Applied Policy Evaluation

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Applied Policy Evaluation

- We are interested in the ***causal*** effect of policy X on some outcome Y

- There are very useful estimators available to us (provided we have the data!)

- The second topic we will focus on is
  - **Regression Discontinuity**

Regression Discontinuity

- Regression discontinuity design (RDD) is a quasi-experimental design that allows for identification of treatment effects when assignment to the treatment changes discontinuously

- EXAMPLE 1 (and first use): Thistlewaite and Campbell (1960)
  - Thistlewaite, D. and Campbell, D. (1960), "Regression-discontinuity analysis: An alternative to the ex post facto experiment.", *Journal of Educational Psychology,* vol. 51 (6): pp.309-317

- Used to evaluate the causal effect of certificates of merit (CoM)

- Basic idea: bare winners and bare losers should be identical in all aspects except the bare winners got the CoM

- Therefore, comparing subsequent outcomes, gives the causal effect of CoM

Regression Discontinuity

- EXAMPLE 2
- Another famous example of RD design is Lee (2008)
  - Lee, D.S. (2008), “Randomized experiments from non-random selection in US House elections”, *Journal of Econometrics,* vol. 142 (2): pp 675-697

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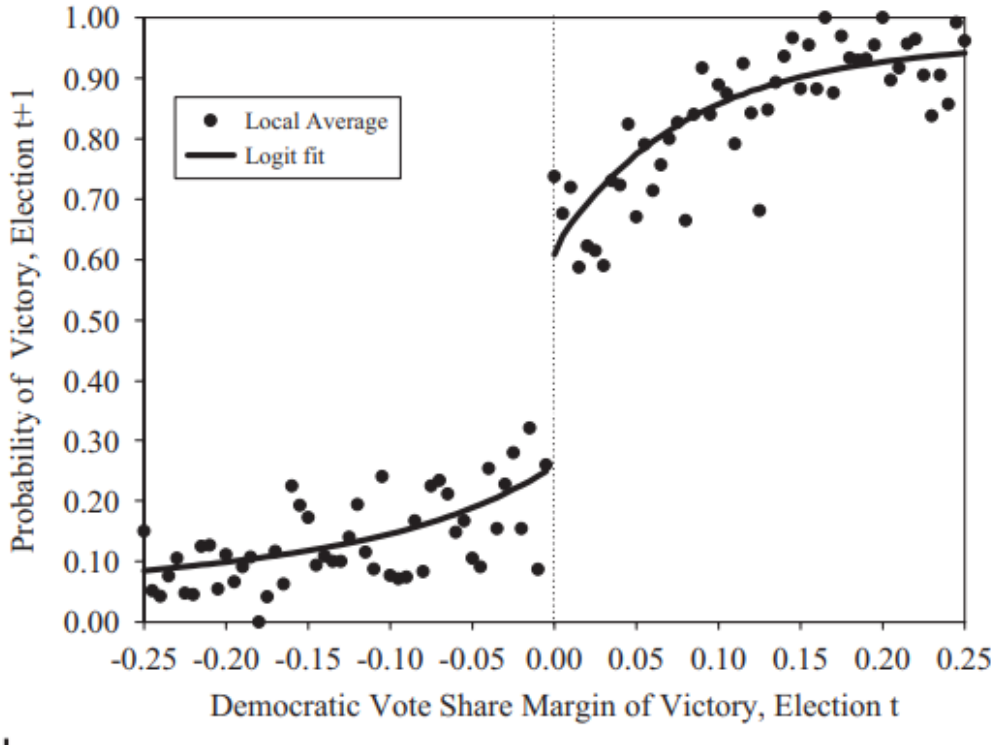


Regression Discontinuity

- How do we implement RD?
  - Let's apply it to the previous graph by Lee (2008)

- Outcomes are estimated separately for those to the right and left of the threshold

$$VictoryL_{i,t+1} = \alpha_L + \beta.f_L\left(Share_{i,t} - 0.5\right) + \varepsilon_{i,t+1}$$

$$VictoryR_{i,t+1} = \alpha_R + \beta.f_R\left(Share_{i,t} - 0.5\right) + \varepsilon_{i,t+1}$$

- Note that we subtract the threshold value (0.5) from the forcing variable
  - This means the treatment effect equals $\hat{\alpha}_R - \hat{\alpha}_L$.

- We don't have to run two regressions – we can estimate this in a single pooled model

$$Victory_{i,t+1} = \alpha + \beta.I_{i,t+1} + \rho.f\left(Share_{i,t} - 0.5\right) + \lambda.I_{i,t+1}.f\left(Share_{i,t} - 0.5\right) + \varepsilon_{i,t+1}$$

Regression Discontinuity

- Validity of the RD design is based on the assumption that treatment assignment is approximately random at the threshold

- This implies that “bare winners” and “bare losers” should differ only in their treatment status and *other pre-treatment covariates should be continuous at the threshold*

- We can test this by checking for discontinuities in observable pre-treatment characteristics

Regression Discontinuity

- EXAMPLE 3

ESRI ECONOMIC & SOCIAL RESEARCH INSTITUTE

ESRI Special Article

Did increasing the state pension age in Ireland affect the retirement rate of 65-year-olds?

P. Redmond, S. McGuinness and E. Kelly

Regression Discontinuity

- EXAMPLE 3 cont'd

- In 2014, the qualifying age for the contributory state pension increased from 65 to 66 years
  - The transition state pension was abolished

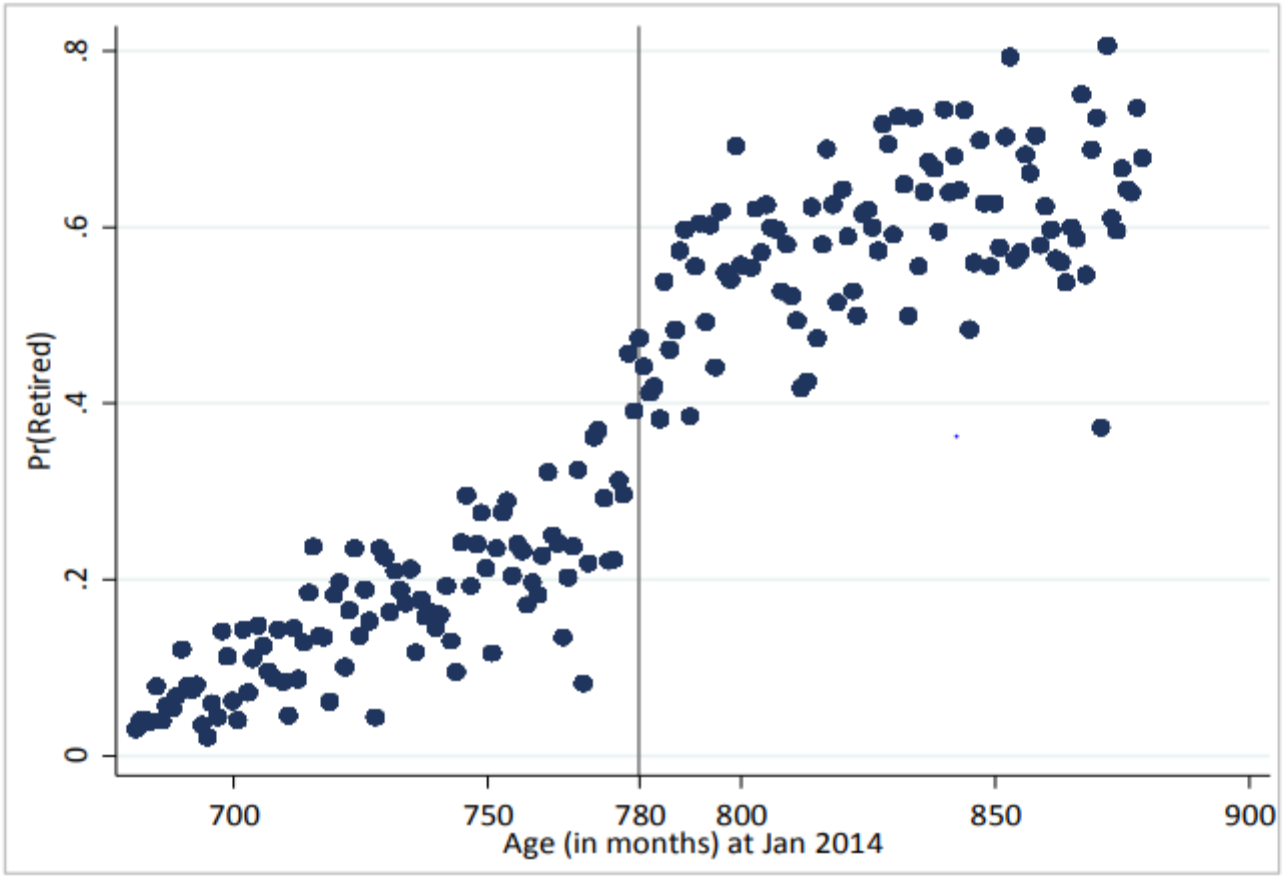
- Implementation of the policy in 2014 was based on a person's date of birth
  - Those born before January 1949 could still qualify at age 65
  - Those born on or after 1 January 1949 had to wait until age 66

- For example,
  - A 65-year-old in 2014 who was born in December 1948 could receive the transition state pension
  - A 65-year-old in 2014 who was born in January 1949 could not receive the transition state pension

Regression Discontinuity

- EXAMPLE 3 cont'd

FIGURE 1 AVERAGE RETIREMENT PROBABILITIES

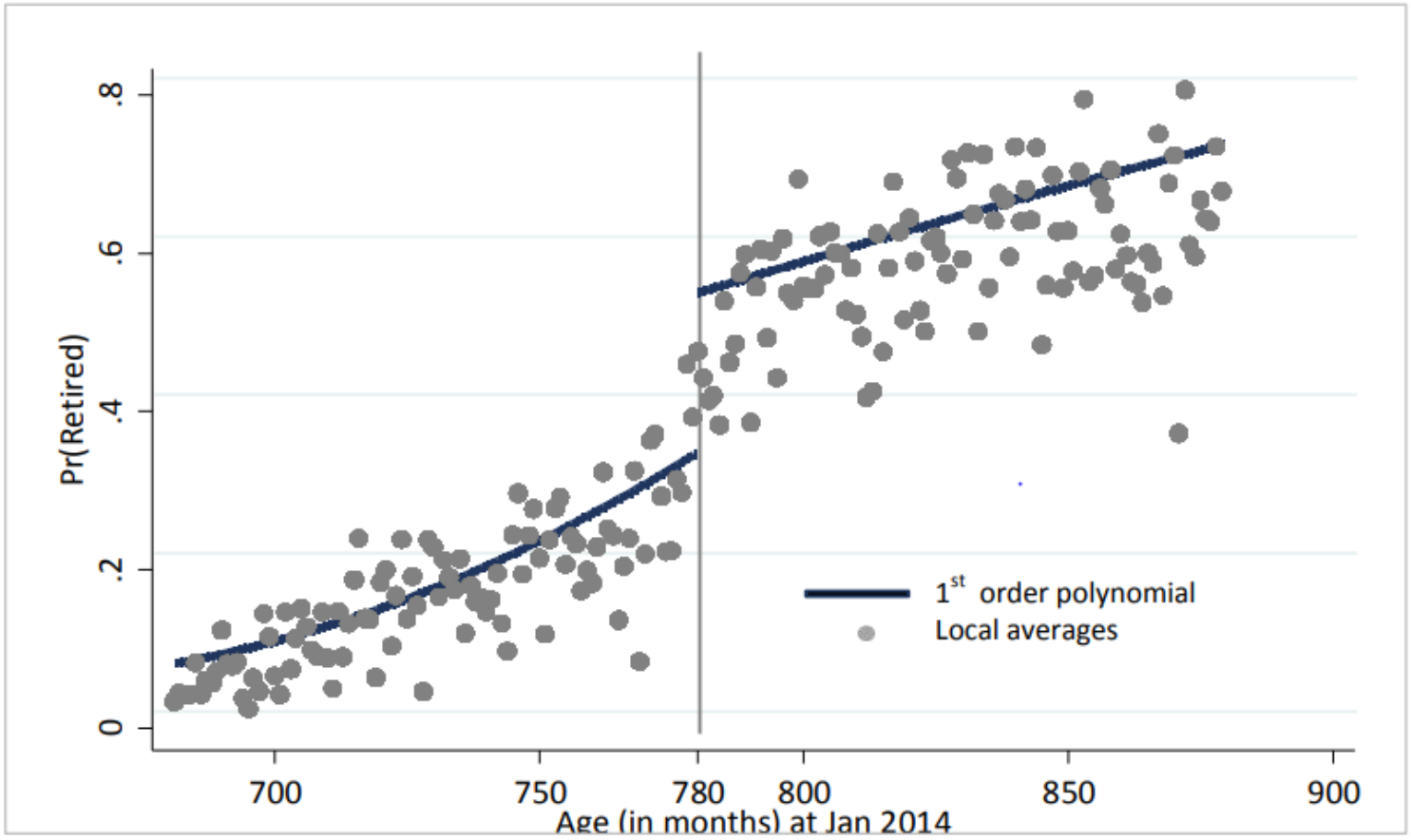


Source: CSO Quarterly National Household Survey.

Regression Discontinuity

- EXAMPLE 3 cont'd

FIGURE 2 FIRST ORDER POLYNOMIAL SPECIFICATION

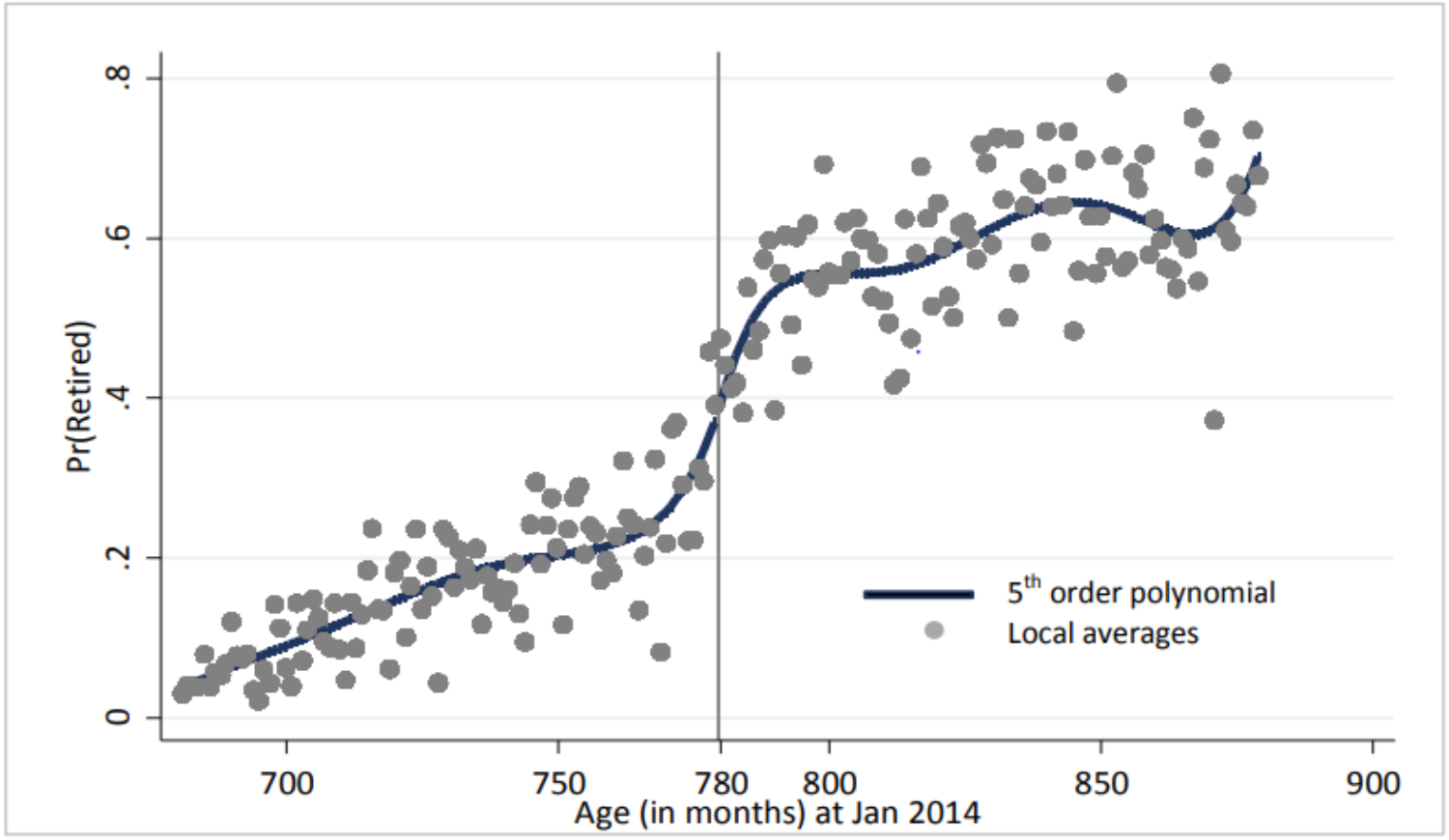


Source: CSO Quarterly National Household Survey.

Regression Discontinuity

- EXAMPLE 3 cont'd

FIGURE 3 FIFTH ORDER POLYNOMIAL SPECIFICATION



Source: CSO Quarterly National Household Survey.

Regression Discontinuity

- EXAMPLE 3 cont'd

- No clear evidence of a causal effect of the policy change on retirement rates

- Several potential reasons
  - Retirement norms / expectations unchanged
  - Occupational pensions unchanged
  - Jobseeker's Benefit seen as a de-factor pension payment

Regression Discontinuity

- EXAMPLE 4

American Economic Journal: Applied Economics 2009, 1:1, 164–182
http://www.aeaweb.org/articles.php?doi=10.1257/app.1.1.164

The Effect of Alcohol Consumption on Mortality: Regression Discontinuity Evidence from the Minimum Drinking Age†

By CHRISTOPHER CARPENTER AND CARLOS DOBKIN*

We estimate the effect of alcohol consumption on mortality using the minimum drinking age in a regression discontinuity design. We find large and immediate increases in drinking at age 21, including a 21 percent increase in recent drinking days. We also find a discrete 9 percent increase in the mortality rate at age 21, primarily due to motor vehicle accidents, alcohol-related deaths, and suicides. We estimate a 10 percent increase in the number of drinking days for young adults results in a 4.3 percent increase in mortality. Our results suggest policies that reduce drinking among young adults can have substantial public health benefits. (*JEL* I12, I18)

Regression Discontinuity

- EXAMPLE 4 cont'd

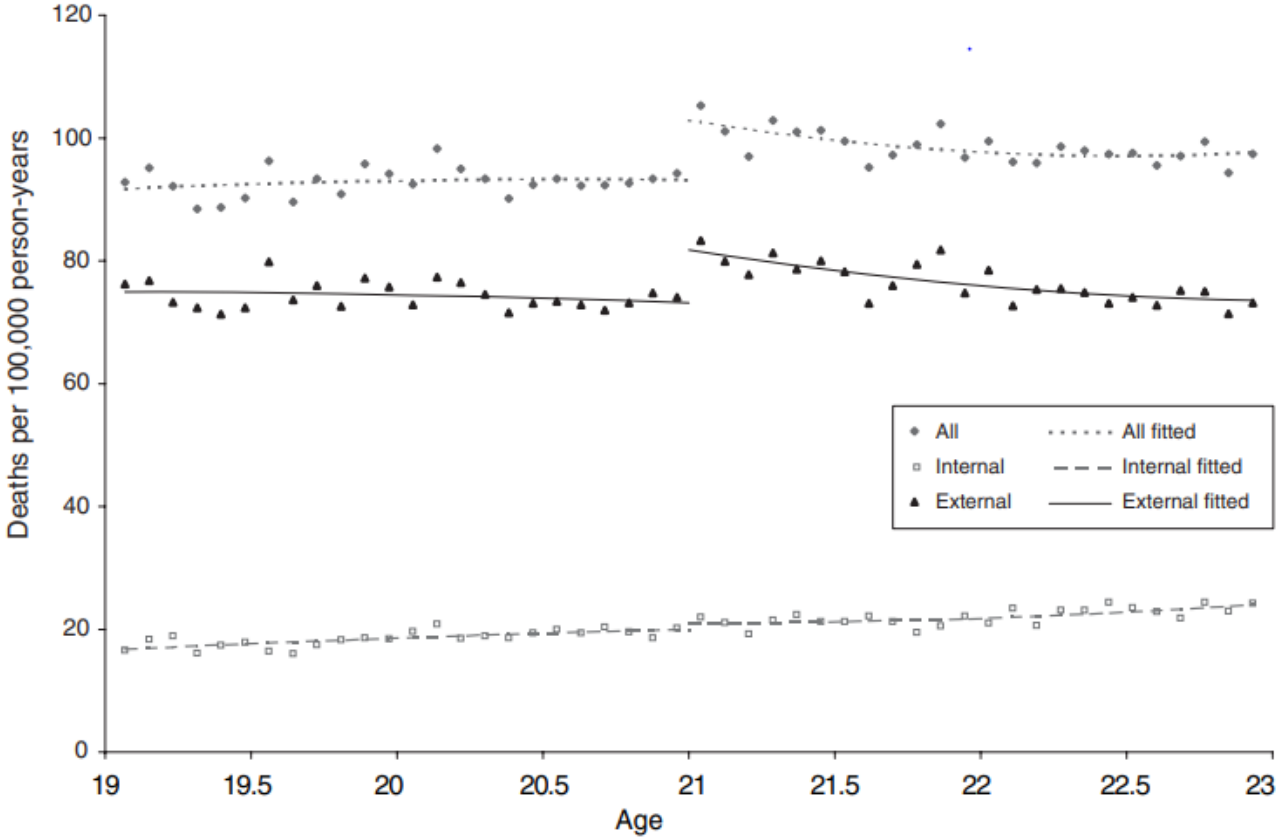


FIGURE 3. AGE PROFILE FOR DEATH RATES

Notes: Deaths from the National Vital Statistics Records. Includes all deaths that occurred in the United States between 1997–2003. The population denominators are derived from the census. See online Appendix C for a list of causes of death.

Regression Discontinuity

- EXAMPLE 5 cont'd

DO LOWER MINIMUM WAGES FOR YOUNG WORKERS RAISE THEIR EMPLOYMENT? EVIDENCE FROM A DANISH DISCONTINUITY

Claus Thustrup Kreiner, Daniel Reck, and Peer Ebbesen Skov*

Abstract—We estimate the impact of youth minimum wages on youth employment by exploiting a large discontinuity in Danish minimum wage rules at age 18, using monthly payroll records for the Danish population. The hourly wage jumps by 40% at the discontinuity. Employment falls by 33%, and total input of hours decreases by 45%, leaving the aggregate wage payment almost unchanged. We show theoretically how the discontinuity may be exploited to evaluate policy changes. The relevant elasticity for evaluating the effect on youth employment of changes in their minimum wage is in the range 0.6 to 1.1.

Regression Discontinuity

- EXAMPLE 5 cont'd