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*)

$\Rightarrow$ 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

$\Rightarrow$ This replication study will focus on RQ1

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Data on Fence Construction

- Data on potential fence construction, restricted to a random 50% sample

- Various sources for identifying locations
  - News articles
  - Legal documents and published construction contracts, e.g. CPB[1] and GAO[2]

- Cross-checked with Sierra Club representatives, an environmental organization observing effects of U.S.-Mexico border fence on wildlife

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[1]U.S. Customs and Border Protection
[2]U.S. Government Accountability Office

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    1. Was the fence indeed constructed?

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  1. Was the fence indeed constructed?

  2. When has the fence construction begun?

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  1. Was the fence indeed constructed?

  2. When has the fence construction begun?

  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

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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
N	142 355		11 235	

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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

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

  - Y_{mqi}: Equals 1 if individual i migrated from municipality m in year-quarter q
  - fence_{mqi}: Equals 1 if fence construction started in the corresponding year-quarter
  - X_{mqi}: Socio-economic characteristics
  - γ_m, λ_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

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

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
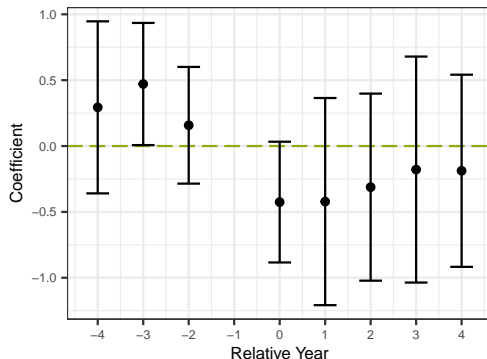

Figure 1: Event Study Results (Logit)

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*	-0.002*	-0.446**	-0.468**
	(0.001)	(0.001)	(0.220)	(0.220)
Age		-0.000***		-0.017***
		(0.000)		(0.005)
Female		-0.002***		-0.489***
		(0.000)		(0.098)
Years of Schooling		0.000		0.010
		(0.000)		(0.021)
Married		-0.002***		-0.627***
		(0.001)		(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.

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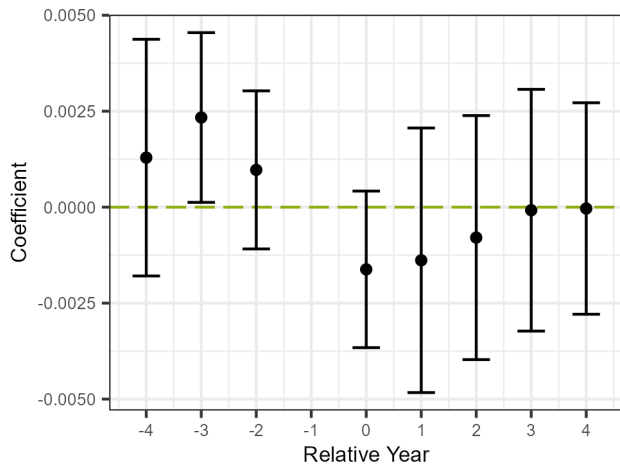Data
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Event Sudy Results (LPM)

Figure 2: Event Study Results (OLS)