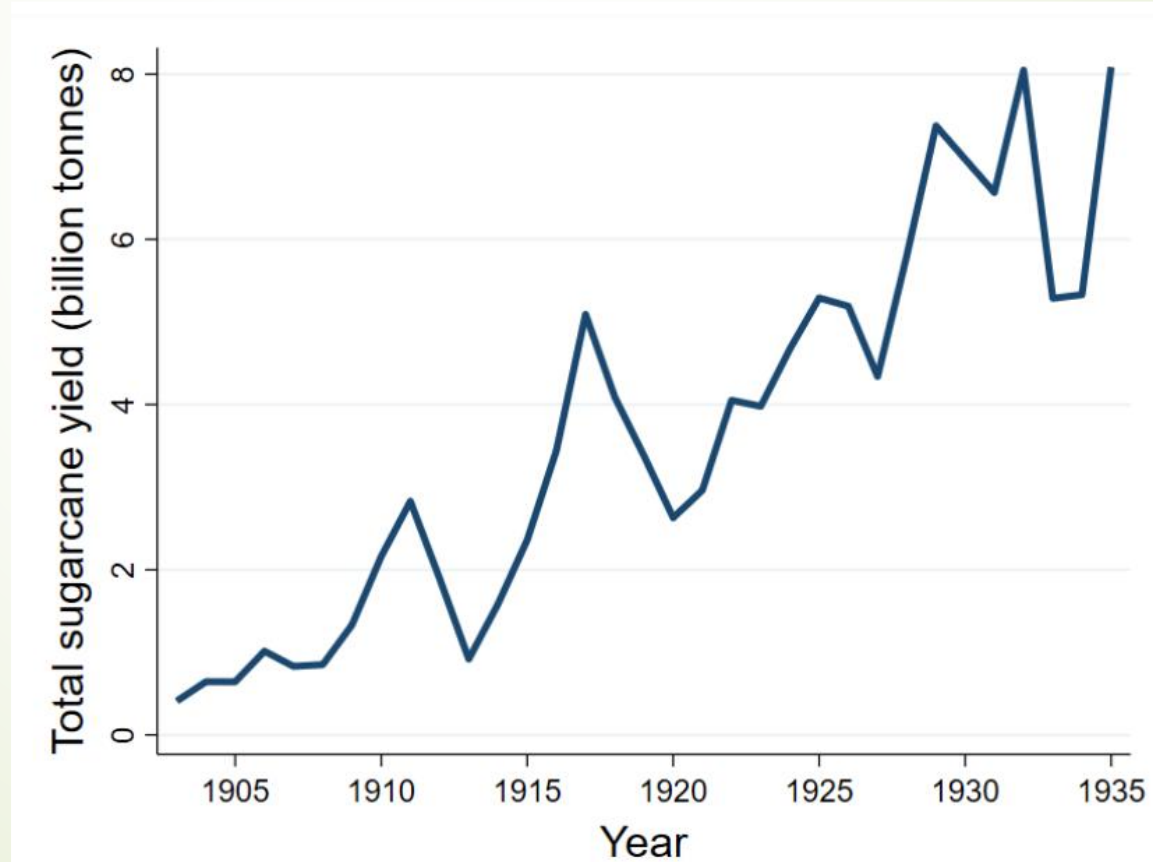


Sugarcane cultivation



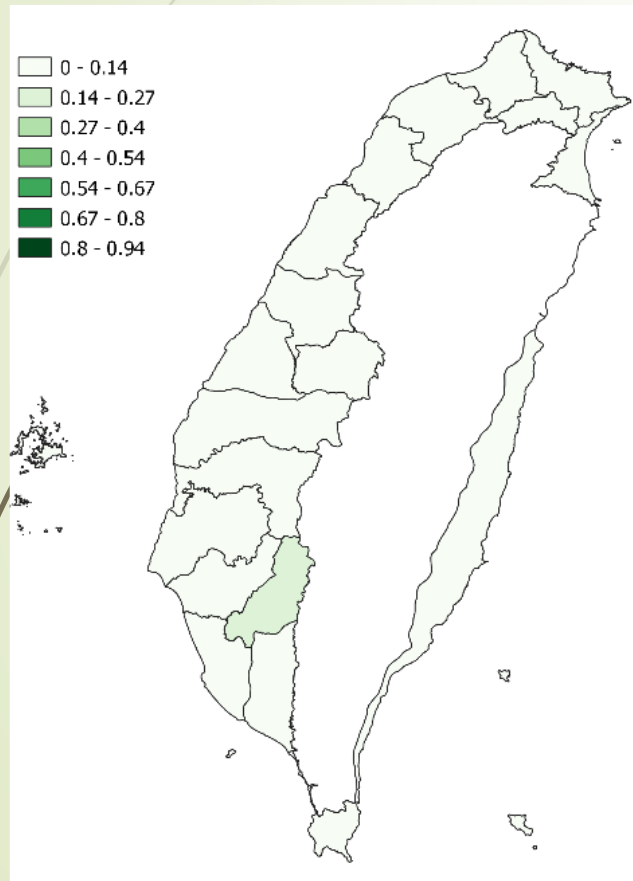
Sugarcane cultivation

Post 1905: Modern sugar factories, invested by large, private companies from Japan, with governmental subsidies, were developed

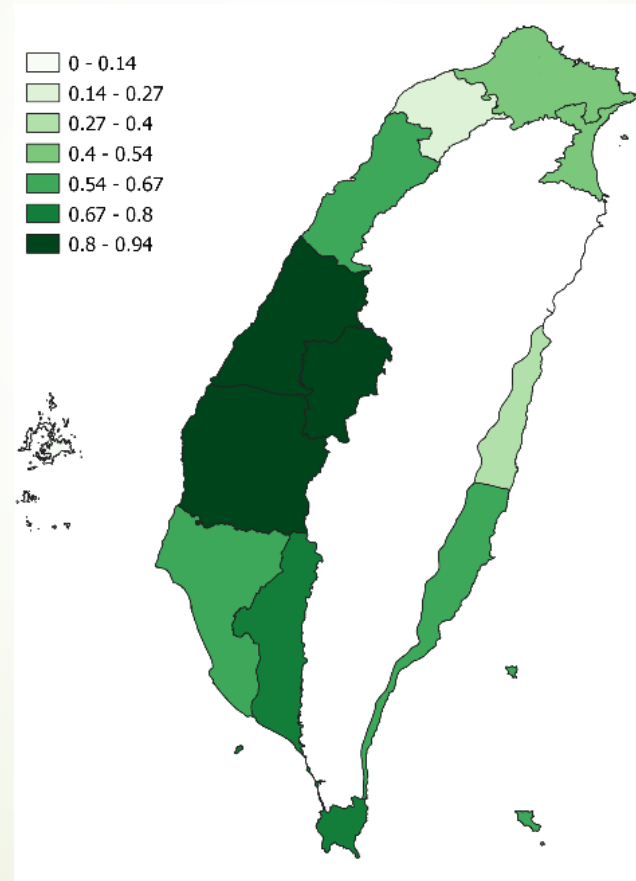


Sweet unbinding

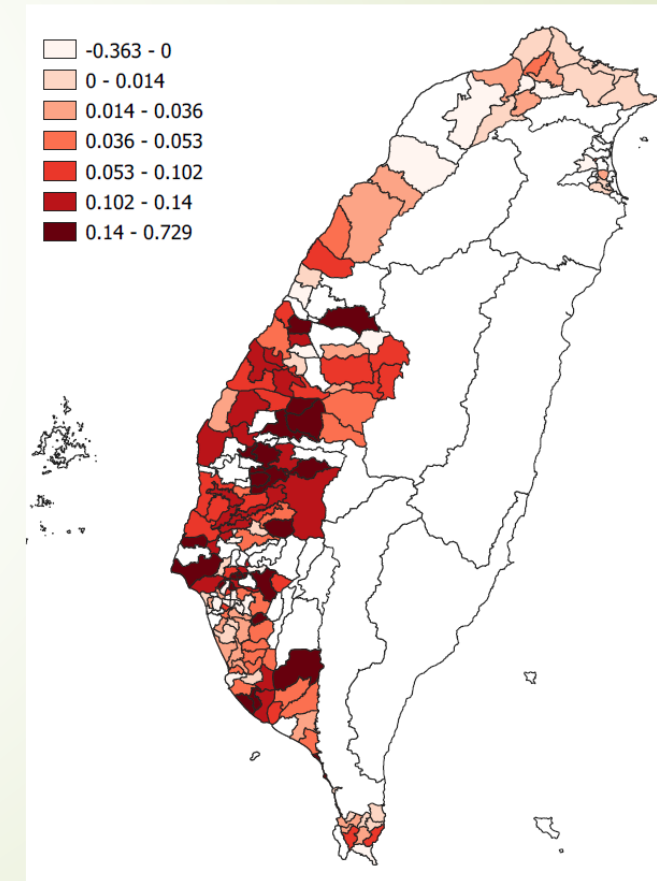
(A) Proportion of unbound women in 1905



(B) Proportion of unbound women in 1915



(C) Change in proportion of cane land from 1905 to 1915



Sweet unbinding

- **The shift to cane cultivation incentivized bound women to unbound their feet**
- **Might explain the quick demise of foot-binding in Taiwan comparing to China**
- **Confirms the role of economic motive to end discriminatory norm practices**

Concluding remarks

- **Economics is important and FUN to study**
- **Economic research can be very applicable, for groups or individuals**
- **Economics goes well with big data**