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

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PRELIMINARY

First Draft: November 2015
This Draft: May 2016

Abstract

This paper examines the potential link between economic shocks and mortality, exploiting a change in U.S. trade policy that increased U.S. counties' exposure to foreign competition differentially via their industry structure. Using a difference-in-differences identification strategy, we find that greater exposure to the trade liberalization is associated with higher rates of death due to suicide and alcohol-related liver disease. Considering potential mechanisms for these results, we find that counties more exposed to the change in trade policy experience greater labor market disruption in terms of higher unemployment, lower labor force participation and lower income, and that residents in these counties are more likely to report loss of health care coverage and not visiting a physician due to cost.

*Schott thanks the National Science Foundation (SES-1427027) for research support. Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of the Board of Governors or its research staff. We thank Belinda Chan and seminar participants at various institutions for helpful comments.

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1 Introduction

Large literatures in economics and public health investigate the impact of economic shocks on health outcomes.[1] This paper explores the relationship between mortality and a plausibly exogenous change in U.S. trade policy – the October, 2000 granting of Permanent Normal Trade Relations (PNTR) to China – that differentially exposed U.S. counties to increased competition from China depending on their industry mix. In principle, the impact of this change in policy on health might be positive or negative depending upon the sector in which workers are employed and the regions they and their dependents inhabit. On one hand, health might improve with income and employment opportunities in regions where the production structure lines up with U.S. comparative advantage, and all consumers might benefit irrespective of location as prices fall for products and services contributing to better health. On the other hand, health might decline in regions where industries experience the largest increases in import compeition as workers suffer temporary or permanent declines in income, employment or healthcare coverage.[2]

PNTR was a non-traditional trade liberalization in that it did not alter the import tariff rates the United States actually applied to Chinese goods. Rather, it eliminated the need for contentious annual renewals of China's continued access to low tariff rates. By locking in this access, PNTR gave producers in the United States greater incentive to source inputs or final goods from China rather than domestic suppliers, to invest in labor-saving production techniques, to move into products more in line with U.S. comparative advantage, and to shift part or all of their operations offshore. Likewise, it encouraged Chinese producers to invest in entering or expanding into the U.S. market, further increasing competition for U.S. producers.[3]

[1] See, for example, the surveys by Morris and Cook (1991), Cutler, Deaton and Lleras-Muney (2006) and Deaton (2007)

[2] A substantial body of research documents a negative relationship between import competition and manufacturing employment, including Freeman and Katz (1991), Revenga (1992), Sachs and Shatz (1994) and Bernard, Jensen and Schott (2006). More recently, a number of papers have focused specifically on the impact of import competition from China, including Autor, Dorn and Hanson (2013), Bloom, Draca and Van Reenen (2015), Ebenstein et al. (2014b), Groizard, Ranjan and Rodriguez-Lopez (2012), Mion and Zhu (2013), Pierce and Schott (2016) and Utar and Torres Ruiz (2013).

[3] Intuition for these channels of adjustment can be derived from the literature on investment under uncertainty, where firms are more likely to undertake irreversible investments as the ambiguity surrounding their expected profit decreases. See, for example, Pindyck (1993) and Bloom, Draca and Van Reenen (2007). Handley and Limao (2016) estimate that extension of PNTR was equivalent to a 13 percentage point reduction in tariffs.

Recent research documents the substantial impact of competition from China on the United States, suggesting a link between labor market disruptions potentially induced by PNTR and worker health. Pierce and Schott (2016) show that manufacturing industries more exposed to the change in U.S. trade policy experienced disproportionate declines in employment and increases in U.S. imports from China. Consistent with the incentives noted above, they also find that PNTR coincided with a jump in both the number of firms engaged in U.S.-China trade and the value of exports to the United States by foreign-owned firms located in China. Geographically within the United States, Autor, Dorn and Hanson (2013) show that the decline in manufacturing employment during the 2000s was concentrated in commuting zones with greater increases in Chinese imports per worker. Complementary research demonstrates that these areas experience greater declines in self-reported health outcomes (McManus and Schaur 2015a,b) and reduced provision of local public goods (Feler and Senses 2015) and crime (Che and Xu 2015).

We quantify the impact of PNTR on counties' mortality rates in two steps. First, we follow Pierce and Schott (2016) in defining industries' exposure to PNTR as the difference between the high non-NTR rates that would have prevailed if an annual renewal had failed and the lower NTR rates that were locked in by the change in policy. We refer to these differences as "NTR gaps," and show that they exhibit substantial variation across industries. Second, we use the industry-level NTR gaps to compute two measures of a county's exposure to PNTR: its own weighted average NTR gap, where industry employment shares before the change in policy are used as weights; and the weighted average NTR gap of surrounding counties within the same commuting zone. Given the high share of non-tradable production in most counties, we find that NTR gaps generally are smaller across counties than across manufacturing industries.

Our baseline difference-in-differences (DID) specification examines whether counties with higher NTR gaps (first difference) experience differential changes in mortality after the policy is implemented (second difference). Using microdata from the U.S. Centers for Disease Control (CDC), which summarizes all death certificates filed in the United States from 1990 to 2013, we find a positive and statistically significant association between the change in U.S. trade policy and two causes of death plausibly related to loss of employment: suicide and alcohol-related liver disease (ARLD). Our estimates imply that moving a county from the 25th to the 75th percentile of its own- and surrounding-county NTR gap distributions increases the mortality rate for these two

causes of death by 4.4 and 7.7 percent relative to their respective average mortality rates in the year 2000, the year of the change in U.S. trade policy.

Examining deaths due to these causes across demographic groups, we find that the relationship between PNTR and suicide is concentrated among white males and females, a result that is in line with the surprising increase in mortality among whites after 1999 highlighted recently in Case and Deaton (2015). Our estimates imply that an interquartile increase in counties' exposure to PNTR increases the mortality rate due to suicide by 3.9 percent for white males and 4.9 percent for white females relative to their averages across counties in the year 2000. Further analysis reveals that these links are most pronounced in middle age, i.e, between the ages of 35 and 50.

Robustness checks provide additional evidence for these relationships. First, we verify the prior trends assumption implicit in DID analysis by showing that the estimated impact of PNTR on suicide is statistically indistinguishable from zero prior to the change in U.S. policy but positive and statistically significant thereafter. Second, we demonstrate that the statistical and economic significance of our results are similar after dropping county-year observations where death rates may be hard to infer. Third, we show that PNTR is associated with other causes of death plausibly related to changes in economic conditions.

In the second part of the paper we use a similar DID identification strategy to explore potential mechanisms for the above results. First, we show that counties more exposed to PNTR experience greater labor market disruption, including higher unemployment, lower labor force participation and lower income. These outcomes might increase stress and depression as well as reduce workers' ability to pay for medical services to identify or treat these ailments. Second, we show that respondents to a CDC survey of health outcomes in counties more exposed to the trade liberalization are more likely to report losing their health coverage and forgoing medical care due to cost. Third, we show that counties more exposed to the change in U.S. trade policy are more likely to experience increases in crime; this outcome is consistent with both the aforementioned labor market disruptions as well as a general decline in the quality of life.[4] Finally, we find that counties more exposed to PNTR experience a reduction in birth rates.

Our results complement several literatures in economics and public health. Most

[4]Fazel et al. (2015), for example, find a positive association between depression and the likelihood of committing violent crime. More generally, Dix-Carneiro et al. (2015) show that local trade liberalization has a strong effect on homicides in Brazil via local labor market conditions.

closely related in terms of substantive focus and findings are studies of mass layoffs and plant closures. Sullivan and von Wachter (2009), for example, find that high-tenure workers displaced from their jobs as part of mass layoffs experienced a sharp increase in the probability of death.[5] More recently, Browning and Heinesen (2012) find that workers displaced by plant closures in Denmark exhibit elevated death rates, particularly in the short run and particularly for mental illness, suicide and alcohol-related diseases.[6] More generally, a number of papers in the public health literature, including Falba et al. (2005) and Deb et al. (2011), find that workers facing job loss are more likely to engage in unhealthy activities.

Our research also contributes to studies that take advantage of "natural" or actual experiments to examine the impact of shocks to healthcare coverage. Two such papers focus on the random allocation of Medicaid coverage in Oregon. Baicker et al. (2013) find that coverage significantly increases use of preventative services, the probability of a positive screening for depression and diabetes and the use of diabetes medication. Finkelstein et al. (2012) find that coverage leads to better self-reported physical and mental health.[7] To the extent that the labor market disruptions associated with PNTR affect healthcare, these findings are consistent with the positive link we find between the change in trade policy and both suicide and alcohol-related liver disease.

Lastly, we note that while our analysis contributes to a broader understanding of the distributional implications of trade liberalization, it does not provide an assessment of the overall welfare effects of PNTR, which is beyond the scope of this study. Indeed, in contrast with the relationship between PNTR and mortality described above, our analysis of product-level trade data reveals that PNTR is associated with a reduction in import prices, including prices for inputs to health-related industries.

The paper proceeds as follows: Section 2 describes the data, Section 3 describes our empirical strategy and mortality results, Section 4 explores mechanisms that might explain the results, Section 5 examines responses of other outcomes that may be indicative of labor market disruption, and Section 6 concludes. An online appendix provides additional empirical results as well as information about dataset construction

[5]Potential reasons for the increase in mortality discussed by Sullivan and von Wachter (2009) include reduced investments in health, increased stress, and loss of health insurance.

[6]In contrast to these papers and our findings, a series of papers starting with Ruhm (2000) documents a *negative* association between unemployment and mortality in more aggregated data. Ruhm (2015) and Stevens et al. (forthcoming) provide concise summaries of this literature.

[7]Sommers et al. (2012) find that expansion of Medicaid across states is associated with a significant reduction in age-adjusted mortality among older adults, non-whites, and residents of poorer counties. They also find Medicaid expansion to be positively associated with self-reported health status.

and sources.

2 Data

2.1 County Level Mortality

We observe the number of deaths by county, demographic category and cause using a proprietary database from the U.S. Centers for Disease Control (CDC) that summarizes all death certificates filed in the United States from 1990 to 2013.[8] Demographic categories encompass the deceased's age, gender, race, county of residence and county of death. Causes of death are classified according to one of several hundred "external" or "internal" categories.[9] Internal causes of death are defined as those that originate within the body (e.g., liver disease) and external causes of death are defined as those whose origins lie outside the body (e.g., suicide or accidental poisoning).

We match year by county of residence by age category death counts to corresponding population estimates compiled by the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) program.[10] We use these population estimates to compute both "crude" and "age-adjusted" mortality rates, conventionally expressed per 100,000 population. The crude death rate for a county-year is simply the total number of deaths in that county in that year divided by its total population in that year. The age-adjusted death rate for a county, by contrast, is a weighted average of the crude death rates across age categories, where the shares of the overall U.S. population in each age category are used as weights.[11] We use the U.S. population shares in the year 2000 for constructing age-adjusted mortality rates.[12]

[8] These data are available by petition from the CDC. A public-use version of these data can be accessed at www.wonder.cdc.gov, though the extent to which mortality rates can be examined within causes of death and demographic groups over time is limited to prevent disclosure of confidential information. The "blue form" instructions for completing the cause of death section of a death certificate are available at http://www.cdc.gov/nchs/data/dvs/blue_form.pdf.

[9] Causes of death are classified according to International Classification of Diseases (ICD). The CDC data use version 10 of these codes (ICD-10) from 1999 to 2013 and version 9 (ICD-9) of these codes from 1990 to 1998. We make use of a concordance between these underlying codes and major disease categories available in Anderson et al. (2001).

[10] Eighty-one percent of deaths occur in the deceased's county of residence, the focus of our analysis. SEER population estimates are available at http://seer.cancer.gov/popdata/download.html.

[11] We use the following age categories in our baseline results: less than 1 year old, 1 to 4 years, 5 to 14 years, 15 to 19 years, 20 to 24 years..., 80 to 84 years, and greater than 85 years.

[12] The SEER population weights associated with these categories are provided in Table A.1 of the online appendix. Age-adjusted mortality rates can also be constructed using demographic-specific age-

Figure 1 plots the (censored) distributions of age-adjusted mortality rates across counties at four-year intervals starting in 1990. The leftward movement in these distributions indicates that overall death rates decline over the sample period, while the relatively wide support of each distribution reveals that death rates vary substantially across counties.

Across-county variation in mortality rates is also apparent in Table 1, which summarizes counties' population-weighted average mortality rates by gender and by race for the year 2000. As indicated in the first row of the table, the overall mortality rate across counties is 858, with an interquartile range stretching from 778 to 1002. The remaining rows show that mortality is higher for males than females (1046 versus 720), and higher for blacks than for other racial groups (1106 versus 839, 716 and 476).[13]

Table 2 reports the year 2000 population-weighted average age-adjusted death rates per 100,000 population for major external and internal causes of death across counties. As noted in the table, internal causes account for more than 90 percent of deaths across racial groups. The three leading causes of death are cancer, circulatory disease and respiratory ailments.

Using publicly available mortality data for the aggregate United States, Case and Deaton (2015) highlight a substantial rise in deaths due to suicide, chronic liver disease and poisoning (accidental and intent undetermined) among middle-aged whites starting in 1999. Figure 2 uses the CDC microdata examined here to re-create this trend and extend it backwards in time to the beginning of our sample period (1990), where we focus more specifically on suicide, alcohol-related liver disease (ARLD) and accidental poisoning. As indicated in the figure, the rates of suicide and ARLD, which are more-or-less flat during the 1990s, begin increasing around the time of the change in U.S. trade policy in the year 2000. Deaths due to poisoning, by contrast, rise throughout the sample period. In Section 3, we find evidence supporting a link between PNTR and both suicide and alcohol-related liver disease but no relationship with respect to

category weights, e.g., the overall share in the U.S. population of white males in each age category.

[13]In 2000, the U.S. population shares representing males, females, whites, blacks, American Indian and Asians or Pacific Islanders are 49, 51, 82, 13, 1 and 4 percent. Counties' weighted average death rates vary depending on whether overall county population or demographic-specific county population is used to weight each county. This sensitivity can be seen by comparing the first two columns of Table A.2 in the online appendix. The first column (like Table 1) uses total population while the second column uses the population specific to the demographic group whose weighted average is being computed. As indicated in the table, the latter are closer to the official CDC age-adjusted death rates for the United States as a whole. We examine the sensitivity of our baseline estimates to various methods of weighting regression observations in the online appendix.

accidental poisoning or external deaths of undetermined intent.

2.2 The NTR Gap

Our analysis takes advantage of a plausibly exogenous change in U.S. trade policy – the U.S. granting of PNTR to China in October 2000 – that increased U.S. firms' incentives to take advantage of production in China as well as introduce labor-saving technology differentially across industries. The U.S. tariff schedule has two sets of tariff rates. The first, known as NTR tariffs, are generally low and applied to goods imported from other members of the World Trade Organization (WTO). The second, known as non-NTR tariffs, were set by the Smoot-Hawley Tariff Act of 1930 and are often substantially higher than the corresponding NTR rates. Imports from non-market economies outside the WTO generally are subject to the higher non-NTR rates, but U.S. law allows the President to grant such countries access to NTR rates on a year-by-year basis subject to annual approval by Congress.

U.S. Presidents granted China such a waiver every year starting in 1980, but Congressional votes over annual renewal became politically contentious and less certain of passage following the Chinese government's crackdown on Tiananmen Square protests in 1989 and other flashpoints in U.S.-China relations during the 1990s such as China's transfer of missile technology to Pakistan in 1993 and the Taiwan Straits Missile Crisis in 1996. Uncertainty over China's access to NTR tariff rates ended with the U.S. granting of permanent normal trade relations (PNTR) status to China in October 2000, which took effect upon China's entry into the WTO in December 2001.

We follow Pierce and Schott (2012a) in measuring the impact of PNTR as the rise in U.S. tariffs on Chinese goods that would have occurred in the event of a failed annual renewal of China's NTR status prior to PNTR,

$$NTR\,Gap_j = Non\,NTR\,Rate_j - NTR\,Rate_j. \tag{1}$$

We refer to this difference as the NTR gap, and compute it for each SIC industry j using *ad valorem equivalent* tariff rates provided by Feenstra et al. (2002) for 1999, the year before passage of PNTR. NTR gaps vary widely across industries, with a mean and standard deviation of 33 and 15 percentage points, respectively. As noted in Pierce and Schott (2012a), 79 percent of the variation in the NTR gap across industries is due to non-NTR rates, set 70 years prior to passage of PNTR. This feature of non-NTR

rates effectively rules out reverse causality that would arise if *non-NTR rates* were set to protect industries with declining employment or surging imports.[14]

We compute U.S. counties' exposure to PNTR as the employment-share weighted average NTR gap across the sectors in which they are active,

$$NTR\,Gap_c = \sum_j \frac{L_{jc}^{1990}}{L_c^{1990}} NTR\,Gap_j. \tag{2}$$

We use employment shares from 1990, a period well before the change in policy.[15] NTR gaps are defined only for industries whose outputs are subject to U.S. import tariffs, primarily in the manufacturing and agricultural sectors. For industries whose output is not subject to tariffs, such as service industries, we set NTR gaps to zero. For each county, we also calculate the population weighted average NTR gap of the *remaining* counties in its commuting zone, $NTR\,Gap_{cz}$.[16]

Figure 3 reports the distribution of NTR gaps across four-digit SIC industries, counties and surrounding commuting zones. Relative to the distribution across industries, the distributions for counties and surrounding labor market areas are shifted towards the left, reflecting the fact that most workers in most counties are employed outside the manufacturing sector. Own-county NTR gaps average 7.3 percent and have a standard deviation of 6.5 percent, with an interquartile range from 10.6 to 2.3 percent, or 1.27 standard deviations. Surrounding-county NTR gaps have a similar distribution, with a mean and standard deviation of 6.6 and 4.8 percent, and an interquartile range from 8.8 to 3.3 percent, or 1.15 standard deviations.[17]

Finally, Figure 4 visually displays the 0.58 correlation between counties' own and surrounding commuting zone NTR gaps. It also notes each distribution's 25th and

[14]Furthermore, to the extent that *NTR rates* were set to protect industries with declining employment prior to PNTR, these *higher* NTR rates would result in *lower* NTR gaps, biasing our results away from finding an effect of PNTR.

[15]Employment by county and industry are available from the U.S. Census Bureau's County Business Patterns (CBP) database, available at http://www.census.gov/econ/cbp/download/. We follow Autor et al. (2013) in imputing employment for counties where only a range of employment is reported. For more information, see David Dorn's data page, at http://www.ddorn.net/data.htm.

[16]We use the U.S. Department of Agriculture definition of commuting zones as of 1990 (Tolbert and Sizer 1996) and the concordance of counties to commuting zones provided by Autor et al. (2013). The counties in our sample are distributed across 741 commuting zones, with the number of counties per commuting zone ranging from 1 to 19 (the Washington DC area).

[17]Counties with NTR gaps equal to zero lie in predominantly agricultural areas, e.g., in Nebraska and North and South Dakota. Counties with the highest NTR gaps, i.e., above 30, tend to be concentrated in the southeast, e.g., in Georgia and South Carolina.

75th percentiles.

2.3 Other U.S. Trade Policy Variables

Our empirical analysis controls for two additional county-level variables that capture changes in U.S. trade policy during our sample period: the average U.S. import NTR tariff rate associated with the goods produced by each county and the average exposure of the county to the end of quantitative restrictions on textiles and clothing imports associated with the phasing out of the global Multi-Fiber Arrangement (MFA).

Counties' labor-share weighted U.S. import tariff rates, NTR_{ct}, are computed as in equation 2, where the U.S. NTR tariff rate for industry j is used in place of the NTR gap for industry j. As indicated in the left panel of Figure 5, NTR_{ct} declines during the late 1990s due to implementation of tariff reductions agreed upon during the Uruguay Round.[18]

We measure counties' exposure to the end of the MFA analogously. As discussed in greater detail in Khandelwal et al. (2013), the MFA and its successor, the Agreement on Textile and Clothing (ATC), grew out of quotas imposed by the United States on textile and clothing imports from Japan during the 1950s. Over time, it evolved into a broader institution that regulated the exports of clothing and textile products from developing countries to the United States, European Union, Canada and Turkey. Bargaining over these restrictions was kept separate from multilateral trade negotiations until the conclusion of the Uruguay Round in 1995, when an agreement was struck to eliminate the quotas over four phases. On January 1, 1995, 1998, 2002 and 2005, the United States was required to remove textile and clothing quotas representing 16, 17, 18 and the remaining 49 percent of their 1990 import volumes, respectively. Relaxation of quotas on Chinese imports did not occur until it became a member of the Wort Trade Organization (WTO) in 2001; as a result, its quotas on the goods in the first three phases were relaxed in early 2002 and its quotas on the goods in the fourth phase were relaxed as scheduled in 2004. The order in which goods were placed into a particular phase was chosen by the United States.

Computation of counties' exposure to elimination of the MFA proceeds in three

[18]NTR tariff rates from Feenstra, Romalis and Schott (2002) are unavailable after 2001 and so are assumed constant after that year. Analysis of analogously computed "revealed" tariff rates from public U.S. trade data during this interval in Pierce and Schott (2012a) suggests this is an reasonable assumption that avoids having to make do with the smaller set of industries for which "revealed" rates are available.

steps. First, we follow Brambilla et al. (2009) in measuring the extent to which MFA quotas in industry j and phase p were binding as the import-weighted average fill rate of the industry's constituent import products in the year before they were phased out, $FillRate_{jp}$.[19] Industries with higher average fill rates faced more binding quotas and are therefore more exposed to the end of the MFA. Second, for each phase, we compute counties' labor-share weighted average fill rate across industries, $FillRate_{cp}$, using a version of equation 2. Finally, we create our county-year variable of interest, $MFA\,Exposure_{ct}$, which, for each year t, is the sum of $FillRate_{cp}$ for goods that have been phased out by that year. The median and inter-quartile range of this variable across counties is displayed in the right panel of Figure 5. As indicated in the figure, fill rates rise over time, consistent with the hypothesis in Brambilla et al (2010) that the United States placed its more "sensitive" textile and clothing products into the latter two phases as a means of deferring politically painful import competition as long as possible.

2.4 County Demographic Information

Our analysis controls for two initial (i.e., 1990) county demographic characteristics – median household income and the percent of the population without a college degree – that may explain variation in mortality rates. This information, summarized in Table 1, is obtained from the U.S. Census Bureau's 1990 Decennial Census.[20] Across counties, 1990 median household income averages 40 thousand dollars and ranges from 11 to 77 thousand dollars. The share of population without a college degree in 1990 ranges from 19 to 88 percent, averaging 54 percent.

Table 3 reports the results of OLS regressions of counties' 1999 NTR gaps against the other county attributes discussed in this section. As indicated in the table, counties with higher NTR gaps have higher import tariffs across the goods they produce, greater exposure to the MFA and a higher population share without a college education in 1990. Counties with higher NTR gaps have lower median household income in 1990.

[19] Fill rates are defined as actual imports divided by allowable imports under the the quota, and products outside the MFA have a fill rate of zero.

[20] These data can be downloaded from the Dexter Data Extractor at the University of Missouri, available at http://mcdc.missouri.edu/.

3 PNTR and Mortality Rates

3.1 Identification Strategy

Our baseline difference-in-differences (DID) specification examines whether counties with higher NTR gaps (first difference) experience differential changes in mortality after the change in U.S. trade policy (second difference),

$$\begin{aligned} Death\,Rate_{ct} \;=\; & \theta_1 Post\,PNTR_t \times NTR\,Gap_c + \\ & \theta_2 Post\,PNTR_t \times NTR\,Gap_{cz} + \\ & \beta \mathbf{X}_{ct} + \gamma Post\,PNTR_t \times \mathbf{X}_c + \\ & \delta_c + \delta_t + \alpha + \varepsilon_{ct}, \end{aligned} \tag{3}$$

The sample period is 1990 to 2013. The left-hand side variable represents county $c's$ age-adjusted death rate for a particular cause of death and demographic group in year t. The first two terms on the right-hand side are the DID terms of interest, interactions of a post-PNTR (i.e., $t > 2000$) indicator with the (time-invariant) own- ($NTR\,Gap_c$) and surrounding county ($NTR\,Gap_{cz}$) NTR gaps. $\mathbf{X}_{ct}$ represents two time-varying covariates that account for the overall U.S. import tariff rate associated with the sectors produced by the county (NTR_{ct}) and the sensitivity of the county to the phasing out of the global Multi-Fiber Arrangement ($MFA\,Exposure_{ct}$). $\mathbf{X}_c$ represents two initial-period county demographic attributes taken from the 1990 Census that are potentially correlated with mortality rates: median household income and the share of population without a college degree. Including interactions of these attributes with the $Post\,PNTR_t$ indicator allows the relationship between these characteristics and mortality rates to differ before and after passage of PNTR. δ_c and δ_t represent county and year fixed effects. Inclusion of these fixed effects nets out characteristics of counties that are time-invariant, such as whether they are near the coast or inland, while also controlling for aggregate shocks that affect all counties identically in a particular year.

An attractive feature of this DID identification strategy is its ability to isolate the role of the change in U.S. trade policy. While counties with high and low NTR gaps are not identical, comparing outcomes within counties over time isolates the differential

impact of China's change in NTR status.[21]

3.2 Baseline Estimates

This section examines the link between PNTR and three specific causes of death: suicide, alcohol-related liver disease (ARLD) and accidental poisoning, which includes drug overdoses. We focus on these causes of death initially for several reasons: because they are highlighted in Case and Deaton (2015); because they are found to be important in the plant-closing and mass-layoff literature (e.g., Browning and Heinesen 2012); because their concordance across the cause-of-death coding schemes used by the CDC over time is straightforward; and because they may be more easily observable than other forms of death, particularly in the case of suicide and poisoning.[22]

Results from estimation of equation 3 for suicide are reported in the first four columns of Table 4, with standard errors clustered at the county level. The first column reports coefficient estimates for a specification containing just the DID term of interest and the fixed effects. The second and third columns add the time-varying policy variables and the interactions of initial demographic characteristics with the post-PNTR indicator variable, respectively. As indicated in the table, the DID point estimate of interest is positive and statistically significant at conventional levels across all three specifications, and declines across columns as additional controls are added to the specification.

We assess economic significance by computing the change in the mortality rates associated with moving a county from the 25th percentile of the NTR gap distribution to the 75th percentile (i.e., from 2.3 to 10.6 percent, or 1.27 standard deviations). As indicated in the bottom panel of the table, the implied increase in mortality under this counterfactual falls from 0.72 = [0.087*(10.6-2.3)] per 100,000 in column 1 to 0.38 per 100,000 in column 3. These changes represent 7.3 and 3.8 percent of the of the average age-adjusted suicide mortality rates across counties in the year 2000 (9.95, as reported in the penultimate row of the table).[23]

The fourth column of Table 4 adds the second DID term of interest, the average

[21] A disadvantage is that the long sample period renders it susceptible to biased standard errors associated with serial correlation (Bertrand, Duflo and Mullainathan 2003).

[22] There is reason to believe that information on death certificates' cause of death may be noisy. Kircher et al. (1985), for example, finds that 29 percent of 272 randomly selected autopsy reports and corresponding death certificates in Connecticut in 1980 exhibit a major disagreement.

[23] By way of context, Ruhm (2000) finds that a 1 percentage point increase in a state's unemployment rate decreases the predicted death rate by approximately 0.5 percent.

NTR gap of the remainder of each county's commuting zone ($NTRGap_{cz}$). Coefficient estimates for both DID terms are positive and, as indicated in the third row of the table's middle panel, they are jointly statistically significant at conventional levels. For this specification, we compute economic significance as the change in mortality rates associated with moving a county from the 25th to the 75th percentile of *both* its own- and surrounding-labor-market-area NTR gap distributions. As noted in the bottom panel of the table, the implied impact of PNTR is an increase in the suicide death rate of 0.44 per 100,000 [0.028*(10.6-2.3)+0.036*(8.8-3.3))], or 4.4 percent of the average age-adjusted death rate across counties in the year 2000.[24]

In column 5 of Table 4 we find a jointly positive and statistically significant relationship between mortality and the two DID terms of interest for ARLD.[25] Here, the implied impact of an interquartile shift in counties' exposure to PNTR is an increase of 0.34 per 100,000, or 7.7 percent of the average age-adjusted mortality rate for this cause in the year 2000 (4.39 per 100,000). We do not find a statistically significant relationship between PNTR and death due to poisoning (column 6), which, as noted above, started increasing during the 1990s.[26]

We examine the link between PNTR, suicide and alcohol-related liver disease across genders and races in Tables 5 and 6.[27] We find a positive and statistically significant relationship between PNTR and suicide among both white males and white females. As indicated in the bottom panel of Table 5, the implied impact of moving a county from the 25th to the 75th percentiles of its own and surrounding-labor-market-area NTR gap distributions is an increase in deaths by suicide of 0.72 per 100,000 for white males and 0.20 per 100,000 for white females, which represent increases of 3.9 and 4.9 percent of their respective averages across counties in the year 2000 (of 18 and 4 per 100,000, respectively). By contrast, we find no relationship between PNTR and

[24] A relationship with PNTR and suicide might spuriously relate to changes in access to firearms across counties that occurs at the same time as the change in trade policy. Re-estimation of suicides according to whether or not they involve a firearm, however, reveals a positive and statistically insignificant association for the former (implied impact and standard error of 0.12 and 0.09; p-value 0.20) and a positive and statistically significant association with respect to the latter (implied impact and standard error of 0.32 and 0.08; p-value less than 0.01).

[25] As noted in Ruhm (2000), Cook and Tauchen (1982) find that mortality due to cirrhosis of the liver responds quickly to changes in alcohol taxes.

[26] One commonly cited explanation for the increase in death due to poisoning is an increase in the misuse of prescription opioid painkillers that occurred around this time. See, e.g., Rudd, Aleshire, Zibbel and Gladden (2016).

[27] We find no link between poisoning and any gender-race bin and therefore omit that table to conserve space.

suicide for blacks or Asians, and a negative and statistically significant relationship for American Indian males (p-value 0.09).[28] These results mirror the findings of Case and Deaton (2015), who report an increase in suicide rates among whites relative to other races.

In Table 6, we find a positive and statistically significant relationship between PNTR and ARLD for white males, and a positive but statistically insignificant relationship at conventional levels (p-value 0.13) for white females. We also find a negative and statistically significant relationship between PNTR and mortality due to ARLD for both American Indian males and females. For white males, the implied impact of an interquartile shift in counties' exposure to PNTR is 0.59 per 100,000, or 8.4 percent of the average rate across counties in the year 2000 (of 7.1 per 100,000).

One potential explanation for why the relationship between PNTR and suicide and ARLD is strongest for white males is this group's disproportionate representation among manufacturing workers most affected by increased import competition from China. As indicated in Table A.6 of the online appendix, males accounted for 68 percent of U.S. manufacturing employment versus 49 percent of the population in 1999, and whites represented 84.3 percent of manufacturing employment versus 81.7 percent of the population. Moreover, within manufacturing, over-representation of whites is highest among occupations likely to be earning the highest wages, rendering layoffs of this group potentially more disruptive.[29]

To determine whether the relationship between PNTR, suicide and ARLD is present among working-age adults most likely to be affected by the change in U.S. trade policy, Figure 6 reports the 95 percent confidence intervals of the implied impact of an interquartile shift in counties' exposure to PNTR on white males (left panels) and white females (right panels) by pre-retirement age group. The first bar in each figure reproduces the 95 percent confidence interval across all ages from Tables 5 and 6. As

[28]Though we report results for all four racial groups, we caution that estimates for the American Indian and Asian populations may be noisy due to their small size and relatively uneven distribution across counties. The American Indian and Asian or Pacific Islander populations represent 1.1 and 4.2 percent of the overall population in the year 2000. In that year, these two groups have populations exceeding 50,000 in 48 and 158 counties, respectively, versus 2290 and 514 counties for whites and blacks. As reported in Figure A.1 of the online appendix, the American Indian and Asian populations also tend to inhabit counties with relatively lower NTR gaps.

[29]Ebenstein et al. (2014a,b), for example, find that workers displaced from manufacturing on average experience wage declines in moving to another sector. As reported in Table A.6 of the online appendix, whites accounted for 90.4 percent of managers and professionals, 86.3 percent of technical, sales, administrative and service positions, and 83.0 percent of precision production positions, versus 78.9 percent among operators, fabricators, laborers and other occupations

indicated in the figure, the association between PNTR and suicide is most evident in middle age for both males and females. For alcohol-related liver disease, it is most prevalent in men starting in their late 30s. For women, it is most prevalent in their late 30s and after age 55.[30]

3.3 Robustness

This section examines the robustness of the baseline DID results reported in the previous section to two exercises: the exclusion of counties with few deaths and the use of a more flexible DID specification to verify timing.

Death Rates from Sparsely Populated Counties: Estimation of age-adjusted death rates may be biased if few deaths are observed.[31] We therefore re-estimate the relationship between PNTR and mortality from either suicide or ARLD after excluding county-year observations with fewer than 20 deaths for the cause of death and demographic group upon which the regression is based. To conserve space we report only the implied impacts on mortality rates of an interquartile shift in counties' exposure to PNTR.

Comparison of Table 8 with Tables 5 to 6 reveals that dropping county-year observations with fewer than 20 deaths yields parameter estimates for whites and blacks that are similar in terms of magnitude, sign and statistical significance. Results for American Indians and Asians change more substantially, a difference which might be driven by the sharp decline in observations associated with those regressions.

Prior Trends and Timing: For the increase in mortality to be attributable to the change in U.S. trade policy, the NTR gap should be correlated with mortality rates after PNTR but not before. To examine whether this is the case, we estimate a version of equation 3 that interacts the time-invariant county-level NTR gap and other county attributes with an indicator variable for each year,

[30] Gemmill et al. (2015) find that macroeconomic shocks appear to induce suicide among working age males, as opposed to simply moving suicides forward in time.

[31] Official CDC mortality estimates exclude crude death rates based on fewer than 20 deaths.

$$
\begin{aligned}
Death\,Rate_{ct} \;=\; & \sum_t \theta_{1t}\, 1\{year = t\} \;\times\; NTR\,Gap_c + \\
& \sum_t \theta_{2t}\, 1\{year = t\} \;\times\; NTR\,Gap_{cz} + \\
& \beta \mathbf{X}_{ct} + \\
& \sum_t \gamma_t\, 1\{year = t\} \;\times\; \mathbf{X}_c + \\
& \delta_c + \delta_t + \alpha + \varepsilon_{ct},
\end{aligned}
\tag{4}
$$

Results for suicide and ARLD among white males and females are displayed visually in Figure 7. Each panel of the figure uses the estimated DID parameters of interest (θ_{1t} and θ_{2t}) to compute the 95 percent confidence interval associated with moving a county from the 25th to the 75th percentiles of its own and surrounding-labor-market-area NTR gap distributions. Three of the four panels in the figure correspond to the three demographic groups for which an association between these causes of death and PNTR is found to be positive and statistically significant using the DID specification in equation 3. For comparison, the fourth panel reports results for white females dying of ARLD, for which the p-value for the coefficient estimate of the DID term from equation 3 is 0.12.

As indicated in the upper two panels of the figure (suicide among white males and females), the implied impact of PNTR is generally statistically indistinguishable from zero prior to the change in U.S. trade policy but shifts upward after it is implemented. This upward shift is most clearly evident for suicide by white males in the top left panel, where the confidence interval for the implied impact of PNTR is above zero from 2003 to 2013.

The lower two panels of Figure 7 report results for alcohol-related liver disease for white males and females. Here, too, an upward shift is discernible for white males. For white females, the confidence interval is not statistically distinguishable from zero either before or after the change in policy.

3.4 Other Causes of Death

In this section we investigate the relationship between PNTR and several other causes of death that one might expect to be either unrelated to the change in trade policy

or related to it via one of the potential mechanisms discussed in the the next section, e.g., a decline in health insurance.

We begin with an investigation into whether PNTR is associated with accidents of "unknown intent," which encompasses poisoning, discharge of firearm and fall from a high place. We view this regression as a check on the results for suicide reported above: to the extent that these events were not classified as clear cases of suicide, we do not expect them to be related to economic conditions. As indicated in the first column of Table 9, we find no statistically significant relationship between this cause of death and PNTR.

In column two, we investigate the link between PNTR and deaths due to motor vehicle accidents, a form of mortality found to be positively related to economic activity in the literature.[32] Intuitively, we find a negative and statistically significant association with respect to PNTR.

A large body of research in the economics and public health literatures examines the potential impact of health insurance and health outcomes, hypothesizing that lack of coverage might inhibit both preventative screening and treatment of known conditions. Toward that end, columns three through five of Table 9 examine links between PNTR and diabetes, which, ideally, involves consistent monitoring and treatment, and two categories of cancer found to be sensitive to preventative screening: cancer of the digestive tract, which includes colorectal cancer, and cancer of the breast, bone and skin.[33] As indicated in the table, we find positive and statistically significant relationships in all three cases. The implied impacts of interquartile shifts in counties' exposure to PNTR are increases in mortality rates of 0.82, 0.35 and 0.91 per 100,000, or 3.3, 1.6 and 1.9 percent of the average rates of death across counties for these causes in the year 2000 (24.98, 21.39 and 46.53 per 100,000).

A number of papers study the link between economic shocks and circulatory disease

[32]Ruhm (2000), for example, finds that a one percent decline in the unemployment rate increase is associated with 3 percent rise in mortality due to motor vehicle accidents. A similar relationship is found in Stevens et al. (2011). On the other hand, the relationship between PNTR and motor vehicle accidents might be more complex if a decline in economic activity occurs as health insurance coverage decreases: Doyle (2005), for example, finds that the medically uninsured receive 20 percent less care and have a substantially higher mortality rate from auto accidents. Relationships might also be more complex depending on the elasticity of drinking while driving.

[33]Studying the Oregon health care experiment, Baiker et al. (2013) find that access to Medicaid increased the probability of being diagnosed with diabetes and increased the use of diabetes medication. Roetzheim et al. (1999), Bradley et al. (2002) and Tawk et al. (2016) find that the uninsured are diagnosed with breast, skin (melanoma), colorectal and prostate cancers at later stages than the insured, reducing the chance of survival.

in general and acute myocardial infarction (AMI, or heart attack) in particular.[34] In columns six and seven of Table 9, we examine death due to AMI versus all other forms of circulatory disease.[35] As indicated in the table, we find a *negative* and statistically significant relationship between PNTR and AMI and no statistically significant relationship between PNTR and other forms circulatory diseases. For AMI, the implied impact of an interquartile increase in counties' exposure to PNTR is a decrease of 3.22 deaths per 100,000, or -4.7 percent of the average rates of death across counties in the year 2000 (67.7 per 100,000). One potential explanation for this result may be the loss of of physically demanding manufacturing employment due to the trade liberalization. McManus and Schaur (2015), for example, argue that firms in import-competing industries emphasize productivity at the expense of worker safety; loss of such jobs may reduce mortality due to AMI. Hummels, Munch and Xiang (2016) find that a rise in firm exports is associated with increases in injuries, severe depression and hospitalizations due to AMI and strokes.

Finally, the last two columns of Table 9 summarize the relationship between PNTR and overall deaths due to internal and external causes. We find a positive and statistically significant relationship for the former and no statistically significant association for the latter. Coefficient estimates for all internal causes of death suggest that the implied impact of an interquartile shift in counties' exposure to PNTR is an increase of 16 deaths per 100,000, or 2.1 percent of the average mortality rate for that cause in the year 2000 (of 803 per 100,000). The lack of a relationship for external causes is unsurprising given the mixture of results for external causes of death described above, i.e., positive for suicide, negative for motor vehicle accidents, and no relationships for accidental poisoning and accidents of unknown intent.

4 Mechanisms

A link between PNTR and mortality due to suicide or other internal causes of death discussed in the previous section might be operating through several mechanisms. In

[34] Ruhm (2000), for example, finds that a one percent increase in the unemployment rate is associated with a 0.5 percent decline in death due to circulatory disease, speculating that this relationship might be driven by a decline in stressful activity. Browning and Heinesen (2012), on the other hand, find that Danish workers displaced by plant closure are more likely to die of both heart attack and other forms of circulatory disease than workers with similar characteristics who are not laid off.

[35] Circulatory disease is the leading cause of death during in the year 2000, with AMI accounting for one-fifth of deaths within this category.

this section we gather data from a variety of sources to investigate many of these mechanisms, though we caution that in the absence of being able to match mortality data to other individual-level data this evidence is necessarily circumstantial. First, we demonstrate that counties more exposed to PNTR experience negative labor market outcomes, including relative increases in unemployment, declines in labor force participation, and declines in overall and per capita personal income. Second, we show show that respondents in counties most affected by PNTR are more likely to report inability to pay for medical services and loss of insurance coverage. Finally, we show that PNTR might be associated with a deterioration in both current and expected living standards, manifest in higher rates of property crime and lower birth rates. In each case, we make use of the same difference-in-difference specification used to study mortality in the previous section.

4.1 Labor Market Outcomes (LAUS)

Passage of PNTR in October 2000 is followed by a sharp decline in aggregate U.S. manufacturing employment and a pronounced increase in the overall unemployment rate, as illustrated in Figure 8. We examine the relationship between these labor market outcomes and PNTR within counties using data from the Bureau of Labor Statistics' Local Area Unemployment Statistics (LAUS) program.[36] With these data, we observe counties' unemployment and labor force participation rates as well as their level of employment from 1990 to 2013.[37]

As indicated in the first two columns of Table 10, we find that greater exposure to PNTR is associated with a statistically significant increase in counties' unemployment rates and a statistically significant decline in counties' labor force participation rates. The DID point estimates suggest that a county moving from the 25th to the 75th percentiles of its own and surrounding-county NTR gap distributions is associated with an increase in the unemployment rate of 1.43 percentage points, or roughly 35 percent of the average unemployment rate across counties in 2000. For the labor force participation rate, the implied impact of PNTR is a decline in the labor force participation rate of -1.51 percentage points, or -3.0 percent of the average across

[36] These data can be accessed at http://www.bls.gov/lau/.

[37] As reported in Table 1, the population weighted average unemployment and labor force participation rates across counties in the year 2000 were 4.1 and 50.5 percent, but these rates vary widely across counties: the minimum and maximum rates in that year are 1.4 to 17.5 percent for unemployment and 17.5 to 91.6 percent for labor force participation.

counties in 2000.[38]

The final three columns of Table 10 examine the relationship between PNTR and the log of overall employment as well as the logs of manufacturing versus non-manufacturing employment. As indicated in the table, we find that both overall and manufacturing employment exhibit a negative and statistically significant relationship with county exposure to PNTR, though the implied impact of this relationship is larger for the latter, -0.11 versus -0.04 log points. We also find a positive relationship between PNTR and non-manufacturing employment, though the implied impact of this association, at -0.0014 log points, is approximately two orders of magnitude smaller than the estimated effect in manufacturing.

4.2 Per Capita Income (LAPI) and Wages (QCEW)

In this section we examine the relationship between PNTR and counties' per capita income and average annual pay. Data on counties' nominal overall and per capita personal income are from the Local Area Personal Income (LAPI) database, produced by the Bureau of Economic Analysis (BEA).[39] Information on counties' nominal average annual pay – overall and for the manufacturing sector – is from the Quarterly Census of Employment and Wages (QCEW) database, published by the Bureau of Labor Statistics (BLS).[40] In the absence of county-level price indexes, we deflate each nominal series by the BLS regional Consumer Price Index (CPI) for all urban consumers (CPI-

[38] Autor et al. (2013) show that commuting zones experiencing greater increases in imports from China between 2000 and 2007 exhibit greater declines in manufacturing employment, larger increases in unemployment and greater declines in labor force participation. Their estimates imply that the $1,840 actual increase in imports per worker from China from 2000 to 2007 decreases the labor force participation rate by 1.42 percentage points.

[39] These data can be accessed at http://www.bea.gov/regional/downloadzip.cfm. Personal income is defined as the income received from all sources. It includes wage income, income from owning a home, business and financial assets, and from government and business in the form of transfers. It includes income received from both domestic and international sources. It does not include realized or unrealized capital gains or losses. For more information, see http://www.bea.gov/regional/histdata/releases/1114lapi/lapi1114methods.pdf.

[40] These data can be accessed at http://www.bls.gov/cew/. Wages include bonuses, stock options, severance pay, profit distributions, cash value of meals and lodging, tips and other gratuities and, for some states, employer contributions to deferred compensation plans. See http://www.bls.gov/cew/cewfaq.htm for more information.

U) that corresponds to the county's state.[41] The base year for each real series is 2000.[42]

Table 11 reports results. As indicated in the bottom panel of the table, we find negative and statistically significant associations between PNTR and counties' real overall personal income, per capita personal income, and average annual pay. We find no relationship between counties' exposure to PNTR and real average annual pay in manufacturing.

The DID point estimates for counties' overall personal income suggest that a county moving from the 25th to the 75th percentiles of exposure to PNTR is associated with a drop in aggregate personal income of -0.035 log points. In principle, this decline in overall county income could be driven by net out-migration or by a decline in income among continuing residents.[43] The -0.043 implied impact of PNTR on counties' per capital personal income, however, suggests that the decline in overall personal income is due at least in part to declines among continuing residents.[44]

Further insight into income effects is provided by the implied impacts of PNTR on counties' overall average annual pay and their average annual pay in manufacturing, which are -0.027 log points and -0.003 log points, respectively. These results indicate that overall average annual pay may have been driven down by workers switching sectors from higher-paying manufacturing jobs to lower-paying jobs outside manufacturing. Furthermore, the lack of an impact of PNTR on counties' average annual pay within manufacturing is consistent with with evidence presented in Ebenstein et al. (2014a,b), who show that manufacturing industries' exposure to trade and offshoring has little impact on wages in that sector due to reallocation: low skill workers leav-

[41] The BLS produces CPIs for four regions: the northeast (Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont), the midwest (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin), the south (Alabama, Arkansas, Delaware, District of Columbia, Florida, Geogia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia) and the west (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming). For each region, the BLS produces indexes for three sets of cites: the overall CPI for urban consumers (CPI-U), the CPI for metropolitan urban areas with population above 1.5 million (class A) and the CPI for metropolitan urban areas fewer than 1.5 million (class B/C). These indexes are compared in Figure A.2 of the online appendix.

[42] Table 1 reports the distribution of these series across counties for the year 2000. As indicated in the table, the population weighted average per capita personal income in the year 2000 has a mean and standard deviation of 30.5 and 9.2 thousand dollars, and ranges from 10.2 to 83.2 thousand dollars. The means and standard deviations for counties' average annual overall and manufacturing pay are 32.9 and 9.9 thousand dollars, and 41.8 and 13.4 thousand dollars, respectively.

[43] We plan to analyze potential migration in response to PNTR in an upcoming draft of this paper.

[44] Autor, Dorn, Hanson and Song (2014) find that workers in industries subject to higher Chinese import growth experience declines in cumulative earnings.

ing manufacturing tend to push the average wage higher, while increased competitive pressure from Chinese manufacturing firms pushes wages lower.[45]

4.3 Self-Reported Health Coverage (BRFSS)

Given that health insurance in the United States is often provided by employers, the temporary or permanent transitions out of employment documented in the previous section may lead to loss of health care coverage. To the extent that this loss leads the uninsured to postpone or forgo necessary medical care, PNTR may exert a direct effect on mortality.

We use data from the CDC's Behavioral Risk Factor Surveillance System (BRFSS) to examine how health outcomes respond to the policy change.[46] The BRFSS is a cross-sectional telephone survey coordinated by state health departments on a monthly basis with technical and methodological assistance from the CDC. Survey questions solicit information about health-related risk behaviors, chronic health conditions and use of preventative services. One useful feature of BRFSS data relative to others for the purposes of our study is that it provides information on respondents' county of residence. However, we caution that this information is often suppressed, with the severity of the suppression increasing as one considers data for years further back in time. Another caveat with respect to the BRFSS is that it is not designed to be representative at the county level.[47]

We examine two questions related to health coverage in the BRFSS. These questions ask respondents whether they have any form of health care coverage and whether there was a time in the previous year when they needed to see a doctor but could not due to cost. We use the responses to construct two outcome variables: the share of respondents in the county that indicate that they have no health coverage, and the share indicating

[45] McLaren and Hakobyan (2010) also find that blue collar workers in the industries most vulnerable to import competition from NAFTA experience wage declines.

[46] The BRFSS data are available at http://www.cdc.gov/brfss/.

[47] The BRFSS uses random-digit dialing to select a representative sample from the non-institutionalized adult (over 18) population in each state. For the survey questions analyzed below, the number of counties included in the regression results (i.e., those with observations both before and after 2000) rises from an average of 550 between 1993 and 2000 to 807 between 2001 and 2006. The average number of respondents per county included in the regression rises from 170 between 1993 and 2000 to 258 from 2001 to 2009. The 2000 population of the counties present in at least one year before and after PNTR is 192 million, or approximately 68 percent of the total U.S. population of 282.2 million in that year. We use the BRFSS' suggested sample weight ("finalwt") to weight individuals' responses when aggregating to the county level. In computing these averages, we include respondents who either report not knowing or do not provide a response.

that cost prevented them from a necessary doctor's visit.[48]

As indicated in the first two columns of Table 12, we find a positive and statistically significant relationship between counties' exposure to PNTR and both reported lack of any form of health care coverage and an inability to see a physician due to cost.[49] The DID point estimates reported in the table imply that a county moving from the 25th to the 75th percentiles of its own and surrounding-county NTR gap distributions is associated with increases in the share of respondents reporting no coverage and an inability to see a doctor of 0.58 and 0.72. these increases represent 4.3 and 5.9 of the average share of those responses across counties in the year 2000 (of 13.4 and 12.2 percent).

Next, we examine the relationship between the policy change and self-reported health assessments. Three questions on the BRFSS ask respondents to rate their general state of health at the time of the survey and to note the number of days in the 30 days preceding the interview that the respondent had physical or mental health that they would rate as "not good."[50] For the former, we consider the share of respondents that indicate their health is "fair" or "poor"; the other possible responses are "excellent," "very good" and "good." For the latter, we examine the county-level average number of days reported. Here, as above, we use the baseline DID specification in equation 3.

The third column of Table 12 reports results for current health status, and here, the positive and statistically significant coefficient on the DID term indicates that the policy change is associated with an increase in the share of respondents reporting the lowest two rankings of health status, though this estimate is statistically insignificant at conventional levels (p-value 0.11).The final two columns of Table 12 indicate no relationship between PNTR and the number of days respondents report having physical or mental health that is "not good." These results contrast with McManus and Schaur

[48]The questions referred to in this paragraph are worded as follows. "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs (Health Maintenance Organizations), or government plans such as Medicare?" "Was there a time in the past 12 months when you needed to see a doctor but could not due to cost?" We include "don't know" and "no response" in constructing these shares.

[49]The regression results presented in Table 12 do not weight county observations by population. When regressions are weighted by population, the implied impact of the DID terms of interest retain their sign but lose statistical significance at conventional levels.

[50]The wording of these questions is as follows."Would you say that in general your health is excellent, very good, good, fair or poor." "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?" "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"

(2015), who use the BRFSS to show that residents of commuting zones experiencing higher imputed import growth per worker from China between 2000 and 2007 exhibit deteriorating physical and mental health.

Taken together, the results in Table 12 provide some evidence that PNTR is associated both with deteriorating health and an diminishing ability to afford treatment. These trends highlight a direct mechanism for the link between greater exposure to PNTR and higher mortality reported in Section 3.

4.4 Crime

We examine the relationship between PNTR and crime rates for three reasons. First, an increase in crime could affect mortality directly, e.g. via homicides, though it turns out that we do not find evidence for that channel. Second, an increase in crime contributes to a lower quality of life and thereby might contribute to depression or other conditions consistent with the increases in mortality noted above. Finally, a link between PNTR and crime rates provides additional evidence of the seriousness of the labor market disruptions documented in the previous section (Iyer and Topalova 2014, Dix-Carneiro et al. 2015).

Our analysis makes use of county-level crime rate statistics per 100,000 residents available from the Federal Bureau of Investigation (FBI) via the Uniform Crime Reporting (UCR) database.[51] These data break overall crime rates into two main categories, violent and property crime, and eight sub-categories: murder, rape, robbery, assault, burglary, larceny, auto theft and arson.[52]

Table 13 reports the results of baseline DID specifications similar to those used above. As indicated in the first and second columns of the table, counties' exposure to the change in U.S. trade policy has a positive relationship with both violent and property crime, but this relationship is only statistically significant at conventional levels for property crime. The DID point estimate for the property crime regression implies that a county moving from the 25th to the 75th percentiles of its own and surrounding-county NTR gap distributions is associated with an increase in the rate of property crime per 100,000 residents of 226.06, or 8.7 percent of the average property crime rate across counties in the year 2000 (2592 per 100,000). These results are

[51] These data are available at https://www.fbi.gov/about-us/cjis/ucr/ucr.

[52] Burglary is defined as theft (i.e., larceny) combined with unlawful entry. Robbery is defined as forcible theft from a person.

consistent with Feler and Senses (2015) who note that counties more exposed to imports from China experienced small increases in property crime, while the least exposed counties experienced a substantial reduction in crime.

The remaining columns of Table 13 illustrate positive and statistically significant relationships between counties' exposure to PNTR and several sub-categories of crime, including robbery, burglary, larceny and motor vehicle theft. The DID coefficient estimates for these regressions suggest that moving a county from the 25th to the 75th percentiles of its own and surrounding-county NTR gap distributions is associated with an increases in the rates of these crimes of 12.9, 11.2 and 6.9 and 14.1 percent compared to their rates per 100,000 residents in the year 2000 (of 113, 570, 1709 and 313).

The relationship between counties' exposure to PNTR and the various violent crime categories is not statistically significant at conventional levels. In particular, PNTR's relationship with rape is positive but statistically insignificant at conventional levels (p-value of 0.12).

4.5 Birth Rates

In light of the literature that finds links between economic shocks and birth rates, we examine the relationship between PNTR and fertility. In principle, the association between PNTR and local labor market conditions discussed above might affect birth rates in at least two ways. On one hand, to the extent that workers perceive the declines in income and employment as temporary, they might perceive a drop in the opportunity cost of having children and the birth rate might rise. On the other hand, to the extent that PNTR results in long-term reductions in income and employment, birth rates might decline.[53]

We make use of county-level data on births available from CDC.[54] Using these data and population estimates from SEER, we compute both the birth rate and the fertility rate for each county, defined as births per population and births per female population aged 15 to 44, respectively. As with the BRFSS data, however, we caution that the county-level birth data is often suppressed, and it is available only for the years

[53]These trade-offs and the potential cyclicality of birth rates are discussed in Ben-Porath (1973), Becker (1960, 1965), Galbraith and Thomas (1941), Mincer (1963) and Silver (1965). Dettling and Kearney (2014) provide a concise discussion of this literature. Anukriti and Kumler (2012) find that an increase in import competition in India associated with the end of the License Raj in 1991 raised birth rates among women with low socioeconomic status but had the opposite affect among women of high socio-economic status.

[54]These data can be downloaded from http://wonder.cdc.gov/wonder/help/natality.html.

1992 to 2006. The number of counties included in the regression results (i.e., those with observations both before and after 2000) rises from an average of 457 between 1995 and 2000 to 501 between 2001 and 2006. These counties are among the largest, representing an average of 76 percent of the total U.S. population across the sample period.

Table 14 reports the results of baseline DID specifications similar to those used above. The first two columns report results for the birth and fertility rates 100,000 population, while the third column reports results for the log number of births. As indicated in the table, the DID coefficients of interest are negative in all three columns but statistically significant at conventional levels only for the birth rate and log births. The coefficient estimates for the birth rate imply that a county moving from the 25th to the 75th percentile of its own and surrounding-county NTR gaps is associated with a decline in the birth rate of -26.75 per 100,000, or 1.8 percent of the average birth rate across counties in the year 2000 (of 1458 per 100,000). The impact of PNTR implied by the coefficients estimates for log births imply a decline of -0.03 log points.

5 Prices

To the extent that imports are an important input into the production of healthcare, trade liberalization with China might improve workers' health via lower prices for health-related goods. Moreover, a general reduction in prices associated with trade liberalization may lead to welfare improvements for U.S. consumers. We investigate this link using customs data from the U.S. Census provided by Schott (2008).[55]

We employ a generalized triple differences specification that compares products with varying NTR gaps (first difference) before and after PNTR (second difference) and across source countries (third difference) for the years 1992 to 2007:

$$\begin{aligned} ln(Unit\,Value)_{hst} &= \theta 1\{c = China\}_s \times PostPNTR_t \times NTR\,Gap_h + \\ &\quad + \lambda Tariff_{hst} + \delta_{st} + \delta_{sh} + \delta_{ht} + \alpha + \varepsilon_{hst}. \end{aligned} \tag{5}$$

The left-hand side variable represents the log of the average unit value observed for ten-digit HS product h from source country s in year t.[56] The first term on the right-

[55] These data are available for download at http://faculty.som.yale.edu/peterschott/sub_international.htm.

[56] The trade data report both value and quantity for each transaction and we use the ratio of these two variables as a proxy for the price. We omit products whose units change over time, and make use of concordances provided by Pierce and Schott (2012b) to ensure product codes are consistent over the sample period. Further details on data construction are provided in the online appendix.

hand side is the term of interest: a triple interaction of an indicator for China, an indicator for the post-PNTR period, and the NTR gap for product h that captures the impact of the change in U.S. policy. $Tariff_{hct}$ represents the U.S. revealed import tariff for product h from country c in year t, computed as the ratio of duties collected to dutiable value using publicly available U.S. trade data. δ_{ct}, δ_{ch} and δ_{ht} represent country×year, country×product and product×year fixed effects. α is the regression constant.

Results are reported in Table 15. As indicated in the table, the NTR gap has a negative and statistically significant relationship with import unit values. The point estimate in the first row of the table implies that Chinese imports after PNTR are 0.18 log points lower *vis a vis* imports of products from other source countries.

We use the following back-of-the-envelope procedure to gauge the potential impact of the decline in Chinese import unit values on health-related versus other goods within the United States. First, we use the results in Table 15 to compute the predicted relative impact of PNTR for each HS import product. Second, we take the average of these impacts across HS products within NAICS industries. Third, we merge these NAICS-level mean log changes into the 2007 U.S. total requirements input-output matrix, whose coefficients indicate the amount of the "input" NAICS industry needed to produce one dollar of the "using" industry. Fourth, we compute the weighted average implied relative log unit value changes across the input industries for each using industry, using the IO coefficients as weights. Finally, we examine the changes associated with healthcare-related NAICS industries. These industries are identified by having one of the following key words in their description: health, care, pharmaceutical, drug, hospital, medical, surgical, medicine, and imaging.

The distribution of log unit value declines across using industries is displayed in Figure 9; the mean and standard deviation across industries is -0.069 and 0.095. The declines associated with the health industries identified in the last paragraph are reported in Table 16, along with the average for those industries versus all others. As indicated in the table, four healthcare-related industries have sizable weighted-average changes: surgical instruments (-0.080), surgical appliances (-0.066), electromedical manufacturing (-0.060) and pharmaceutical preparation manufacturing (-.054). Weighted-average changes for the remaining industries in the table are far lower. Intuitively, this is due to their relatively high share of labor versus other goods.

6 Conclusion

This paper examines the relationship between county-level mortality rates and exposure to an important economic shock, the trade liberalization associated with the U.S. granting of Permanent Normal Trade Relations to China. We calculate exposure to PNTR as the employment-weighted average of exposure for the industries active in each county. We then estimate the relationship between PNTR and mortality using a differences-in-differences framework that nets out any time-invariant county characteristics, as well as annual shocks that affect counties identically.

We find that exposure to PNTR is associated with an increase in mortality due to suicide and alcohol-related liver disease, particularly among white males. We find that these associations are robust to various exercises examining their sensitivity to the counties included in the sample and an empirical specification verifying that their timing matches the change in U.S. trade policy.

We gather data from a variety of sources to provide evidence on the mechanisms that might explain these results, including loss of income or employment, or reduced access to healthcare due to loss of insurance. We find that counties more exposed to PNTR subsequently exhibit higher unemployment, lower labor force participation, residents more likely to report inability to afford visits to a physician and loss of health insurance, higher crime and lower birth rates.

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Variable	Obs	Mean	StdDev	Min	10th	25th	75th	90th	Max
Age-Adjusted Death Rate (2000)									
Overall	3135	858	112	0	726	778	922	1,002	2,864
- Male	3135	1,047	154	0	875	934	1,127	1,249	4,657
- Female	3135	719	94	0	604	658	775	835	2,296
- White	3135	841	98	0	728	776	898	964	2,641
- Black	3101	1,021	475	0	595	885	1,191	1,291	9,897
- American Indian	3130	461	563	0	0	22	670	1,130	11,233
- Asian or Pacific Islander	3112	416	381	0	0	255	516	652	8,028
Median Household Income (1990)	3133	40.4	10.6	11.2	28.3	33.2	45.6	56.6	77.3
Percent No College (1990)	3133	54.4	11.4	18.8	40.3	46.2	62.7	69.9	88.3
Unemployment Rate (2000)	3133	4.1	1.4	1.4	2.7	3.2	4.8	5.6	17.5
Labor Force Participation Rate (2000)	3133	50.5	4.9	17.5	43.7	48.2	53.7	56.3	91.6
Personal income (2000)	3069	30.5	60.3	0.0	0.8	2.5	38.7	92.2	284.1
Per capital personal income (2000)	3069	30.5	9.2	10.2	21.5	24.8	34.3	41.3	83.2
Average Annual Pay (2000)	3118	32.9	9.9	12.6	22.5	25.9	38.6	43.5	79.5
Average Annual Manufacturing Pay (2000)	3118	41.8	13.4	11.8	27.9	33.3	47.5	56.8	246.7

Notes: Table summarizes distribution of noted attributes across counties. Age-adjusted death rates are computed using mortality data from the Centers for Disease Control and population estimates from the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) Program. Counties' initial median household income and percent of population with no college education in 1990 are from the 1990 Decennial Census. Counties' unemployment and labor force participation rates in the year 2000 are from the Bureau of Labor Statistics Local Area Unemployment Statistics (LAUS) program. Counties' overall and per capita and personal income in the year 2000 are from the Bureau of Economic Analysis' Local Area Personal Income (LAPI) program. Counties' average overall and manufacturing annual pay in the year 2000 are from the Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW) program. Death rates are per 100,000; household income, per capital personal income and average annual pay are in dollars; personal income is in millions of dollars.

Table 1: Summary Statistics

		Mortality Rate				
	Total Deaths	All	White	Black	Amerian Indian	Asian or Pacific Islander
Extneral causes of death						
Suicide	27,740	10	11	6	5	6
Poison	12,757	5	5	7	2	1
Motor Vehicle Accidents	43,354	16	16	16	11	10
Other	67,417	24	22	34	17	13
Total External	151,268	54	53	63	35	30
Internal causes of death						
Infectious or Parasitic Diseases (e.g., septicemia)	59,007	21	18	40	12	11
Neoplasms (i.e., cancer)	566,637	201	199	231	90	107
Diseases of the Blood (e.g., anemia)	9,315	3	3	7	1	1
Endocrine, Nutritional and Metabolic Diseases (e.g., diabetes)	94,345	34	31	59	27	18
Mental (e.g., dementia)	46,015	17	17	17	9	5
Diseases of the Nervous System (e.g., Alzheimers, parkinsons)	91,140	33	34	30	15	12
Diseases of the Circulatory System (e.g., AMI, hypertension)	941,526	335	329	403	170	162
Diseases of the Respiratory System (e.g., pneumonia, influenza)	231,079	83	85	69	51	35
Diseases of the Digestive System (e.g., liver failure)	84,015	30	30	33	24	13
Diseases of the Skin	3,753	1	1	3	2	1
Diseases of the Skeletal System (e.g., arthritis)	13,764	5	5	6	3	3
Diseases of the Genitourinary System (e.g., renal failure)	54,560	20	18	32	14	10
Pregnancy and Childbirth	404	0	0	0	0	0
Conditions Arising in the Perinatal Period	14,069	5	4	9	2	3
Congenital Malformations and Abnormalities	10,578	4	4	4	2	2
Not elsewhere classified	31,876	11	11	16	5	4
Total Internal	2,252,083	803	788	958	426	386
Total	2,403,351	858	841	1,021	461	416

Notes: Table displays overall number of deaths and age-adjusted death rates by major cause of death and demographic group for the year 2000. Each rate is the population-weighted average across counties per 100,000 population using counties' total population as weights.

Table 2: Average Death Rates by Major Causes of Death

	$NTR\ Gap_c$	$NTR\ Gap_c$	$NTR\ Gap_c$	$NTR\ Gap_c$	$NTR\ Gap_c$
$NTR\ Gap_{cz}$	0.789***				
	0.02				
2000 NTR_c		4.256***			
		0.068			
MFA $Exposure_c$			1.590***		
			0.788		
1990 Median HHI_c				-0.084***	
				0.013	
1990 Percent No $College_c$					0.255***
					0.01
Observations	3,138	3,138	3,138	3,136	3,136
R-squared	0.34	0.56	0.41	0.01	0.19

Notes: Table reports the results of county-level OLS regression of the 1999 NTR gap on county attributes. First covariate is the 1999 NTR gap of remaining counties in the county's commuting zone. Second covariate is the labor-share weighted average NTR tariff rate of the goods produced in the region. Third covariate is the labor-share weighted average fill rate of the MFA products produced in the county across all four phases. Final two covariates are counties' median household income and percent of residents without college education in 1990. Results for the regression constant are suppressed. Standard errors are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 3: 1999 NTR Gap versus Other County Attributes

VARIABLES	Suicide	Suicide	Suicide	Suicide	Alcohol-Related Liver Disease	Accidental Poisoning
Post x NTR Gap$_c$	0.087***	0.087***	0.046***	0.028	0.062***	-0.06
	0.014	0.013	0.016	0.018	0.017	0.042
Post x NTR Gap$_{cz}$				0.036**	-0.032*	0.062
				0.018	0.019	0.045
MFA Exposure$_{ct}$		-0.013	-0.055	-0.053	-0.189***	-0.146
		0.036	0.038	0.037	0.036	0.095
NTR$_{ct}$		-0.073	-0.23	-0.249	-0.425**	-0.303
		0.209	0.192	0.191	0.18	0.285
Post x Median HHI in 1990$_c$			-0.016**	-0.014*	-0.038***	-0.078***
			0.008	0.008	0.007	0.019
Post x % No College in 1990$_c$			0.031***	0.032***	-0.032***	0.089***
			0.009	0.009	0.012	0.024
Observations	74,900	74,900	74,900	74,900	74,900	74,900
R-squared	0.41	0.41	0.41	0.41	0.51	0.60
P-Value Joint NTR Gap Significance	.	.	.	0.00	0.00	0.20
Estimation	OLS	OLS	OLS	OLS	OLS	OLS
Sample Period	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13
FE	c,t	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c	c
Weighting	Population	Population	Population	Population	Population	Population
Implied Impact of PNTR	0.72***	0.73***	0.38***	0.44***	0.34**	-0.16
Std Err	0.11	0.11	0.13	0.13	0.17	0.39
Average Death Rate (2000)	9.95	9.95	9.95	9.95	4.39	4.59
Impact/Average	0.073***	0.073***	0.038***	0.044***	0.077**	-0.034

Notes: Table reports difference-in-differences (DID) OLS regression results for age-adjusted mortality rates per 100,000 population for noted cause of death for county c in year t. Sample period is 1990 to 2013. The first covariate is an interaction of the county's NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's commuting zone as defined by the U.S. Census. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 for the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average death rate for this cause of death across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 4: PNTR and Suicide, ARLD and Accidental Poisoning

	Suicide							
	White		Black		American Indian		Asian or Pac Is	
VARIABLES	Male	Female	Male	Female	Male	Female	Male	Female
Post x NTR Gap$_c$	0.027	0.013	-0.058	-0.005	-0.551***	0.145*	0.015	0.008
	0.033	0.013	0.047	0.014	0.196	0.081	0.111	0.061
Post x NTR Gap$_{cz}$	0.089***	0.017	0.035	-0.007	0.401*	-0.364***	0.127	0.031
	0.032	0.014	0.037	0.014	0.223	0.103	0.101	0.051
MFA Exposure$_{ct}$	-0.054	0.007	0.02	-0.024	-0.07	-0.077	-0.281	0.145
	0.073	0.031	0.078	0.022	0.383	0.183	0.449	0.188
NTR$_{ct}$	-0.347	-0.141	0.123	-0.276*	-5.205*	3.472***	-2.2	0.894
	0.37	0.152	0.697	0.141	2.864	1.257	1.692	1.104
Post x Median HHI in 1990$_c$	-0.009	-0.021***	0.016	0.012*	-0.12	-0.083*	0.039	0.034**
	0.013	0.005	0.021	0.006	0.1	0.046	0.034	0.016
Post x % No College in 1990$_c$	0.054***	0.011*	-0.013	0.002	0.102	0.006	0.039	0.019
	0.015	0.006	0.022	0.007	0.102	0.042	0.043	0.02
Observations	74,900	74,900	67,082	65,600	70,203	70,316	64,139	68,284
R-squared	0.32	0.17	0.09	0.05	0.14	0.06	0.05	0.05
P-Value Joint NTR Gap Significance	0.00	0.07	0.41	0.76	0.02	0.00	0.41	0.81
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Sample Period	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13
Fixed Effects	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c	c	c	c
Weighting	Population	Population	Population	Population	Population	Population	Population	Population
Implied Impact of PNTR	0.72***	0.2**	-0.29	-0.08	-2.36*	-0.81	0.83	0.24
Std Err	0.23	0.09	0.37	0.11	1.40	0.69	0.96	0.53
Average Death Rate (2000)	18.3	4.1	9.4	1.5	16.0	3.7	7.6	2.4
Impact/Average	0.039***	0.049**	-0.031	-0.049	-0.148*	-0.217	0.108	0.099

Notes: Table reports difference-in-differences (DID) OLS regression results for age-adjusted mortality rates per 100,000 population for noted demographic group and cause of death for county c in year t. Sample period is 1990 to 2013. The first covariate is an interaction of the county's own NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's U.S. Census defined commuting zone. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 of the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average death rate for this cause of death across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 5: PNTR and Suicide

	Alcohol-Related Liver Disease (ARLD)							
	White		Black		American Indian		Asian or Pac Is	
VARIABLES	Male	Female	Male	Female	Male	Female	Male	Female
Post x NTR Gap$_c$	0.081***	0.020*	0.059	0.028	-0.392	-0.01	-0.014	-0.007
	0.023	0.011	0.058	0.024	0.293	0.2	0.044	0.021
Post x NTR Gap$_{cz}$	-0.014	-0.009	-0.031	-0.027	-0.178	-0.469**	0.015	0.012
	0.024	0.009	0.058	0.024	0.265	0.215	0.065	0.016
MFA Exposure$_{ct}$	-0.248***	-0.089***	-0.104	-0.066	0.686	-0.543*	-0.315*	-0.044
	0.049	0.02	0.099	0.046	0.716	0.308	0.175	0.044
NTR$_{ct}$	-0.368	-0.048	-1.690**	-0.583**	-6.339*	-1.986	0.078	-0.063
	0.25	0.105	0.702	0.278	3.723	2.402	0.756	0.337
Post x Median HHI in 1990$_c$	-0.046***	-0.031***	-0.017	-0.012	-0.205*	-0.125*	0.004	-0.009*
	0.009	0.004	0.032	0.013	0.112	0.071	0.014	0.005
Post x % No College in 1990$_c$	-0.048***	-0.019***	-0.06	-0.025	-0.025	-0.027	-0.019	-0.014**
	0.015	0.005	0.047	0.017	0.101	0.07	0.024	0.006
Observations	74,900	74,900	67,082	65,600	70,203	70,316	64,139	68,284
R-squared	0.46	0.27	0.15	0.08	0.18	0.15	0.06	0.05
P-Value Joint NTR Gap Significance	0.00	0.18	0.56	0.38	0.09	0.01	0.92	0.77
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Period	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13
Fixed Effects	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c	c	c	c
Weighting	Population	Population	Population	Population	Population	Population	Population	Population
Implied Impact of PNTR	0.59***	0.12	0.32	0.08	-4.24**	-2.69**	-0.03	0.01
Std Err	0.23	0.08	0.53	0.21	2.01	1.22	0.53	0.18
Average Death Rate (2000)	7.1	2.1	6.6	2.4	9.8	4.5	1.3	0.5
Impact/Average	0.084***	0.055	0.048	0.034	-0.431**	-0.601**	-0.024	0.019

Notes: Table reports difference-in-differences (DID) OLS regression results for age-adjusted mortality rates per 100,000 population for noted demographic group and cause of death for county c in year t. Sample period is 1990 to 2013. The first covariate is an interaction of the county's own NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's U.S. Census defined commuting zone. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 of the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average death rate for this cause of death across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 6: PNTR and Alcohol-Related Liver Disease

	Accidental Poisoning							
	White		Black		American Indian		Asian or Pac Is	
VARIABLES	Male	Female	Male	Female	Male	Female	Male	Female
Post x NTR Gap$_c$	-0.174***	-0.073**	0.055	-0.012	-0.249	0.148	-0.041	0.016
	0.057	0.031	0.088	0.034	0.224	0.119	0.041	0.025
Post x NTR Gap$_{cz}$	0.123**	0.064*	0.021	0.006	-0.410**	-0.014	-0.011	-0.001
	0.06	0.034	0.084	0.039	0.198	0.133	0.038	0.019
MFA Exposure$_{ct}$	-0.098	0.136**	-0.496***	-0.187**	0.254	-0.253	-0.449**	-0.011
	0.127	0.069	0.153	0.075	0.512	0.316	0.178	0.092
NTR$_{ct}$	-0.351	-0.206	0.285	-0.127	-2.749	0.643	0.391	0.436
	0.378	0.209	0.956	0.298	2.4	1.537	0.73	0.357
Post x Median HHI in 1990$_c$	-0.04	-0.101***	-0.154***	-0.031	-0.493***	-0.179***	-0.018	0.004
	0.026	0.013	0.058	0.02	0.081	0.067	0.011	0.008
Post x % No College in 1990$_c$	0.178***	0.043***	-0.114	-0.036	-0.126*	-0.139**	0.011	0.005
	0.027	0.014	0.08	0.031	0.07	0.069	0.014	0.012
Observations	74,900	74,900	74,900	67,082	65,600	70,203	70,316	64,139
R-squared	0.60	0.56	0.47	0.30	0.16	0.12	0.09	0.05
P-Value Joint NTR Gap Significance	0.00	0.03	0.80	0.94	0.00	0.42	0.43	0.81
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Sample Period	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13
Fixed Effects	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c	c	c	c
Weighting	Population	Population	Population	Population	Population	Population	Population	Population
Implied Impact of PNTR	-0.77	-0.25	0.57	-0.06	-4.34***	1.15	-0.41	0.13
Std Err	0.49	0.26	0.88	0.35	1.56	0.97	0.31	0.20
Average Death Rate (2000)	6.7	2.5	9.4	3.3	6.1	3.5	1.0	0.4
Impact/Average	-0.115	-0.100	0.061	-0.019	-0.707	0.327	-0.395	0.355

Notes: Table reports difference-in-differences (DID) OLS regression results for age-adjusted mortality rates per 100,000 population for noted demographic group and cause of death for county c in year t. Sample period is 1990 to 2013. The first covariate is an interaction of the county's own NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's U.S. Census defined commuting zone. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 of the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average death rate for this cause of death across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 7: PNTR and Poisoning

	Implied Impact of Moving A County from the 25th-75th Percentile NTR Gap							
	White		Black		American Indian		Asian or Pac Is	
	Male	Female	Male	Female	Male	Female	Male	Female
	Suicide							
Implied Impact of PNTR	0.74***	0.19**	-0.32	-0.07	-4.46*	-1.58	-0.4	0.45
Std Err	0.23	0.09	0.41	0.12	2.36	1.31	1.12	0.78
Average Death Rate (2000)	18.17	4.18	9.57	1.81	7.70	1.62	7.37	2.83
Impact/Average	0.041	0.046	-0.033	-0.036	-0.579	-0.979	-0.054	0.158
Observations	69,532	68,892	20,182	19,301	1,717	1,361	2,559	2,384
	Alcohol-Related Liver Disease							
Implied Impact of PNTR	0.6***	0.12	0.25	0.07	-8.48*	-4.03*	0.06	-0.39**
Std Err	0.23	0.08	0.56	0.22	4.57	2.10	0.60	0.18
Average Death Rate (2000)	7.10	2.11	6.57	2.43	9.84	4.47	1.32	0.52
Impact/Average	0.085	0.059	0.038	0.029	-0.861	-0.900	0.049	-0.765
Observations	69,532	68,892	20,182	19,301	1,717	1,361	2,559	2,384

Notes: Table reports implied impact of difference-in-differences (DID) OLS regression results for age-adjusted mortality rates per 100,000 population for noted demographic group and cause of death for county c in year t. First row of each panel reports the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the two DID terms of interest described below. Second row of each panel reports the standard error of this implied impact, where standard errors are adjusted for clustering at the county level. Superscripts *, ** and *** signify statistical significance at the 10, 5 and 1 percent level. Third row of each panel reports the population-weighted age-adjusted death rate across counties in 2000. Fourth row of each panel reports the ratio of the first and third rows. Final row reports the number of observations in the underlying estimation. Sample period of underlying regressions is 1990 to 2013. Each regression includes the following covariates. The first two covariates are interactions of the county's own NTR gap with an indicator for the post-PNTR period (years after 2000) and an interaction of the NTR gap for all other counties in the county's U.S. Census defined commuting zone. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining covariates are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 of the demographic group for which death rates are being estimated.

Table 8: Implied Impact of PNTR Based on Regression Where Counties with Few Deaths Are Excluded

VARIABLES	Accidents of Unknown Intent	Motor Vehicle Accidents	Diabetes	Cancer of Breast, Bone, and Skin	Cancer of Digestive Tract	Acute Myocardial Infarction	Other Circulatory Diseases	All Internal Causes	All External Causes
Post x NTR Gap$_c$	0.008	-0.048**	0.136***	0.051***	0.114***	-0.269**	0.102	1.111***	0.037
	0.013	0.02	0.049	0.018	0.03	0.118	0.186	0.42	0.099
Post x NTR Gap$_{cz}$	-0.009	0.012	-0.057	-0.014	-0.007	-0.176	-0.2	1.356**	0.107
	0.01	0.019	0.053	0.018	0.03	0.125	0.229	0.561	0.11
MFA Exposure$_{ct}$	-0.044*	-0.184***	0.138*	-0.018	0.201***	-0.075	0.348	-0.012	-0.993***
	0.024	0.045	0.077	0.037	0.061	0.211	0.347	1.179	0.24
NTR$_{ct}$	0.056	0.057	-0.213	-0.213	-0.862***	0.427	-2.603	-15.099***	-1.136
	0.12	0.224	0.413	0.192	0.317	1.181	1.953	4.55	0.979
Post x Median HHI in 1990$_c$	-0.006	0.001	-0.141***	-0.060***	-0.172***	-0.199***	-0.454***	-2.095***	-0.080*
	0.007	0.007	0.021	0.01	0.016	0.056	0.086	0.218	0.044
Post x % No College in 1990$_c$	0.008	0.017**	-0.042**	-0.01	-0.067***	-0.534***	0.215**	-0.002	0.120**
	0.007	0.007	0.021	0.01	0.016	0.05	0.092	0.333	0.059
Observations	74,900	74,852	74,900	74,900	74,900	74,900	74,900	74,900	74,900
R-squared	0.59	0.61	0.55	0.25	0.41	0.82	0.85	0.88	0.67
P-Value Joint NTR Gap Significance		0.05	0.02	0.02	0.00	0.00	0.68	0.00	0.51
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Sample Period	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13
FE	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c	c	c	c	c
Weighting	Population	Population	Population	Population	Population	Population	Population	Population	Population
Implied Impact of PNTR	0.02	-0.33**	0.82***	0.35**	0.91***	-3.22***	-0.26	16.76***	0.9
Std Err	0.11	0.15	0.33	0.15	0.23	0.85	1.41	4.58	0.89
Average Death Rate (2000)	1.38	15.66	24.98	21.39	46.53	67.70	267.55	803.41	54.23
Impact/Average	0.015	-0.021**	0.033***	0.016**	0.019***	-0.047***	-0.001	0.021***	0.017

Notes: Table reports difference-in-differences (DID) OLS regression results for age-adjusted mortality rates per 100,000 population for noted cause of death for county c in year t. Sample period is 1990 to 2007. The first covariate is an interaction of the county's NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's commuting zone as defined by the U.S. Census. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 for the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average death rate for this cause of death across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 9: PNTR and Other Causes of Death

VARIABLES	Unemployment Rate$_{ct}$	Labor Force Participation Rate$_{ct}$	Log Employment$_{ct}$	Log Manufacturing Employment$_{ct}$	Log Non-Manufacturing Employment$_{ct}$
Post x Own NTR Gap$_{c}$	0.100***	-0.123***	-0.0010	-0.010***	0.000***
	0.0120	0.0270	0.0010	0.0020	0.0000
Post x Labor Mkt Area NTR Gap$_{z}$	0.108***	-0.087***	-0.006***	-0.006***	-0.000***
	0.0120	0.0270	0.0010	0.0020	0.0000
MFA Exposure$_{ct}$	-0.139***	-0.0330	0.004***	-0.024***	0.001***
	0.0260	0.0440	0.0010	0.0040	0.0000
NTR$_{ct}$	0.1020	0.1210	0.0060	0.0280	-0.001*
	0.0810	0.1750	0.0070	0.0200	0.0010
Post x Median HHI in 1990$_{c}$	-0.0040	-0.030***	-0.0010	-0.002*	-0.000**
	0.0050	0.0120	0.0010	0.0010	0.0000
Post x % No College in 1990$_{c}$	-0.060***	0.033**	-0.001**	-0.0020	-0.000**
	0.0060	0.0130	0.0010	0.0010	0.0000
Observations	62,386	62,383	62,386	65,156	62,344
R-squared	0.818	0.885	0.998	0.99	0.998
P-Value Joint Gap Significance	0.00	0.00	0.00	0.00	0.00
Estimation	OLS	OLS	OLS	OLS	OLS
Period	1990-09	1990-09	1990-09	1990-09	1990-09
FE	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c
Weighting	Population	Population	Population	Population	Population
Implied Impact of PNTR	1.43***	-1.51***	-0.04***	-0.11***	0.0014*
Std Err	0.10	0.19	0.01	0.02	0.0007
Average (2000)	4.1	50.5	12.0	9.8	11.8
Impact/Average	0.349***	-0.03***	.	.	.

Notes: Table reports difference-in-differences (DID) OLS regression results of publicly available county c by year t labor market attributes on noted covariates. Sample period is 1990 to 2009. The first covariate is an interaction of the county's NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's commuting zone as defined by the U.S. Census. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average of the dependent variable across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 10: PNTR and Employment Outcomes (LAUS)

	Real (Base Year 2000)			
VARIABLES	ln(Personal Income)	ln(Per Capita Personal Income)	ln(Average Annual Pay)	ln(Average Annual Man-ufacturing Pay)
Post x NTR Gap$_c$	0.0005	-0.0027***	-0.0010**	0.0015*
	0.0012	0.0005	0.0005	0.0009
Post x NTR Gap$_{cz}$	-0.0070***	-0.0036***	-0.0005	-0.0011
	0.0012	0.0006	0.0005	0.0008
MFA Exposure$_{ct}$	0.0075***	0.0038***	0.0034***	0.0085***
	0.0017	0.0008	0.0011	0.0015
NTR$_{ct}$	-0.0023	-0.0096	-0.0017	-0.006
	0.0111	0.0064	0.0087	0.0116
Post x Median HHI in 1990$_c$	-0.0021***	-0.0015***	-0.0002	0
	0.0006	0.0003	0.0003	0.0006
Post x Percent No College in 1990$_c$	-0.0040***	-0.0004	-0.0023***	-0.0019***
	0.0006	0.0003	0.0003	0.0005
Observations	73,622	73,622	56,030	48,255
R-squared	0.9981	0.9685	0.9705	0.9484
P-value Gap Joint Significance	0.00	0.00	0.00	0.11
Estimation	OLS	OLS	OLS	OLS
Period	1990-13	1990-13	1990-07	1990-07
FE	c,t	c,t	c,t	c,t
Clustering	c	c	c	c
Weighting	Population	Population	Population	Population
Implied Impact of PNTR	-0.035***	-0.043***	-0.027***	-0.003
Std Err	0.009	0.004	0.005	0.007
Average (2000)	23.0	10.3	9.8	10.5
Impact/Average	.	.	.	.

Notes: Table reports difference-in-differences (DID) OLS regression results for county-yearaggregate and per capita personal income as well as average annual overall and manufacturing pay. Incomes and wages are deflated using regional CPIs available from the Bureau of Labor Statistics (base year 2000). Sample period is 1990 to 2013 for income and 1990 to 2007 for wages. The first covariate is an interaction of the county's NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's commuting zone as defined by the U.S. Census. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 for the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average of the dependent variable across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 11: PNTR and County Per Capita Personal Income (LAPI)

				Days in Last Month With "Not Good"	
VARIABLES	No Health Care Coverage	Did Not See Doctor due to Cost	General Health is "Fair" or "Poor"	Physical Health	Mental Health
Post x NTR Gap$_c$	0.071	0.066*	0.039	-0.002	0.001
	0.044	0.036	0.030	0.008	0.008
Post x NTR Gap$_{cz}$	-0.001	0.031	0.006	-0.002	-0.002
	0.031	0.027	0.024	0.005	0.007
MFA Exposure$_{ct}$	0.143	0.154	0.107	0.056***	0.058**
	0.124	0.094	0.102	0.018	0.025
NTR$_{ct}$	-1.160*	-0.585	0.805	0.001	-0.134
	0.662	0.526	0.542	0.134	0.119
Post x Median HHI in 1990$_c$	-0.012	-0.021*	-0.009	-0.005**	0.002
	0.012	0.011	0.010	0.002	0.002
Post x Percent No College in 1990$_c$	0.004	0.017	0.002	0.011***	0.016***
	0.013	0.012	0.010	0.002	0.003
Observations	11,904	10,461	11,567	11,499	11,499
R-squared	0.22	0.03	0.28	0.87	0.94
P-value Gap Joint Significance	0.17	0.01	0.11	0.92	0.93
Estimation	OLS	OLS	OLS	OLS	OLS
Period	1993-09	1993-09	1993-09	1993-09	1993-09
FE	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c
Weighting	.	.	.	.	.
Implied Impact of PNTR	0.58*	0.72***	0.35	-0.03	0
Std Err	0.34	0.28	0.22	0.06	0.06
Average (2000)	13.4	12.2	15.2	3.4	3.3
Impact/Average	0.043*	0.059***	0.023	-0.008	-0.001

Notes: Table reports difference-in-differences (DID) OLS regression results for various self-reported health measures from the BRFSS. First column reports results for share or respondents indicating they have no health care coverage. Remaining columns report results for shares of respondents indicating their Second column is share of respondents indicating that in general their health is excellent, very good, good, fair and poor. Sample period is 1990 to 2007. The first covariate is an interaction of the county's NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's commuting zone as defined by the U.S. Census. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 for the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the average of the dependent variable across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 12: PNTR and Self-Reported Health Insurance Coverage (BRFSS)

VARIABLES	Violent	Property	Murder	Rape	Robbery	Assault	Burglary	Larceny	Motor Vehicle Theft	Arson
Post x NTR Gap$_c$	3.032	24.324***	0.032	0.301***	1.970**	0.728	6.781***	9.029*	8.514***	0.885**
	2.193	7.225	0.025	0.106	0.927	1.521	2.003	4.981	2.27	0.387
Post x NTR Gap$_{cz}$	-2.854	4.292	-0.046	-0.250*	-0.309	-2.248	1.321	7.804	-4.833**	-0.494**
	2.297	7.782	0.029	0.133	0.831	1.8	2.153	6.297	2.309	0.231
MFA Exposure$_{ct}$	-4.63	14.307	-0.096	0.011	-2.41	-2.134	-2.612	16.828*	0.091	0.291
	6.334	16.277	0.068	0.145	2.634	3.718	4.234	9.681	4.261	0.319
NTR$_{ct}$	-0.066	-93.343	-0.209	-1.312	-7.673	9.128	-24.923	-67.925	-0.494	4.775**
	25.294	89.148	0.381	1.04	12.588	13.967	25.429	51.329	27.063	2.311
Post x Median HHI in 1990$_c$	1.267	-0.894	0.051***	0.077*	0.101	1.038	0.18	2.137	-3.211***	-0.129
	1.137	3.857	0.013	0.044	0.527	0.661	1.165	2.358	1.137	0.107
Post x Percent No College in 1990$_c$	4.449***	24.542***	0.048***	0.252***	1.070**	3.079***	4.976***	20.469***	-0.903	-0.039
	1.036	4.077	0.013	0.056	0.474	0.687	1.126	2.741	1.295	0.21
Observations	53,057	53,057	53,057	53,057	53,057	53,057	53,057	53,057	53,057	53,057
R-squared	0.853	0.849	0.791	0.727	0.888	0.79	0.827	0.827	0.87	0.689
P-value Gap Joint Significance	0.36	0.00	0.21	0.02	0.04	0.39	0.00	0.01	0.00	0.01
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Period	1990-06	1990-06	1990-06	1990-06	1990-06	1990-06	1990-06	1990-06	1990-06	1990-06
FE	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c	c	c	c	c	c
Weighting	Population	Population	Population	Population	Population	Population	Population	Population	Population	Population
Implied Impact of PNTR	9.39	226.06***	0.01	1.12	14.67***	-6.41	63.71***	118.34***	44.01***	4.62
Std Err	13.09	58.54	0.21	0.73	5.80	9.13	16.06	37.46	16.87	3.34
Average (2000)	365.6	2592.0	4.4	21.5	113.7	225.9	569.6	1709.4	312.9	20.0
Impact/Average	0.026	0.087***	0.001	0.052	0.129***	-0.028	0.112***	0.069***	0.141***	0.231

Notes: Table reports difference-in-differences (DID) OLS regression results for county-year crime rates per 100,000 population. Burglary is defined as theft (i.e., larceny) combined with unlawful entry. Robbery is defined as forcible theft from a person. Sample period is 1990 to 2007. The first covariate is an interaction of the county's NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the aveage NTR gap for all other counties in the county's commuting zone as defined by the U.S. Census. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 for the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average of the dependent variable across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 13: PNTR and Crime Rates per 100,000 Population (UCR)

VARIABLES	Birth Rate	Fertility Rate	ln(Births)
Post x NTR Gap$_c$	-3.694*	-13.525	-0.001
	1.968	9.52	0.002
Post x NTR Gap$_{cz}$	0.715	9.45	-0.003
	1.545	7.292	0.002
MFA Exposure$_{ct}$	-10.65	-91.699	0
	15.361	77.583	0.012
NTR$_{ct}$	7.325	-40.496	0.002
	56.292	268.405	0.044
Post x Median HHI in 1990$_c$	-2.813***	-9.618***	-0.003***
	0.524	2.499	0.001
Post x Percent No College in 1990$_c$	-1.927***	-8.995***	-0.003***
	0.596	2.929	0.001
Observations	5,389	5,389	5,389
R-squared	0.956	0.937	0.998
P-value Gap Joint Significance	0.12	0.32	0.09
Estimation	OLS	OLS	OLS
Period	1990-06	1990-06	1990-06
FE	c,t	c,t	c,t
Clustering	c	c	c
Weighting	Population	Population	Population
Implied Impact of PNTR	-26.75**	-60.08	-0.03*
Std Err	12.89	61.30	0.02
Average (2000)	1457.9	1457.9	9.3
Impact/Average	-0.018**	-0.041	.

Notes: Table reports difference-in-differences (DID) OLS regression results for county-year birth rate per 100,000 population and and log number of births Sample period is 1990 to 2006. The first covariate is an interaction of the county's NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's commuting zone as defined by the U.S. Census. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; lower values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 for the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average of the dependent variable across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 14: PNTR and Birth Rates per 100,000 Population

VARIABLES	Ln(Unit Value)
Post x NTR Gap	-0.184***
	0.033
NTR Tariff Rate	-1.391***
	0.053
Observations	1,888,815
R-squared	0.90
Estimation	OLS
Period	1992-2007
FE	sh,ht,st
Clustering	sh

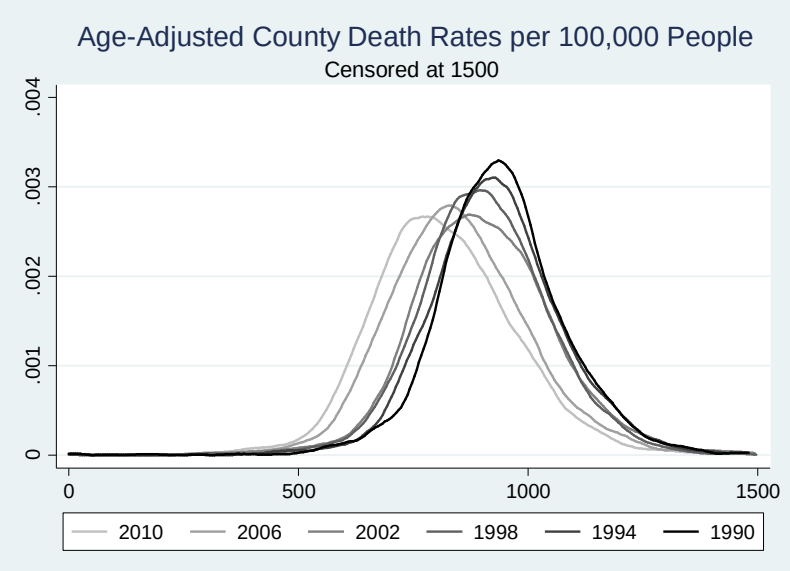
Notes: Table reports difference-in-differences (DID) OLS regression results of country (s) by product (p) by year (y) log unit values county-year on a triple-interaction DID term and tariff rates. Sample period is 1992 to 2006. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table 15: PNTR and U.S. Import Prices

NAICS	"Using" Industry	Log Change
339112	Surgical and medical instrument manufacturing	-0.08000
339113	Surgical appliance and supplies manufacturing	-0.06608
334510	Electromedical and electrotherapeutic apparatus manufacturing	-0.05992
325412	Pharmaceutical preparation manufacturing	-0.05406
621900	Other ambulatory health care services	-0.00006
624400	Child day care services	-0.00003
621300	Offices of other health practitioners	-0.00002
621400	Outpatient care centers	-0.00002
621500	Medical and diagnostic laboratories	-0.00001
623A00	Nursing and community care facilities	-0.00001
623B00	Residential mental retardation, mental health, substance abuse and other facilities	0
812100	Personal care services	0
812200	Death care services	0
233210	Health care structures	0
622000	Hospitals	0
621600	Home health care services	0
Mean		-0.016
All other "using" industries		-0.072

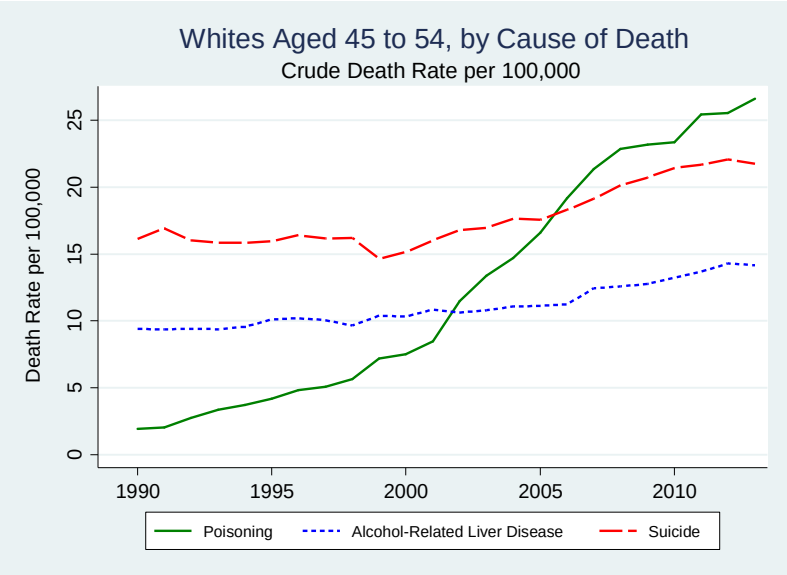
Notes: Table highlights "using" industries containing the key words health, care, pharmaceutical, drug, hospital, medical, surgical, medicine, and imaging in their desription. Second column reports the input-output coeficient weighted average decline in relative import prices from China associated with these industries, using the results reported in Table 8.

Table 16: Unit Value Declines Weighted by Health-Industry IO Coefficients



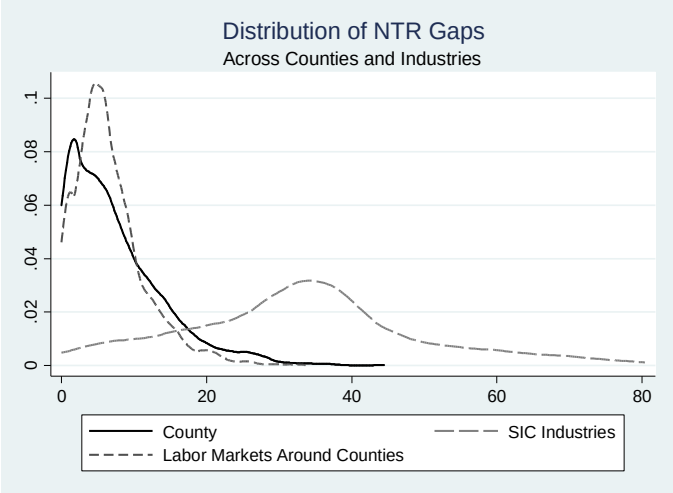
Notes: Figure displays the distribution of age-adjusted death rates per 100,000 population across counties. Counties with death rates exceeding 1500 per 100,000 population are excluded to promote readability. The number of counties with non-missing death rates for 1998, 2000 and 2002-2006 are 3131, 3136, and 3141. Source: CDC.

Figure 1: Distribution of Overall Mortality Rates



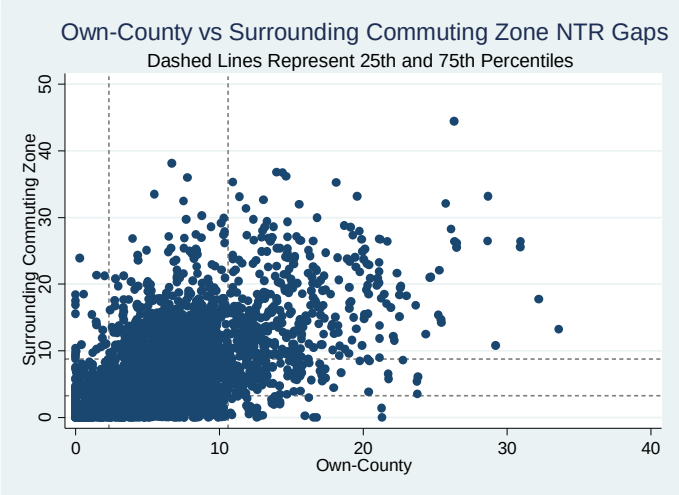
Notes: Figure displays the crude death rate for three causes of death across all U.S. counties for whites aged 45 to 54.

Figure 2: Death Rates for Non-Hispanic Whites



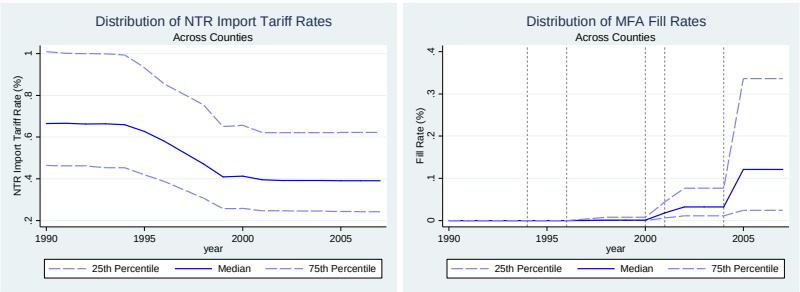
Notes: The first two kernel densities display the distribution of NTR gaps across counties and four-digit SIC industries. The third kernel density displays the distribution, for each county, of the average NTR gap.

Figure 3: Distribution of 1999 NTR Gaps Across Counties



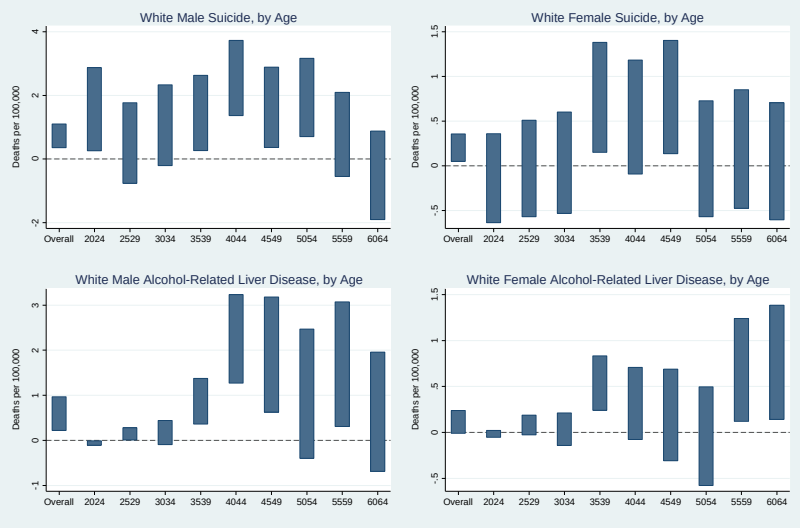
Notes: Figure compares counties' own NTR gaps to the average NTR gap of their surrounding counties. Dashed lines indicate the 25th and 75th percentiles of each distribution (2.3 and 10.6 for own county and 3.3 and 8.8 for surrounding counties). The commuting zone for each county is defined by the U.S. Census Bureau. The correlation of the two gaps is 0.58.

Figure 4: Counties' Own versus Surrounding Commuting Zone NTR Gaps



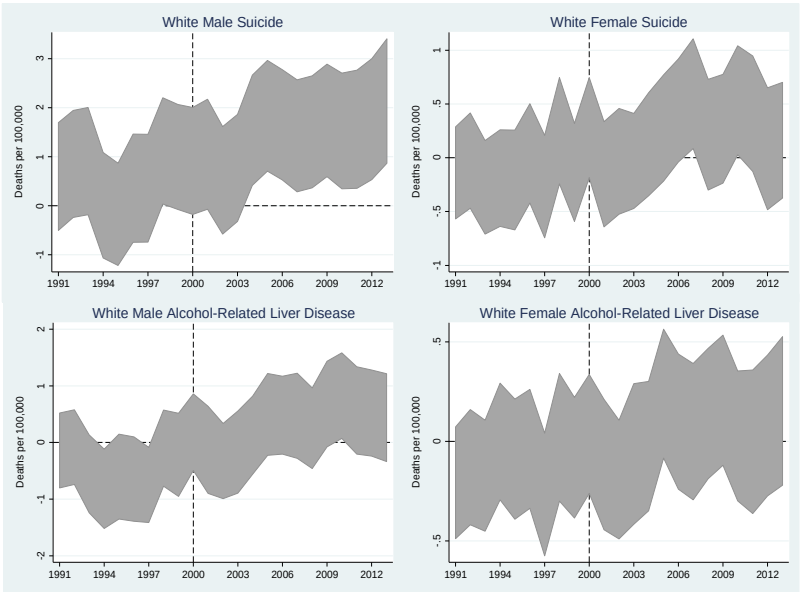
Notes: Left panel displays distribution of counties' labor-share weighted average NTR import tariff rate. Right panel displays distribution of counties' labor-share weighted average fill rates over time. Fill rates step up after each successive phase out of MFA quotas, with larger jumps indicating phasing out of products whose quotas were more binding. The timing of the phase-outs in 1996, 1998, 2000, 2001 and 2004 is noted by the dashed vertical lines.

Figure 5: Distribution of Counties' Exposure to MFA Phase-Outs ($MFA\,Exposure_{ct}$) and Counties' NTR Tariffs (NTR_{ct})



Notes: Figure displays the 95 percent confidence interval for the estimated impact of moving a county from the 25th to the 75th percentiles of its own and surrounding commuting zone NTR gaps. This impact is derived from the difference-in-differences coefficients estimated in equation 3. Confidence interval is based on robust standard errors adjusted for clustering at the county level.

Figure 6: Implied Impact of PNTR on Death by Suicide and Alcohol-Related Liver Disease, by Age Category



Notes: Figure displays the 95 percent confidence interval for the estimated impact of moving a county from the 25th to the 75th percentiles of its own and surrounding commuting zone NTR gaps. This impact is derived from the difference-in-differences coefficients for interactions of year dummies with the NTR gap in equation 4. Confidence interval is based on robust standard errors adjusted for clustering at the county level.

Figure 7: Implied Impact of PNTR Using Annual DID Specification (Equation 4)

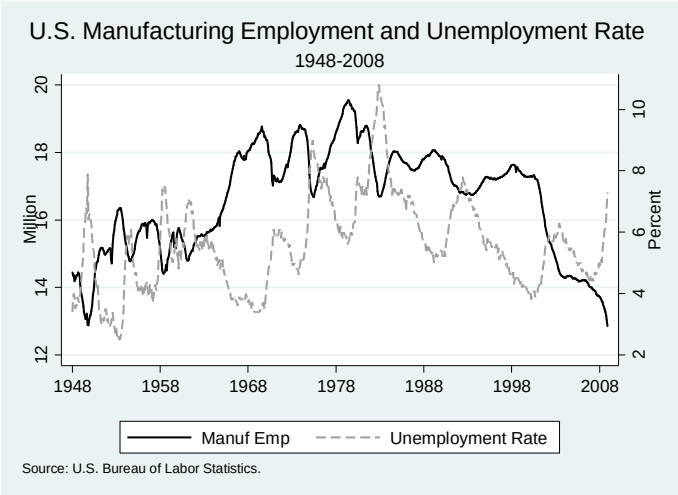
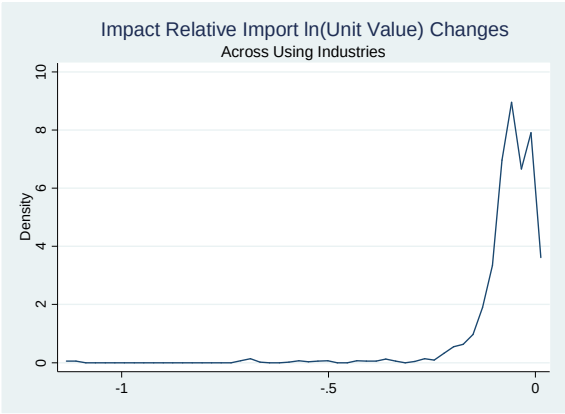


Figure 8: Post-War U.S. Manufacturing Employment



Notes: Figure displays the distribution of weighted-average change in relative import unit value changes associated with PNTR on "using" industries, using input-output table total use requirement coefficients as weights. This distribution is constructed as follows. First, use the specification in equation 5 to predict the change in relative unit values associated with PNTR. Second, take the average of these predictions a the ten-digit HS level across their associated NAICS industries. Third, merge these changes into the 2007 U.S. total requirements input-output matrix, where the coefficients indicate the amount of the input NAICS industry needed to produce one dollar of the "using" industry. Finally, take the weighted average implied change in relative log unit values, using the IO coefficients as weights.

Figure 9: Weighted Average ln(Unit Value) Declines by "Using" NAICS Industries

Online Appendix

This online appendix contains additional empirical results and information on data creation referenced in the main text.

Appendix Tables and Figures

Age	Population	Share
Under 1 year	3,855,956	0.0137
1-4 years	15,322,337	0.0543
5-14 years	41,101,548	0.1457
15-19 years	20,294,955	0.0719
20-24 years	19,116,667	0.0678
25-29 years	19,280,263	0.0683
30-34 years	20,524,234	0.0727
35-39 years	22,650,852	0.0803
40-44 years	22,517,991	0.0798
45-49 years	20,219,527	0.0717
50-54 years	17,779,447	0.0630
55-59 years	13,565,937	0.0481
60-64 years	10,863,129	0.0385
65-69 years	9,523,909	0.0338
70-74 years	8,860,028	0.0314
75-79 years	7,438,619	0.0264
80-84 years	4,984,540	0.0177
85 and over	4,262,472	0.0151
Total	282,162,411	1.0000

Notes: Table reports the overall U.S. population weights associated with the age categories used in our baseline results.

Table A.1: Distribution of U.S. Population Across Age Categories in 2000

	Weighted Average Across Counties		Aggregate U.S.
Variable	Overall Population	Demographic-Specific Population	Official CDC Rate
Overall	858	858	872
- Males	1,047	1,046	1,043
- Females	719	720	739
Whites	841	839	852
- Males	1,026	1,022	1,018
- Females	705	704	722
Blacks	1,021	1,106	1,130
- Males	1,244	1,386	1,378
- Females	828	915	948
American Indian	461	716	697
- Males	484	840	829
- Females	388	610	586
Asian	416	476	507
- Males	461	580	629
- Females	350	393	415

Notes: Table reports age-adjusted death rates by demographic group. First column represents weighted average across counties using counties' total populations as weights. Second column represents weighted average across counties using counties' populations in the relevant demographic group as weights. Final column represents the official estimate reported by the CDC.

Table A.2: Sensitivity of Weighted Average Death Rates Across Counties to Population Weights

	Suicide, White Female								
VARIABLES	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Post x NTR Gap$_c$	-0.03	0.003	-0.018	0.090*	0.078	0.043	-0.015	-0.056	0.028
	0.039	0.042	0.044	0.048	0.05	0.051	0.05	0.055	0.051
Post x NTR Gap$_{cz}$	0.02	-0.01	0.033	0.002	-0.019	0.074	0.036	0.117*	-0.033
	0.035	0.034	0.038	0.045	0.048	0.049	0.048	0.061	0.044
MFA Exposure$_{ct}$	0.077	-0.019	0.159	-0.032	0.02	0	0.238**	-0.113	-0.05
	0.096	0.096	0.123	0.12	0.131	0.131	0.118	0.109	0.103
NTR$_{ct}$	-1.384***	-0.294	-0.286	0.477	0.011	-0.768	-0.268	0.112	0.17
	0.487	0.565	0.556	0.524	0.625	0.607	0.62	0.631	0.705
Post x Median HHI in 1990$_c$	0.014	0.005	-0.025*	-0.039**	-0.049***	-0.091***	-0.078***	-0.059***	-0.031*
	0.013	0.014	0.014	0.017	0.019	0.019	0.018	0.021	0.019
Post x % No College in 1990$_c$	0.016	0.026*	0.019	0.028	0.033*	-0.003	-0.03	-0.033	-0.01
	0.013	0.015	0.016	0.018	0.019	0.021	0.019	0.024	0.021
Observations	74,890	74,885	74,895	74,900	74,900	74,900	74,899	74,900	74,900
R-squared	0.05	0.05	0.05	0.06	0.07	0.07	0.06	0.06	0.06
P-Value Joint NTR Gap Significance	0.72	0.96	0.68	0.11	0.29	0.07	0.75	0.15	0.72
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Sample Period	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13
Fixed Effects	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c	c	c	c	c
Weighting	Population	Population	Population	Population	Population	Population	Population	Population	Population
Implied Impact of PNTR	-0.14	-0.03	0.03	0.77**	0.55	0.77**	0.08	0.19	0.05
Std Err	0.30	0.33	0.35	0.37	0.39	0.39	0.39	0.40	0.40
Average Death Rate (2000)	3.24	4.06	4.91	5.09	5.78	6.43	6.95	7.01	7.51
Impact/Average	-0.043	-0.007	0.007	0.151**	0.094	0.12**	0.011	0.027	0.007

Notes: Table reports difference-in-differences (DID) OLS regression results for crude mortality rates per 100,000 population for noted demographic and age group and cause of death for county c in year t. Sample period is 1990 to 2013. The first covariate is an interaction of the county's own NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's U.S. Census defined commuting zone. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 of the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average death rate for this cause of death across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table A.3: PNTR and Suicide by White Males, By Age Group

	Suicide, White Female								
VARIABLES	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Post x NTR Gap$_c$	-0.03	0.003	-0.018	0.090*	0.078	0.043	-0.015	-0.056	0.028
	0.039	0.042	0.044	0.048	0.05	0.051	0.05	0.055	0.051
Post x NTR Gap$_{cz}$	0.02	-0.01	0.033	0.002	-0.019	0.074	0.036	0.117*	-0.033
	0.035	0.034	0.038	0.045	0.048	0.049	0.048	0.061	0.044
MFA Exposure$_{ct}$	0.077	-0.019	0.159	-0.032	0.02	0	0.238**	-0.113	-0.05
	0.096	0.096	0.123	0.12	0.131	0.131	0.118	0.109	0.103
NTR$_{ct}$	-1.384***	-0.294	-0.286	0.477	0.011	-0.768	-0.268	0.112	0.17
	0.487	0.565	0.556	0.524	0.625	0.607	0.62	0.631	0.705
Post x Median HHI in 1990$_c$	0.014	0.005	-0.025*	-0.039**	-0.049***	-0.091***	-0.078***	-0.059***	-0.031*
	0.013	0.014	0.014	0.017	0.019	0.019	0.018	0.021	0.019
Post x % No College in 1990$_c$	0.016	0.026*	0.019	0.028	0.033*	-0.003	-0.03	-0.033	-0.01
	0.013	0.015	0.016	0.018	0.019	0.021	0.019	0.024	0.021
Observations	74,890	74,885	74,895	74,900	74,900	74,900	74,899	74,900	74,900
R-squared	0.05	0.05	0.05	0.06	0.07	0.07	0.06	0.06	0.06
P-Value Joint NTR Gap Significance	0.72	0.96	0.68	0.11	0.29	0.07	0.75	0.15	0.72
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Sample Period	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13
Fixed Effects	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c	c	c	c	c
Weighting	Population	Population	Population	Population	Population	Population	Population	Population	Population
Implied Impact of PNTR	-0.14	-0.03	0.03	0.77**	0.55	0.77**	0.08	0.19	0.05
Std Err	0.30	0.33	0.35	0.37	0.39	0.39	0.39	0.40	0.40
Average Death Rate (2000)	3.24	4.06	4.91	5.09	5.78	6.43	6.95	7.01	7.51
Impact/Average	-0.043	-0.007	0.007	0.151**	0.094	0.12**	0.011	0.027	0.007

Notes: Table reports difference-in-differences (DID) OLS regression results for crude mortality rates per 100,000 population for noted demographic and age group and cause of death for county c in year t. Sample period is 1990 to 2013. The first covariate is an interaction of the county's own NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's U.S. Census defined commuting zone. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 of the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average death rate for this cause of death across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table A.4: PNTR and Suicide by White Females, By Age Group

	Alcohol-Related Liver Disease, White Male								
VARIABLES	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Post x NTR Gap$_c$	-0.005	0.017	0.014	0.118***	0.199***	0.210***	0.148	0.231**	0.13
	0.004	0.011	0.021	0.037	0.068	0.079	0.096	0.098	0.102
Post x NTR Gap$_{cz}$	-0.004	0	0.01	-0.02	0.108*	0.028	-0.035	-0.042	-0.081
	0.004	0.009	0.018	0.036	0.064	0.078	0.098	0.095	0.103
MFA Exposure$_{ct}$	0.004	-0.046**	-0.105**	-0.216***	-0.610***	-0.688***	-0.727***	-0.829***	-0.534***
	0.01	0.021	0.043	0.071	0.14	0.164	0.188	0.228	0.187
NTR$_{ct}$	-0.047	-0.151	-0.106	0.545	0.342	-0.611	-2.603**	-0.935	-1.404
	0.051	0.121	0.226	0.486	0.641	0.841	1.076	1.126	1.283
Post x Median HHI in 1990$_c$	-0.001	-0.008*	-0.014*	-0.009	-0.039*	-0.101***	-0.127***	-0.203***	-0.138***
	0.002	0.004	0.008	0.013	0.023	0.026	0.035	0.041	0.04
Post x % No College in 1990$_c$	-0.001	-0.010**	-0.020**	-0.032*	-0.051	-0.118***	-0.134***	-0.153***	-0.107**
	0.002	0.004	0.008	0.017	0.034	0.045	0.051	0.054	0.048
Observations	74,888	74,900	74,898	74,894	74,899	74,900	74,900	74,900	74,900
R-squared	0.04	0.04	0.06	0.09	0.12	0.15	0.16	0.17	0.15
P-Value Joint NTR Gap Significance	0.13	0.21	0.54	0.01	0.00	0.03	0.30	0.06	0.42
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Sample Period	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13	1990-13
Fixed Effects	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t	c,t
Clustering	c	c	c	c	c	c	c	c	c
Weighting	Population	Population	Population	Population	Population	Population	Population	Population	Population
Implied Impact of PNTR	-0.06*	0.14*	0.17	0.87***	2.25***	1.9***	1.03	1.69**	0.63
Std Err	0.03	0.08	0.16	0.31	0.60	0.78	0.87	0.84	0.80
Average Death Rate (2000)	0.04	0.45	1.57	4.34	9.50	15.87	17.08	18.47	21.32
Impact/Average	-1.657*	0.322*	0.11	0.2***	0.237***	0.12***	0.061	0.091**	0.03

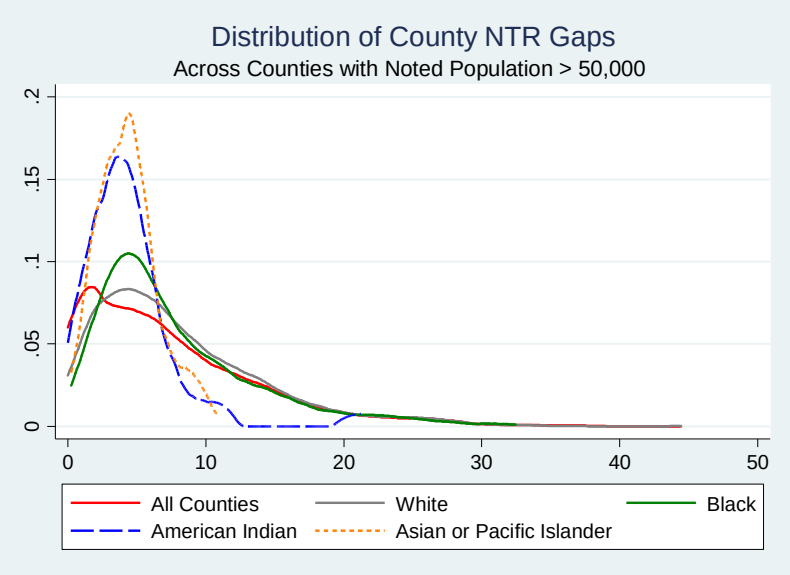
Notes: Table reports difference-in-differences (DID) OLS regression results for crude mortality rates per 100,000 population for noted demographic and age group and cause of death for county c in year t. Sample period is 1990 to 2013. The first covariate is an interaction of the county's own NTR gap with an indicator for the post-PNTR period (years after 2000). The second covariate is an interaction of the avearge NTR gap for all other counties in the county's U.S. Census defined commuting zone. The third covariate accounts for the elimination of quantitative restrictions on apparel and clothing imports from developing countries durring the sample period; higher values correspond to greater exposure. The fourth covariate is the weighted average U.S. import tariff of the products produced in the county; higher values indicate greater protection. Remaining variables are interactions of the post-period dummy variable with the county's median household income in 1990 and the percent of residents who have not attended any college. Regressions are weighted by county population in 1990 of the demographic group for which death rates are being estimated. Penultimate three rows of table report the implied impact of PNTR in terms of moving a county from the 25th to the 75th percentile of the first two covariates, the standard error of this implied impact and the population-weighted average death rate for this cause of death across counties in the year 2000. Final row of table reports the ratio of the implied impact to this average. Standard errors adjusted for clustering at the county level are reported below coefficients. *, ** and *** signify statistical significance at the 10, 5 and 1 percent level.

Table A.5: PNTR and Alcohol-Related Liver Disease for White Males, By Age Group

Occupation	Male	White	White-Male	Total
Managerial, Professional	0.708	0.904	.	1.000
Technical, Sales, Admin, Service	0.496	0.863	.	1.000
Precision Production	0.830	0.855	.	1.000
Operators, Fabricators, Laborers, Other	0.670	0.789	.	1.000
Total	0.680	0.843	0.584	1.000

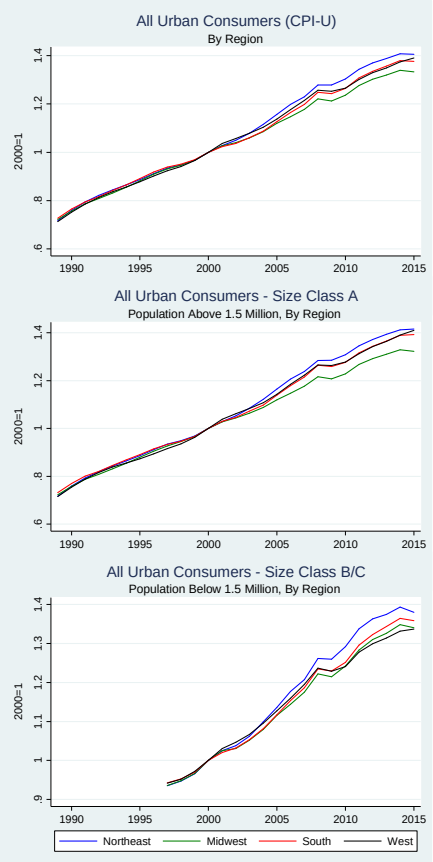
Notes: Table displays the share of manufacturing workers in 1999 that are male or white, by occupation within manufacturing. In 1999, the shares of the U.S. population that was male, white and white-male were 49.0, 81.9 and 40.3 percent. "." represents unavailable data. Soure: www.bls.gov.

Table A.6: Share of Whites and Males Among Occupations in Manufacturing, 1999



Notes: Figure displays distribution of NTR gaps across counties where population of noted racial group is 50,000 or higher.

Figure A.1: County NTR Gaps by Racial Group



Notes: Figure displays the noted consumer price indexes discussed in the main text. Top panel contains series CUUS0100SA0, CUUS0200SA0, CUUS0300SA0 and CUUS0400SA0; middle panel contain series CUUSA100SA0, CUUSA200SA0, CUUSA300SA0 and CUUSA400SA0; and bottom panel contains series CUUSX100SA0, CUUSX200SA0, CUUSX300SA0 and CUUSX400SA0.

Figure A.2: Consumer Price Indexes by Region and Size Class