

# Fenced Out: The Impact of Border Construction on US-Mexico Migration

## A Replication Study

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# Motivation

- Global migration increased by 43% over the last two decades
- Inflow countries pay more attention to border control and migration regulation
  - Ten-fold increase of border patrols in the U.S.
  - Border patrols are intended to deter potential (irregular) migrants
  - U.S. efforts focused on deterring illegal migration by raising migration costs
- Existing literature
  - Little scientific evidence on cost-effectiveness of border enforcement
  - Less known how border enforcement shapes migration patterns
  - Limited, mostly descriptive evidence because changes in migration costs are often not exogenous
- This presentation: Replication study of Feigenberg (2020a) using data provided by Feigenberg (2020b)

# Background

- U.S.-Mexican border is the most frequently crossed international border
- Migration restriction efforts are rather new
  - 1965: Immigration and Nationality Act
  - 1986: Immigration Reform and Control Act made hiring undocumented immigrants illegal
  - 1996: Illegal Immigration Reform and Immigrant Responsibility Act authorized the construction of a border fence
- Secure Fence Act (2006) set specific locations for the construction of 689 miles fencing
- Variation in local construction starting dates due to logistical and administrative processes
  - Independent of migrant behavior or local migration trend
  - Introduces exogeneity in the geographical distribution and timing of border fence construction

# Research Question(s)

- ① What effect does changing of costs (of migration) have on migration from Mexico to the United States?
  - ② What effect does changing of costs have on the stock of Mexicans living in the U.S.? (*not considered*)
  - ③ How does the impact of changing costs vary based on migrants' access to alternative crossing locations, as well as their demographic characteristics? (*not considered*)
- ⇒ Use spatio-temporal (exogenous) variation in the construction dates of U.S. border fences to assess the effect of expanding border fences on the migration decision of individuals
- ⇒ This replication study will focus on RQ1

# Data on Fence Construction

- Data on potential fence construction sites self-collected
- Various sources for identifying locations
  - News articles
  - Legal documents and published construction contracts, e.g. CPB<sup>1</sup> and GAO<sup>2</sup>
- Cross-checked with Sierra Club representatives, an environmental organization observing effects of U.S.-Mexico border fence on wildlife

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<sup>1</sup>U.S. Customs and Border Protection

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  - ③ How long is the constructed fence?

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# Data on Migration Decision

- Data on migration decision taken from the Mexican Encuesta Nacional de Ocupación y Empleo (ENOE)
  - Quarterly rotating panel
  - Households are included for 5 quarters
- Potential migrants restricted to ages 15 to 65
- Data includes age, gender, marital status and education for all household members
- Sample restricted to observations with full information
- Limitation: Does not capture migration of the whole household!
- Replication study uses a random 50% sample of the original data

# Descriptive Statistics

Table 1: Summary Statistics

	Municipalities w/ fence		Municipalities w/o fence	
	Mean	Std. Dev.	Mean	Std. Dev.
Migrated	0.32%		0.45%	
Female	50.54%		50.65%	
Married	57.69%		61.56%	
Age	35.05	13.57	35.49	13.85
Years of schooling	9.22	4.09	8.88	4.24
<i>N</i>	142 355		11 235	

# Empirical Strategy

## Difference-in-Differences

- Exploit spatio-temporal variation in the start of fence construction to identify the effect of a border fence on the migration decision
- Two-way fixed effects (logit) model with staggered treatment exposure

$$Pr(Y_{mqi} = 1 \mid z_{mqi}) = \Lambda(\alpha + \beta \times \text{fence}_{mqi} + \Gamma X_{mqi} + \gamma_m + \lambda_q)$$

- $Y_{mqi}$ : Equals 1 if individual  $i$  migrated from municipality  $m$  in year-quarter  $q$
- $\text{fence}_{mqi}$ : Equals 1 if fence construction started in the corresponding year-quarter
- $X_{mqi}$ : Socio-economic characteristics
- $\gamma_m, \lambda_q$ : Municipality / year-quarter fixed effects
- Linear probability model as robustness check leads to similar results

# Identifying Assumption

- Parallel Trends Assumption (PTA): Migration decision of treated and non-treated municipalities should have developed in parallel in absence of fence construction
- Tested in an event study

$$Pr(Y_{mqi} = 1 \mid z_{mqi}) = \Lambda(\alpha + \sum_{t=-4}^4 \beta_t \times \text{fence}_{mqi} + \Gamma X_{mqi} + \gamma_m + \lambda_q),$$

where  $t$  are years relative to the starting date of fence construction

- Implemented with relative years binned starting 4 years prior/after treatment exposure
- Pre-treatment period coefficients should not be significant if PTA holds

# Parallel Trends Assumption

- Pattern in pre-treatment coefficients indicates PTA violation
  - Post-trends show clear pattern but lack statistical significance
  - OLS results show similar patterns (see Figure 2)
  - “Random” sampling could explain difference in results to Feigenberg (2020a)
- ⇒ Differential out-migration might be driven by pre-trends

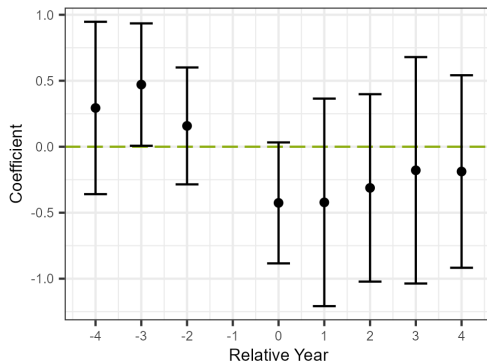


Figure 1: Event Study Results (Logit)

Note:  $t = 0$  represents the start of fence construction. Standard errors are clustered on municipality-level and error bars show 95% confidence intervals of fence construction coefficients.

# Main Results

- Fence construction significantly reduces potential migrants' likelihood of migrating
    - By approx.  $1 - e^{\beta} = 37.4\%$
    - Relative to baseline level of 3.34 migration episodes per 1,000 respondents
  - OLS indicate 0.2 percentage points significantly lower migration likelihood
  - Results are robust to the estimator and including additional controls
- ⇒ Construction of border fence is effective in deterring potential migrants, albeit to small extends only

Table 2: Impact of Fence Construction on US-Mexico Migration

	OLS		Logit	
	(1)	(2)	(3)	(4)
Fence Construction	-0.002* (0.001)	-0.002* (0.001)	-0.446** (0.220)	-0.468** (0.220)
Age		0.000*** (0.000)		-0.017*** (0.005)
Female		-0.002*** (0.000)		-0.489*** (0.098)
Years of Schooling		0.000 (0.000)		0.010 (0.021)
Married		-0.002*** (0.001)		-0.627*** (0.108)
Municipality FE	✓	✓	✓	✓
Year-quarter FE	✓	✓	✓	✓
Observations	153590	153590	153508	153508

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Parentheses shows standard errors clustered on municipality-level.

# Key Takeaways

- Fence construction significantly reduces out-migration from Mexico to the United States
  - Potential migrants are 37.4% less likely to migrate
  - Only relative to an already small baseline level of migration
- Event study results indicate presence of pre-trends
  - Out-migration from municipalities with constructed border does not develop in parallel to out-migration from non-fenced municipalities
  - Effects are likely overstated
  - Differences to Feigenberg (2020a) might arise due to random draw of observations

# References

- Feigenberg, Benjamin. 2020a. "Fenced Out: The Impact of Border Construction on US-Mexico Migration." *American Economic Journal: Applied Economics* 12 (3): 106–39. <https://doi.org/10.1257/app.20170231>.
- . 2020b. *Replication Package for: Fenced Out: The Impact of Border Construction on US-Mexico Migration*. American Economic Association. <https://www.aeaweb.org/journals/dataset?id=10.1257/app.20170231>.



## Event Study Results (LPM)

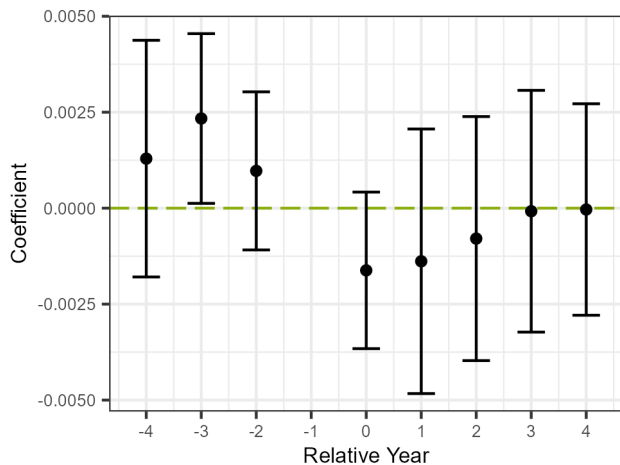


Figure 2: Event Study Results (OLS)