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## *ECONOMIC CONSEQUENCES OF IMMIGRATION POLICY AND ENFORCEMENT*‡

# Border Fencing, Migrant Flows, and Crossing Deaths†

*By* Cynthia Bansak, Abigail Hall Blanco, and Michael Coon*

Contemporary discussions of US immigration policy, particularly discussions of migration along the US southern border, are mired in controversy. Nowhere is this contention more apparent than in discourse related to the construction of border fencing. As recently as December 2021, Texas Governor Greg Abbott launched the construction of additional border wall in his state, calling it an "unprecedented action" in border security.[1] Former President Donald Trump is perhaps most associated with the idea of border barriers. Throughout his campaigns and presidency, he made repeated promises to further extend border fencing at the expense of the Mexican government.[2]

But advocacy for more border fencing is not exclusive to Mr. Trump, nor was his idea an original one. Indeed, many policymakers argue that the construction of more physical barriers is a necessary prerequisite for other immigration reform and that border fencing both deters illegal migration and enhances safety. This sentiment is captured clearly by former President George W. Bush. Signing the Secure Fence Act of 2006 (hereafter, SFA), Mr. Bush stated that the bill authorizing the construction of hundreds of miles of new fencing would "help protect the American people … [and] make our borders more secure. It is an important step toward immigration reform" (White House 2006).

Popular discourse on the costs of border fences is frequently relegated to discussions of monetary costs. Depending on the type of barrier (primary, secondary, pedestrian, vehicular, etc.), the cost of each new mile of fencing ranges from $1.8 million to $6.5 million. Life cycle estimates for operations and maintenance anticipate an expenditure of $1.4 billion from 2009 to 2029 (Gambler 2017). This near-exclusive focus on monetary expenditures ignores a host of important nonpecuniary costs and similarly disregards questions of efficacy.

Research indicates that additional fencing has not substantially deterred migrant crossings. Both the Congressional Research Service and the Government Accountability Office found that new border wall simply induced crossers to find alternative routes or other methods to defeat the barriers (Haddal, Kim, and Garcia 2009; Gambler 2017). Academic research also finds clear empirical evidence that erecting border fencing does not deter crossings entirely but instead induces migrants to divert and detour (Allen, Dobbin, and Morten 2019; Feigenberg 2020). Adman and Foad (2022) found no reduction in property or violent crimes in the counties where the new fencing was built. They found no evidence of crime displacement or spillovers. Feigenberg (2020) found a deterrent effect for low-skilled migrants, with pedestrian fencing resulting in

‡*Discussants:* José R. Bucheli, New Mexico State University; Michael Coon, University of Tampa; Madeline Zavodny, University of North Florida; Hisham Foad, San Diego State University.

* Bansak: Department of Economics, St. Lawrence University (email: cbansak@stlawu.edu); Blanco: Department of Economics and Finance, Bellarmine University (email: ablanco@bellarmine.edu); Coon: Department of Economics, University of Tampa (email: mcoon@ut.edu).

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[1] Quoted in Klibanoff, Elanor, and Uriel J. García. 2021. "Gov. Greg Abbott Inaugurates First Stretch of State-Funded Border Barrier in Starr County." *The Texas Tribune*, December 18. https://www.texastribune.org/2021/12/18/texas-mexico-border-wall-greg-abbott/.

[2] For an overview of these statements, see Qui, Linda. 2019. "The Many Ways Trump Has Said Mexico Will Pay for the Wall." *The New York Times*, January 11. https://www.nytimes.com/2019/01/11/us/politics/trump-mexico-pay-wall.html.

a 27 percent decrease in crossings in that area. Allen, Dobbin, and Morten (2018) observed that border wall construction had minimal effects on overall crossings but altered migrant choices of destination and route, resulting in clear—though small—effects on labor markets on both sides of the border.

The purpose of this paper is to further study the costs and consequences of the border wall by analyzing the effects of the SFA on migrant flows and deaths. Our work builds on the aforementioned studies. To the extent that increased border fencing and enforcement impacts *where* migrants cross as opposed to *whether* they cross, we hypothesize that construction of the border fence induced migrants to cross the border in more dangerous areas. This, in turn, increases the mortality rate among attempted crossers. Using data from the US Customs and Border Protection on apprehensions, deaths, and staffing levels and novel data on border fencing, we examine how the construction of border fencing as a result of the SFA influenced crossing decisions and the likelihood of death for migrants.

## I. Methodology

To estimate the impact of fence construction on the flow of migrants and the danger of crossing the southern US border, we estimate the following difference-in-differences model:

$$(1)\quad Y_{it} = \alpha + \beta_1 Fenced_i + \beta_2 SFA_t + \beta_3 Fenced_i \times SFA_t + \Gamma X_{it} + \epsilon_{it},$$

where $i$ is the border sector (there are nine) and $t$ is the year. We estimate our model on two separate dependent variables. The first is the natural log of annual apprehensions. The second is the number of migrant deaths recorded in border patrol sector $i$ in year $t$ per 100,000 apprehensions, calculated as follows:

$$(2)\quad Y_{it} = \left(Deaths_{it}/Apprehensions_{it}\right) \times 100{,}000$$

We report this measure of deaths as a ratio to standardize the data, as districts vary greatly in size, total number of crossings, and number of US patrols. Additionally, this format conforms to the standard reporting style of other common death rates. *Fenced* is an indicator equal to one if the sector had new fencing constructed after the passage of the SFA. The sectors coded as *Fenced* are the treated sectors, while those without new fencing are the control sectors. The time or post dummy variable, *SFA*, takes the value one in the years after the SFA is in effect. As is standard in the difference-in-differences framework, the coefficient on the interaction term gives the difference-in-differences estimate. In this context, that is the change in deaths per 100,000 apprehensions over the period surrounding the implementation of the act for the treated sectors, relative to the change in the control sectors, $\beta_3$—our key parameter of interest.

The impact of the border wall on migrant deaths is, a priori, an empirical question. On the one hand, if border fencing reduces crossing attempts, this would reduce crossing deaths. On the other hand, if border wall does not discourage crossings completely but instead pushes migrants to cross in other, less traversable, nonfenced areas (e.g., desert, private land outside of border patrols, mountainous areas, etc.), increased fencing could increase the number of deaths.

To control for other factors impacting crossing deaths, captured by $X$ in our specification, we include variables on weather conditions (the number of months when the average temperature was over 80 degrees, by year and sector) and the number of border patrol agents (or staffing) by sector by year. We exclude 2006–2008 from our main analysis, as these are the years during which the SFA construction took place and may include incomplete buildup of the wall in certain sectors in 2007 and 2008. We assume no anticipation effects. The location of the wall has been argued as "plausibly exogenous" since fence locations were dependent more on terrain and ease of construction, land acquisition, and environmental evaluation rather than on border crossings (Feigenberg 2020). To address trends over time, we have included year fixed effects.

## II. Data and Descriptive Statistics

Our data cover nine Border Patrol sectors over the period 1998 to 2017. The key variables are fence construction, apprehensions, and deaths. We discuss each in turn. The data for fence construction come from Castañeda and Guerrero

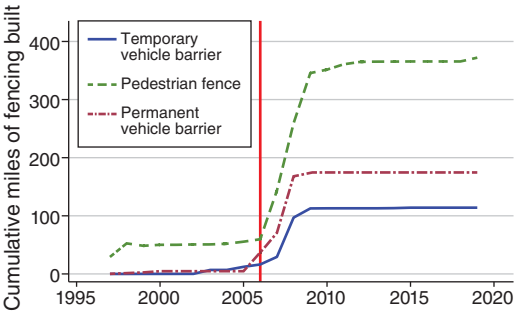


FIGURE 1. CUMULATIVE BARRIER CONSTRUCTION BY TYPE

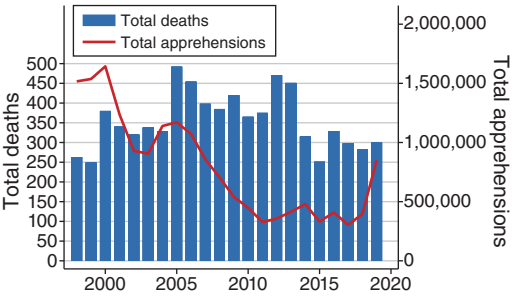


FIGURE 2. MIGRANT DEATHS AND APPREHENSIONS AT THE US–MEXICO BORDER

(2017).[3] The data include the year, border sector, length, and type of fence constructed. In 2005, there existed approximately 60 miles of pedestrian fencing, 16 miles of temporary vehicle barrier, and 36 miles of permanent vehicle barrier along the southern US border. This fencing was located primarily in the San Diego and El Centro Border Patrol sectors. In 2009, those lengths had increased to 346 miles, 113 miles, and 175 miles, respectively (see Figure 1). Most new construction occurred in the Yuma, Tucson, and El Paso Border Patrol sectors, with additional construction occurring in the San Diego, El Centro, and Rio Grande Valley sectors. These six sectors make up our treatment group, with the remaining three sectors (Big Bend, Del Rio, Laredo) serving as our control group. Prior to the passing of the SFA, the San Diego sector already had fencing equivalent to 63 percent of its total border length, and the El Centro sector had the equivalent of 23 percent of its border fenced.[4] The remaining sectors had less than 5 percent of their border length covered by some type of fencing. By 2009, the San Diego and Yuma sectors had lengths of fence equivalent to 90 percent of their border length, the Tucson and El Centro sectors had fencing equivalent to approximately 75 percent of their border length, the El Paso sector had the equivalent of 60 percent of its border length, and the Rio Grande Valley sector had the equivalent of 15 percent.

Data for Border Patrol staffing, migrant deaths, and apprehensions come from publicly available US Customs and Border Protection reports (United States Customs and Border Protection 2021abc). The years following the SFA saw a significant decline in apprehensions (see Figure 2). However, given that this time period also coincides with the Great Recession, it is difficult to disentangle effects due to the fence installation and effects due to economic factors. Allen, Dobbin, and Morten (2019) estimate that the fence resulted in an annual decrease of 40,000 migrants, a small share of the total decline during that period. There is, however, a noticeable shift in terms of where migrants choose to cross. Following the SFA, we find that the share of migrants crossing in the Tucson sector fell substantially, while the share of migrants crossing in the Rio Grande Valley sector rose.

## III. The SFA and the Unintended Consequences on the Risk of Death

Table 1 presents our estimation results. In columns 1 and 2, our dependent variable is the natural log of apprehensions. In both specifications, the coefficient for *Fenced* is positive and highly significant, indicating that prior to the SFA, apprehensions were significantly higher in areas that received fencing after the act. In our baseline difference-in-differences estimate, presented in column 1, the coefficient for *SFA* is negative and significant, but the interaction

[3] Castañeda, Leo, and Jean Guerrero. 2017. "Decades-Long Struggle to Secure US–Mexico Border." *America's Wall*, November 13. https://www.kpbs.org/news/border-immigration/2017/11/13/americas-wall.

[4] Note that this does not necessarily mean that this is the share of the border covered by fencing, as different types of fencing may overlap in certain areas, as it is not uncommon for there to be double-fenced portions of the border.

Table 1—Difference-in-Differences Estimation Results

| | Dep var: Ln(apprehensions) | | Dep var: deaths per 100,000 apprehensions | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Fenced | 1.1383 | 0.6953 | −0.2904 | −12.2415 |
| | (0.2222) | (0.1461) | (3.9056) | (5.1674) |
| SFA | −1.1029 | −2.2395 | 82.6423 | 85.6715 |
| | (0.2654) | (0.2919) | (13.6249) | (30.3987) |
| Fenced × SFA | −0.4004 | −0.8258 | −50.0210 | −63.5672 |
| | (0.3176) | (0.1988) | (15.2819) | (13.4538) |
| Months above 80° F | | 0.1409 | | 8.4761 |
| | | (0.0313) | | (1.6433) |
| $\text{Staff}_{t-1}$ | | 0.0010 | | 0.0294 |
| | | (0.0001) | | (0.0055) |
| Constant | 10.7314 | 10.2220 | 28.7065 | −16.4512 |
| | (0.2030) | (0.2860) | (3.2511) | (9.6161) |
| Year fixed effects | No | Yes | No | Yes |
| Observations | 153 | 153 | 153 | 153 |
| F | 58.0701 | 30.9446 | 19.7457 | 8.1555 |
| p | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

*Note:* Robust standard errors are in parentheses.

term is not significantly different from zero. This would suggest that both treated and control sectors saw equivalent percentage declines in apprehensions following the SFA. However, after controlling for heat conditions, staffing levels, and year fixed effects (presented in column 2), we find that the interaction term is negative and significant. This indicates that areas that received fencing after the SFA saw a greater decline in apprehensions relative to their pre-SFA levels. To the extent that nonenforcement factors contributed to the aggregate decline in migration to the United States following the SFA (e.g., the Great Recession), the finding that apprehensions fell less in nonfenced sectors suggests that construction of the fence induced migrants to attempt crossing in unfenced sectors instead. This corroborates prior findings that migrants divert from fenced areas to unfenced areas (Allen, Dobbin, and Morten 2019; Feigenberg 2020).

We next turn to the impact of fence construction on migrant deaths, presented in columns 3 and 4 of Table 1. Our baseline estimate, presented in column 3, suggests that prior to the SFA, there was no significant difference in the death rate between the treated and untreated sectors. Prior to the SFA, the average annual number of deaths per 100,000 apprehensions in treated and untreated sectors was 28.4 and 28.7, respectively. Our coefficient estimate for SFA is highly significant and indicates that the annual death rate in untreated sectors rose by 82.6 deaths per 100,000 apprehensions in the period following fence construction. This represents a nearly threefold increase in the death rates in sectors where fence was *not* built. Further, our coefficient estimate for our interaction term is negative and significant but smaller than the coefficient estimate for SFA alone. This indicates that the death rate also rose in areas where fence was built, but less so than in unfenced areas. Indeed, the death rate approximately doubled in sectors where fencing was built. These results are robust to the inclusion of weather and staffing controls and year fixed effects (column 4). However, the coefficient estimate for *Fenced* is now negative and significant, indicating that all else equal, sectors in the treatment group would have been safer to cross in than the untreated group prior to fence construction.

Taken together, these results support our hypotheses that fence construction induced some migrants to cross in unfenced sectors, while others who crossed in fenced sectors would be diverted to cross in other, more dangerous locations. Both resulted in increased death rates among migrants crossing the US southern border.

## IV. Conclusion

Public discourse surrounding border fencing largely assumes that such barriers are effective migration deterrents. This work supports prior research and suggests that while border fencing may have deterred some migrants from crossing, the border walls constructed as part of the SFA did little to prevent illegal crossings. Instead of foregoing crossing attempts, the existence of border walls pushes migrants to cross in less hospitable, more dangerous areas. This increases the likelihood of dying while attempting to cross. This suggests the need for an expanded discussion on the costs and consequences of border walls. In addition to significant monetary costs, this research shows that the erection of border walls has real nonpecuniary costs—human lives.

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