Trade Liberalization and Mortality: Evidence from U.S. Counties

January 2019

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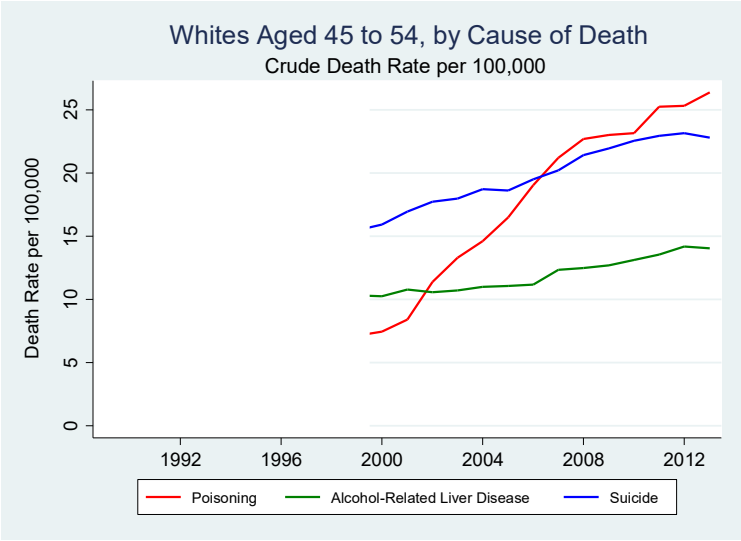
Disclaimer

Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of the National Center for Health Statistics, the Board of Governors of the Federal Reserve System or its research staff.

Introduction

- Research in public health (e.g. Case and Deaton 2015) identifies an increase in U.S. mortality among middle-aged whites after 1999

Extending Case-Deaton (2015) Back in Time



Accidental Poisoning

Suicide

Alcohol-Related Liver Disease (ALRD)

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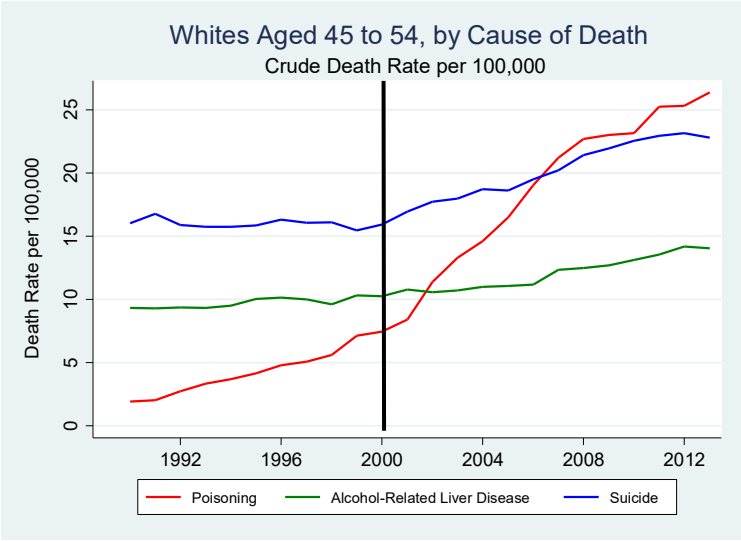

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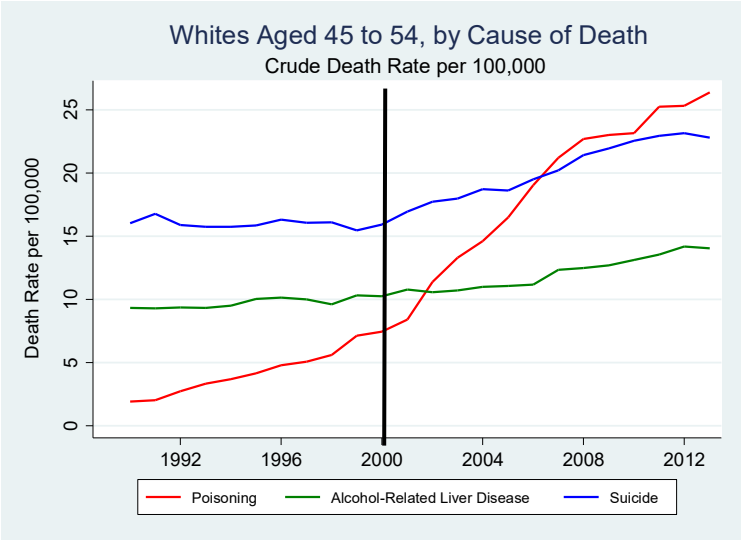

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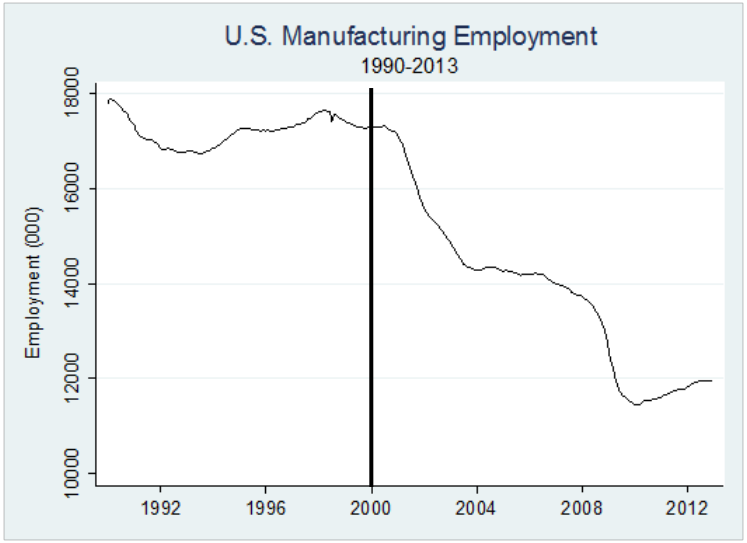

Introduction

- A large literature investigates the effect of economic shocks on health
- Public health researchers (e.g. Case and Deaton 2015) have identified an increase in mortality among middle-aged whites in the U.S. after 1999
- This paper examines county-level relationship between mortality and the U.S. granting of Permanent Normal Trade Relations (PNTR) to China in Oct 2000
- Difference in differences identification strategy:
  - Do counties more exposed to the trade liberalization (first difference) experience larger changes in mortality after it was implemented (second difference)?
- Note: this is not a welfare analysis of PNTR

Literature

- Business cycle, mass layoffs, plant closings → Mortality
  - Cyclicality: Ruhm (2000, 2015), Stevens et al. (forthcoming)
  - Layoffs: Jacobson et al. (1993), Sullivan and von Wachter (2009), Browning and Heinesen (2012)

- China/low-wage countries → U.S. labor market
  - Imports: Bernard et al. (2006), Ebenstein et al. (2011), Autor et al. (2013)
  - PNTR: Pierce and Schott (2016), Handley and Limao (2017), Feng, Li and Swenson (2017)

- Import competition → crime, public goods, health, marriage, fertility
  - Dix-Carneiro et al. (2017), Feler and Senses (2017), McManus and Schaur (2015), Autor, Dorn and Hanson (2017)

Outline

- Data
- DID empirical strategy and results
- Mechanism: Labor market outcomes
- Robustness
- Conclusion

Data: County-Level Mortality Rates

- CDC microdata containing all U.S. death certificates filed between 1990 and 2013
  - Observe age, gender, race, county of residence, year of death and underlying cause of death

- Match year x county x gender x race x age bin death counts to NCI's SEER population estimates to compute death rates
  - Rates conventionally expressed per 100,000 population

- Two types of county-level death rates
  - Crude: just divide deaths by population
  - Age-adjusted: weighted average crude death rate across age categories, using the year 2000 overall population shares as weights for all counties; (baseline results use 5-year age bins)

Data: Trade Policy

U.S. Trade Policy: Permanent Normal Trade Relations

- U.S. granted temporary Normal Trade Relations (NTR) status to China in 1980
  - NTR = MFN; available to most U.S. trading partners
- Continued access to low NTR rates required annual renewals, which were politically contentious, especially after Tiananmen Square
- Absent renewal, tariffs would have increased to non-MFN rates (Smoot-Hawley)
- Uncertainty from threat of future tariff hikes created disincentives for U.S. firms considering locating production in China; Chinese firms considering investments for exporting to the U.S.
- U.S. passed PNTR for China in October 2000, effective when China joined WTO, eliminating disincentives

Measuring U.S. Counties' Exposure to PNTR

j=industry ; *c*=county; *L*=employment

- NTR gap for industry *j* is

$$NTR\,Gap_j = Non\,NTR\,Rate_j - NTR\,Rate_j$$

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- NTR gap for county *c* is the employment share weighted average NTR gap of each industry (L_{jc}/L_c) in 1990 (i.e., 10 years before PNTR)

$$NTR\,Gap_c = \sum_j \frac{L_{jc}^{1990}}{L_c^{1990}} NTR\,Gap_j$$

Other County-Level Controls

- Policy
  - Labor-weighted average U.S. NTR tariff
  - Labor-weighted average exposure to end of MFA/ATC quotas
  - Labor-weighted average exposure to 1997-2002 changes in Chinese import tariffs
  - Labor weighted average exposure to 1996-2005 reduction in Chinese production subsidies

- County attributes
  - 1990 share of employment in manufacturing
  - 1990 county median household income
  - 1990 county share of population with no college education
  - 1990 county share of population that are veterans

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"Annual" Difference in Differences Specification

c=county; *z*=commuting zone; *t*=year

$$DeathRate_{ct} = \sum_t \theta_t \, 1\{year = t\} \times NTRGap_c + \quad \text{DID term for own county}$$

$$\beta \mathbf{X}_{ct} + \quad \text{Time-varying county attributes}$$

$$\sum_t \gamma_t \, 1\{year = t\} \times \mathbf{X}_c + \quad \text{Initial (time-invariant) county attributes}$$

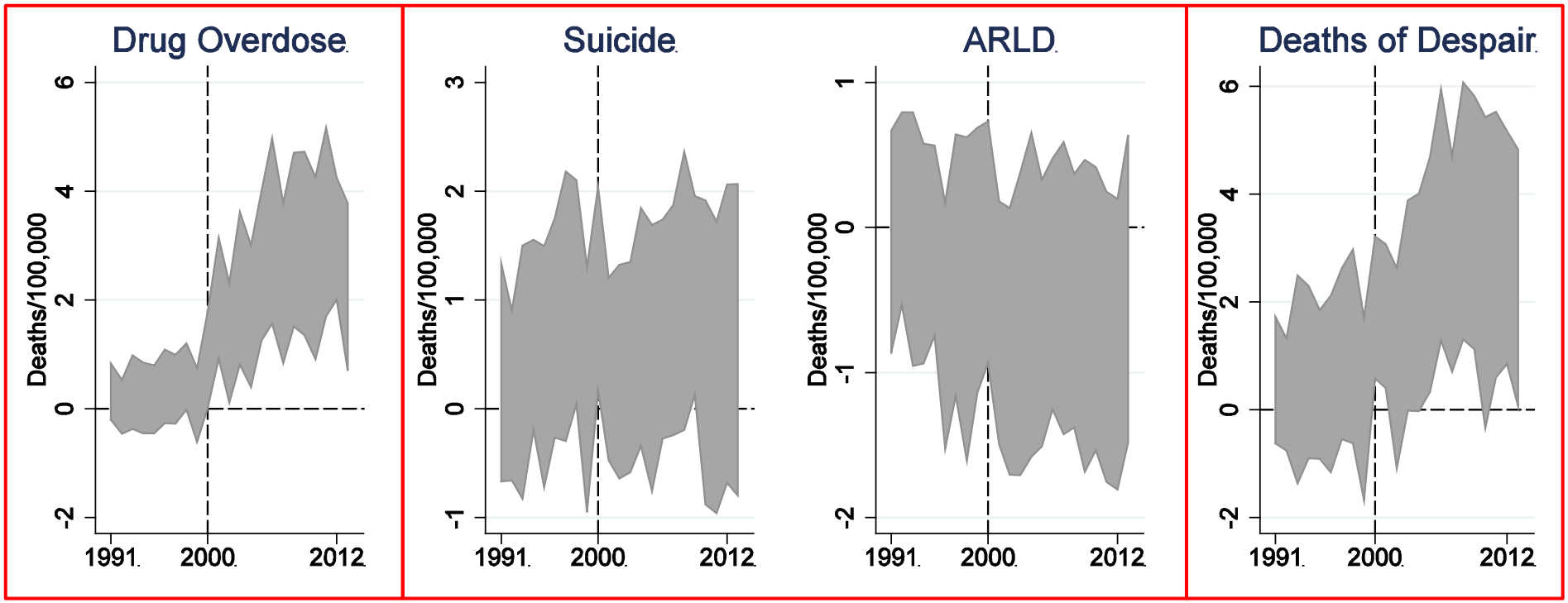
$$\delta_c + \delta_t + \varepsilon_{ct}, \quad \text{County and year fixed effects}$$

Notes

- Sample period 1990-2013
- Standard errors clustered at state-level
- Economic significance: move a county from the 25th to the 75th percentiles of the NTR gap distribution, i.e., θ*8.3

Baseline Results

95% Confidence Interval of Estimated DID Coefficients



Economic significance:

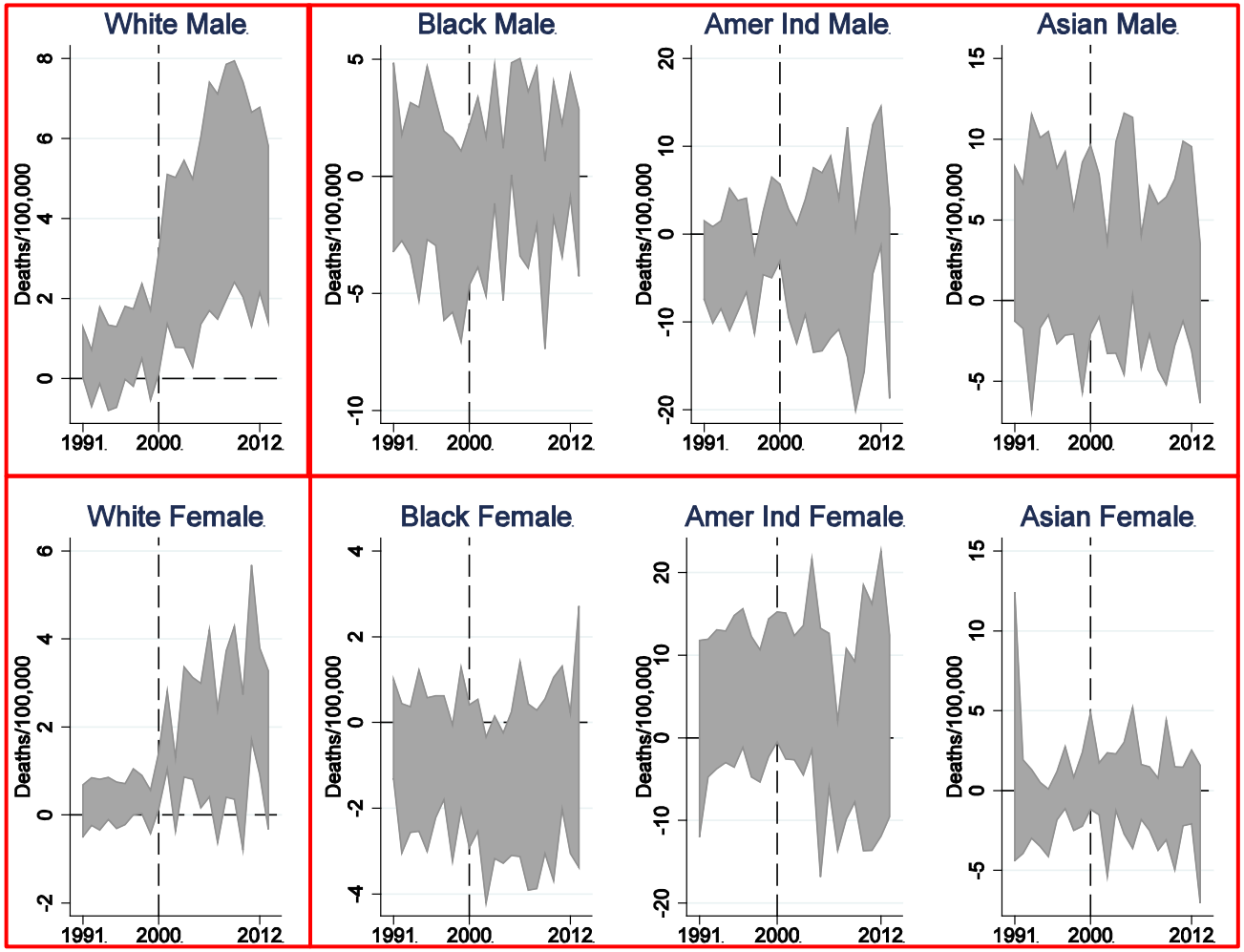
Interquartile shift in NTR gap = Relative increase in mortality from drug overdoses that is 40-60% year 2000 rate.

Economic significance:

Interquartile shift in NTR gap = Relative increase in mortality from deaths of despair that is 10-15% year 2000 rate.

Results by Gender and Race

95% Confidence Interval of Estimated DID Coefficients



Effect is strongest for white men
Also present for white women, though estimates are less precise

No statistically significant relationship for males or females of other races

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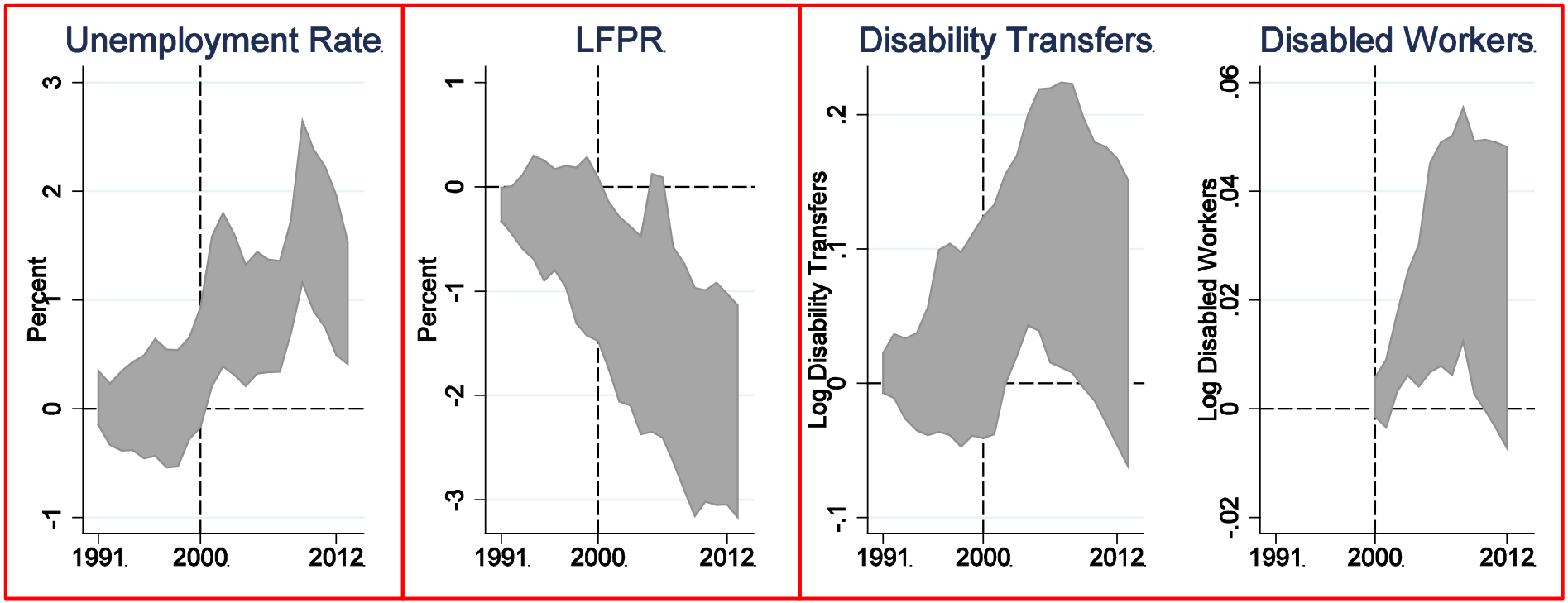
Mechanism

- We offer evidence for mechanism operating through labor market
- Consistent with Sullivan and Von Wachter (2009), Browning and Heinesen (2012)
- Potential ways that employment loss associated with mortality
  - Mental stress
  - Increase in risky/unhealthy activities
  - Diminished budget for healthful expenditures
  - Loss of health insurance
- Could be other mechanisms, e.g. reduction in local government expenditures on public goods like health, police (Feler and Senses 2017)

Labor Market Mechanism



Additional mechanism?

Disability application process may expose workers to prescription opioid painkillers.

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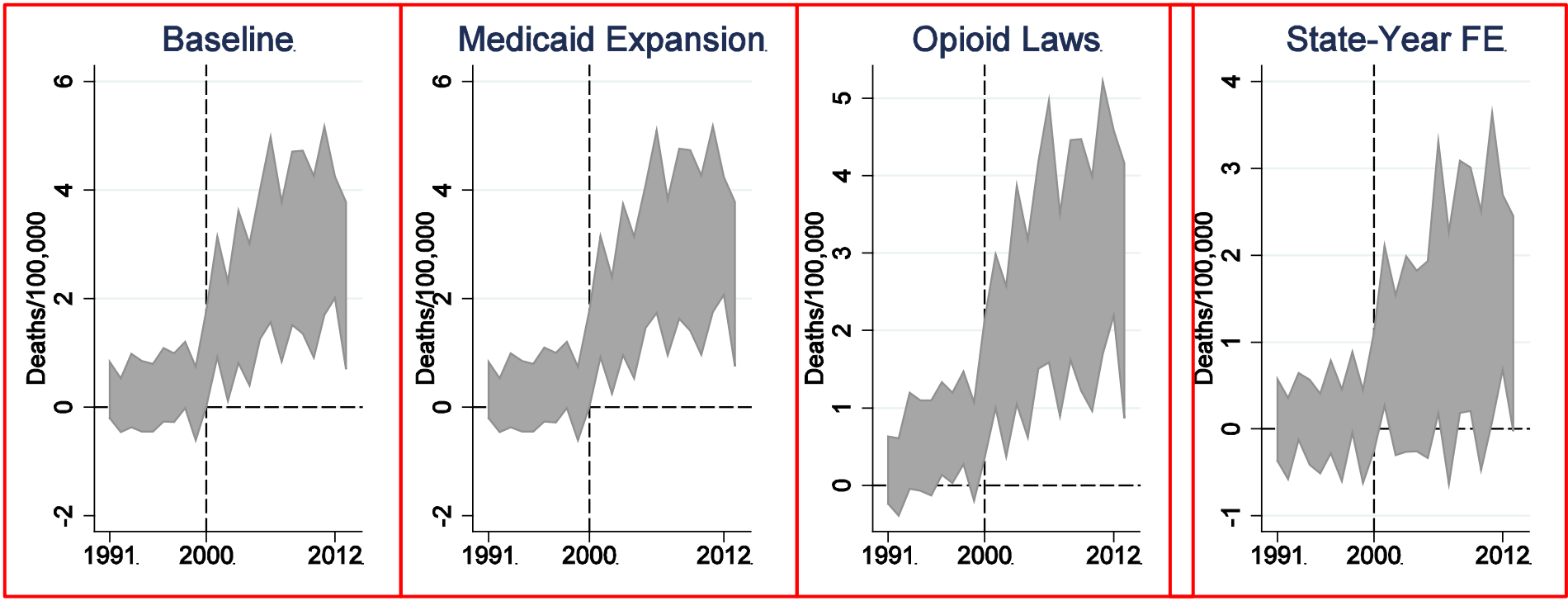
Robustness Exercises



Medicaid expansion:

NY (2001), ME (2002),AZ (2006), MA (2006), and OR (2008) expanded Medicaid during sample period

Opioid Laws:

Variation in state regulation and legislation pertaining to opioid prescriptions

State-Year FE:

A particularly conservative approach; sweeps out cross-state variation in exposure to PNTR

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Conclusion

- Examine whether increases in deaths of despair since 2000 are related to a shock to labor markets induced by trade liberalization
- Counties more exposed to import competition via PNTR exhibit relative increases in drug overdoses among whites, particularly males
- The timing of the relationship between PNTR and mortality matches closely with timing of policy change, is robust to broad set of controls
- Evidence for mechanism acting through the labor market
  - Exposure is also associated with persistent increases in unemployment rates and decreases in labor force participation
- Provides new evidence on distributional effects of trade liberalization

Thanks