Border Walls and Smuggling Spillovers

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Abstract

A growing number of states are erecting physical barriers along their borders to stem the illicit flow of goods and people. Though border fortification policies are both controversial and politically salient, their distributional consequences remain largely unexplored. We study the impact of a border wall project on smuggling in Israel. We use the initial phase of the wall construction to causally estimate spillover effects on cross-border smuggling, especially vehicle theft. We find a large decrease in smuggling of stolen vehicles in protected towns and a similar substantial increase in not-yet-protected towns. For some protected towns, fortification also arbitrarily increased the length of smuggling routes. These township-level shocks further deterred smuggling (6% per kilometer). Our findings suggest that border fortification may have uneven distributional consequences, creating unintended winners and losers.

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Enhanced security efforts, as many public policies, may have unintended consequences, both positive and negative. Changes in the terror alert system in Washington DC, for example, reduced criminal activity in areas with corresponding heightened security (Klick and Tabarrok, 2005). Similarly, changes in the deployment of police units following the 2005 terrorist bombings in London reduced crime, arguably by increasing the costs of localized illicit activity (Draca, Machin and Witt, 2011). Other security policies had unintended adverse effects. For example, justice system reform in Venezuela resulted in an increase in extra-judicial killings of those whom police officers could no longer arrest (Kronick, 2018). The 2010 Dodd-Frank Act discouraged electronics manufacturers from sourcing minerals from the eastern Democratic Republic of the Congo, reducing revenue available to warlord-led militias, but also dramatically increasing infant deaths in villages near policy-targeted mines (Parker, Foltz and Elsea, 2016).[1] We focus on the unintended *distributional* consequences of an increasingly salient public policy—border securitization.[2]

While efforts to regulate the movement of goods and people in and out of its territory have long been a core state activity, recently many states have intensified efforts to deny territorial access to "clandestine transnational actors," such as human smugglers, drug traffickers and terrorists.[3] Cross-border smuggling and trafficking is ubiquitous: the annual value of these illicit activities is estimated at 1.014 Trillion USD, a third of which is the value of the global drug trade.[4] Trafficking in humans has also been a source of growing concerns: in 2016 alone, at least 2.5 million migrants from over 140 countries were smuggled across borders for an economic return of about $7 billion USD (UNODC, 2018). In this paper, we use the case of Israel to study the efficacy of one effort to stem illegal cross-border smuggling: constructing physical border walls; a highly politicized policy response to border instability.

[1] Unintended negative externalities are not limited to the security domain: a cash transfer program in Mexico increased deforestation (Alix-Garcia et al., 2013) and women's inheritance rights reform in India worsened sex-ratio by encouraging female feticide (Bhalotra, Brulé and Roy, 2018).

[2] For distributional effects of policy choices in non-security domains, see Hacker and Pierson (2010).

[3] Andreas (2003) defines clandestine transnational actors as non-state agents who operate across national borders in violation of state laws and who attempt to evade law enforcement efforts.

[4] See Havocscope Global Disruption Index Breakdown.

In the past two decades, over 30 countries have constructed physical walls along their borders to limit unauthorized border crossing (Figure SI-1). And irrespective of whether a physical wall is primarily intended to minimize smuggling of people or goods, all forms of illicit transnational activities are treated as a national security concern (Wastl-Walter et al., 2014). In the Israeli case, the primary reason to erect a physical barrier was to stop the movement of terrorists from the West Bank into Israel. Making it more difficult for militants to cross the border, the wall has also increased the costs of smuggling stolen vehicles from Israel into the West Bank. Notably, about 80 percent of stolen vehicles are transported to the West Bank, where they are dismantled for spare parts and sold to car shops in Israel (State Comptroller, 2014). The Israeli case thus provides an opportunity to study the effect of physical border barriers on the smuggling activities and strategies of transnational criminal gangs, and ultimately, the welfare implications of border walls for the local population.

There is a growing literature that explores the determinants of border fortification (Hassner and Wittenberg, 2015; Jones, 2012; Carter and Poast, 2017). Yet, we know relatively little about the consequences and efficacy of border walls. Construction of the Israeli wall was staggered in a manner unrelated to criminal activity, with Northern townships receiving protection earlier than Southern border towns. Among protected localities, the wall also blocked some, but not all, of the most-preferred smuggling routes. We take advantage of this feature of Israel's border wall project to draw causal inferences about the efficacy and distributional consequences of (partial) fortification with respect to cross-border smuggling activity.

We leverage a collection of novel data enabling us to track both border wall completion over time and the monthly number of vehicles stolen at the township level. We report two main results. First, a 'naive' estimation of the impact of border fortification on car theft—comparing protected to yet-to-be protected towns—suggests a large *but misleading* reduction in cross-border smuggling. This approach, which besets a large number of past crime studies, assumes that smuggling activity does not relocate geographically. However, once spatial spillovers are accounted for, we find that smuggling decreases in places protected by the wall and increases *at similar rates* in unprotected towns where the border wall has not yet been built. The Israeli border wall thus had little effect on *overall crime*, yet it had distributional consequences due to spatial crime displacement.

Second, we further explore whether and how criminal gangs respond (rationally) to border fortification efforts—i.e., to changes in smuggling costs. Here, we use the location of official border crossings to identify *town-specific* changes in optimal length of smuggling routes before and after barrier construction. We find that idiosyncratic smuggling shocks are correlated with shifts in smuggling activity. On average, each additional kilometer traveled due to the border wall corresponds to about a 6% decrease in monthly vehicle theft. Importantly, this finding helps to alleviate possible concerns that the reduction in cross-border smuggling in newly protected towns is not due to localized costs of crime, but to unobserved contemporaneous confounders. In addition to demonstrating the responsiveness of local gangs to shifting costs of illicit activity—in itself, a contribution to the literature on crime determinants—this analysis helps explain an additional distributional outcome: why some localities in protected areas experienced significantly larger reductions in smuggling than others.

Our results suggest that even when border walls raise smuggling costs, they do little to reduce cross-border smuggling if fortification is partial, demand for illicit goods is stable and smuggling can be displaced to neighboring regions with minimal transaction costs. Since nearly all border walls are partial barriers, opportunities for smuggling spillovers abound. Additional analysis—included in the appendix published online—reveals that smugglers operating in protected areas likely substituted into alternative criminal enterprises, as the cost of cross-border smuggling increased. Thus a narrow focus on a single type of crime or on a single region—ignoring spatial spillovers and gangs' adaptive behavior—might result in misleading conclusions regarding the efficacy of partial border walls.

This paper makes contributions to several bodies of work, most notably to the growing literature on the effects of border securitization. Laughlin (2018) finds that the construction of fences along the U.S.-Mexico border caused at least 2,000 additional deaths in localities near smuggling routes. Relatedly, Massey, Pren and Durand (2016) find that the securitization of the U.S. southern border increased the number of undocumented migrants. Migrants extend the duration of their stays north of the border, in part, to cover the increased costs of border crossing. The border fortification project we study shares many features with other cases of border walls—in particular, the stark economic disparities between Israel and the West Bank that encourage illicit goods smuggling. Our research clarifies the consequences of border fortification, especially when such efforts raise the costs of cross-border smuggling along some, but not all, segments of a border. Specifically, our findings highlight distributional consequences of partial walls and underscore their limited efficacy due to transnational gangs' strategic adaptation.

Auto Theft in Israel

Cross-border smuggling of stolen property remains a prominent threat to public order and border stability in Israel. Auto theft especially has been increasing since the mid-1980s, and is considered among the highest in the world.[5]

Car theft in Israel is perpetrated by gangs, operating within "a well-established and organized criminal industry" (Herzog, 2002, 716). These gangs are comprised of Palestinians from Israel and from the West Bank, and in some cases also involve Israeli Jewish criminals. Prior to the border wall construction, most but not all stolen vehicles were transported to the West Bank through uncontrolled and unpaved routes. Often, though, stolen cars were driven east through border checkpoints located on main roads connecting Israel and the West Bank. In such cases, gangs use scouts to report police and soldiers' alertness. Almost all stolen vehicles are driven directly to West Bank chop shops, which strip the vehicles of their parts. In many cases, the stolen parts are sold to Israeli vehicle repair shops (State Comptroller, 2014).

We focus on the period between late 2000—the eruption of the *Second Intifada* that triggered the staggered wall construction—and early 2004. Importantly, legislation and enforce-

[5] "Stolen to Order: Israel's Car Thieves Are Getting Choosier." *Haaretz:* October 15, 2013. The direct economic damage caused by the theft of vehicles is estimated at more than NIS 1 billion a year.

ment did not experience major changes during this period, helping to isolate the effect of the construction of the border wall. While a 1998 law banned the import of used spare parts from the West Bank, the ban went into effect only after an amendment was passed in 2005. Moreover, a specialized police unit (ETGAR) devoted to preventing and prosecuting auto thefts was fully operational during the study's period (but was dismantled in 2005 and reorganized in 2006).[6]

Research Design

Three features of the Israeli barrier make it a well-suited case for examining the unintended consequences of border securitization efforts on transnational illicit smuggling activity.

First, the wall's route and the sequence of its construction were exogenous to auto theft rates, driven instead by security concerns and litigation of route appeals. Erecting a physical 'separation barrier' gained popular support with the outbreak of the Second *Intifada* in September 2000 (Brom and Shapir, 2002). Between the onset of the uprising and mid-2002, 78 Palestinians committed suicide attacks against Israeli targets; the majority of terrorists hailing from the West Bank's Northern region. This led the Israeli cabinet to prioritize wall construction in the north to "improve and reinforce the readiness and operational capability in coping with terrorism" (Lein, 2003). The border wall's route was determined on the basis of the Green Line (the pre-1967 border), with deviations intended to encompass as many Jewish settlements as possible, so as to enable their de facto annexation by Israel (Hareuveni, 2012). Further delays in constructing the wall along the southern part of the West Bank were due to legal appeals of Palestinians against the proposed route and its associated land confiscations, and, in several cases, because of environmental considerations.[7] That regional prioritization in wall construction was unrelated to auto theft is central for the study's identification strategy.

Second, the Israeli border wall increased the expected cost of crime participation by making the transportation of stolen vehicles to the West Bank riskier. The wall comprises a multi-

[6]Based on in-person interviews we had conducted with police officers and industry experts in Israel.
[7]"Cabinet Due to Again Approve Controversial Section of West Bank Barrier." *Haaretz*, Sept 19, 2015.

layered system of chain-link fences, electronic sensors that trigger signals to nearby command centers, and electronic cameras equipped with night vision (Dolphin, 2006). Wall sections close to Palestinian urban areas or to Israeli highways are 25 feet tall and 10 feet wide concrete slabs (see Figure 1a). The remaining barrier consists of chain-link fences and barbed wire, trenches, and patrol roads (see Figure 1b).

(a) Concrete barrier (b) Chain-link barrier

Figure 1: Separation barrier, pictures from OCHA (2014, 2).

Following the wall construction, all stolen vehicles smuggled out of Israel into the West Bank have therefore had to travel along main roads and pass through guarded checkpoints. Thus, the barrier increased the average length of travel between Israel's northern border localities and the West Bank, which directly increases apprehension probability. Moreover, though security forces mostly focus on monitoring entry into Israel from the West Bank, and pay less attention to vehicles with Israeli license plates driving into the West Bank, they still may stop a stolen vehicle if alerted quickly. This also increases the expected cost of cross-border smuggling of stolen vehicles.

Third, the visibility of the border wall makes the increased risk of apprehension salient to potential smugglers. Together, these features of the Israeli border wall increase our confidence that changes in crime incidence are a rational response to situational measure externalities.

Data and Variable Description

Our unit of analysis is the locality-month. We focus on Jewish Israeli localities (municipalities, local councils, towns, etc.) west of the Green Line, thereby excluding Jewish settlements in the West Bank and Arab localities in Israel proper. The number of localities in a given year ranges from 914 to 1,050, reflecting both the establishment of some new localities and merging of existing ones in various years.

The study's key dependent variable is the number of reported vehicle thefts per 1,000 residents in a given locality-month. We obtained these data from the Israeli Police using the Israeli Freedom of Information Law.

We employ a spatial overlap design to assign localities to three treatment classifications based on their geographic zone (see Figure 2). Starting with the northern part of the West Bank, the thick black line ('Separation Barrier 2002') represents the first segment that was built starting from June 2002. The gray thick line ('Separation Barrier 2003') depicts an extension constructed in early 2003. These lines are the basis for assigning localities to the Northern treatment area. The treatment boundary extends from the edges of separation barrier to the western coastline (approximately 25 kilometers) and an equivalent distance to the north. The resulting boundary rectangle excludes areas to the south and the east of the barrier. A spatial intersection was used to identify localities within this boundary.

The dotted lines ('Separation Barrier 2006') depict the south and central West Bank areas, where the wall was constructed only after 2005. Localities west and south to the post-2005 line are assigned to the Southern control zone. For these localities, the expected cost of stealing vehicles remained constant throughout the study's period; however, post June-2002 they became increasingly vulnerable to possible crime displacement from treatment localities. Consistent with our classification of treatment towns, we use a spatial intersection to identify Southern townships.[8]

[8]We note two minor differences between our classification of Northern and Southern localities. First, the control group boundary extends approximately 40 kilometers from the 2006 line to the western coastline and

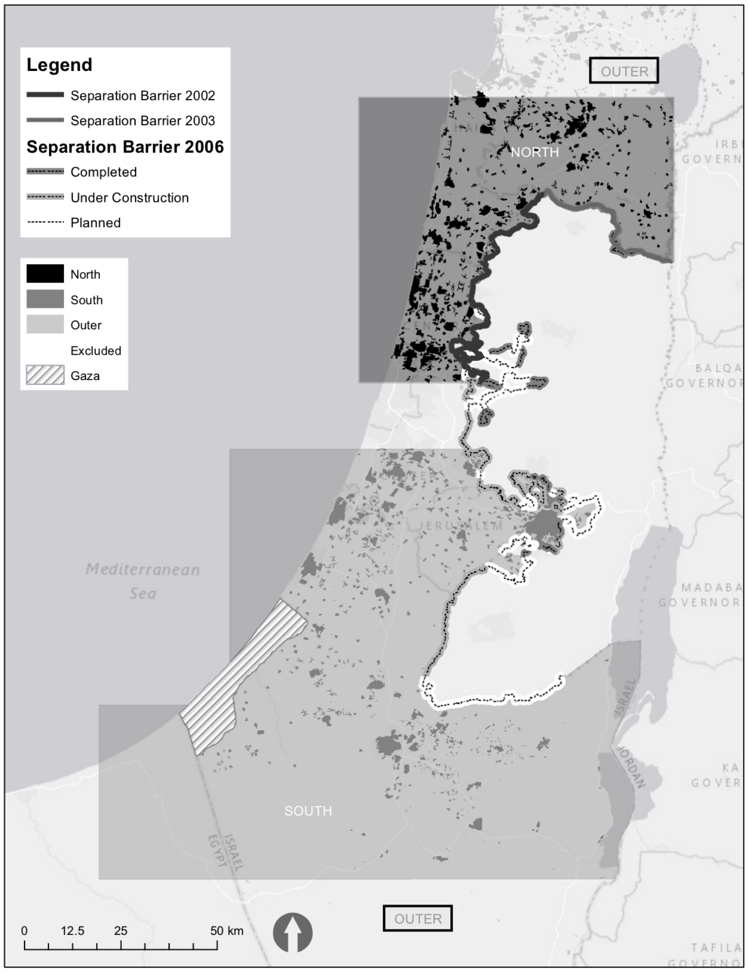

Figure 2: Map describes study area and assignment of localities to treatment status.

We classify Israeli localities outside the two shaded regions (above the Northern zone and below the Southern area) as an "Outer" group. These towns are located sufficiently far from West Bank chop shops, such that they are unaffected by fortification efforts along the West Bank border. Vehicles stolen from Outer localities in northern Israel are either dismantled in chop shops in the Galilee region or smuggled to Lebanon; most vehicles stolen from Outer localities in southern Israel are smuggled to Egypt. The Outer group is therefore a residual category that is essential for estimating general equilibrium securitization effects. As we demonstrate below, our findings are robust to alternative treatment and control assignment criteria.

an equivalent distance to the south, reflecting the greater distance to the coastline. Second, we exclude Gaza from the control area.

In our baseline analysis, we define a binary variable *Treatment* that takes the value of one for all localities in the treated Northern region and the value of zero for localities in the unprotected Southern (or control) area. Using this specification, we are able to test a partial equilibrium common in the literature [e.g., DiTella and Schargrodsky (2004)]. In our general equilibrium specifications, we replace this specification with two binary variables. In one specification, we compare the Northern localities to the Outer localities. In the other specification we compare the Southern localities to the Outer localities. This design most closely follows Donohue, Ho and Leahy (2015). We define the *Post* period as all months from June 2002, when construction of the barrier along the Northern (but not Southern) border began.

We control for a variety of locality-level attributes that can affect auto theft. In particular, we include a continuous measure of population size, a binary measure of urbanization, a continuous measure of distance from the Green Line (and its squared term), municipal administrative designation, and flexible time trend. These measures are taken from the Israeli Central Bureau of Statistics. In robustness checks, we also control for locality's socio-economic status and exposure to terrorism. A more detailed description of the data can be found in the online appendix (see Section B).

Summary statistics are in Table SI-2. The data show that in the Northern localities the mean number of monthly vehicles stolen per 1,000 residents dropped from 1.02 in the pre-construction period to 0.56 in the post-construction period. In the Southern localities, car theft increased from 0.87 to 1.07. In the Outer localities, we observe a statistically insignificant shift in mean theft from .34 to .29.

Estimation Strategy

We use a series of difference-in-difference regressions to estimate the effect of barrier construction on auto theft. Our base model is captured by equation 1:

$$Y_{jt} = \alpha + \beta_1 Treatment_j + \beta_2 Post_t + \beta_3 Treatment_j \times Post_t + \eta_t + \gamma X_{jt} + \epsilon_{jt} \qquad (1)$$

where Y_{jt} is the number of vehicles stolen per 1,000 residents in locality j in month t; $Treatment_j$ is a treatment indicator; $Post_t$ is the indicator for the post-construction period (June 2002); η_t denotes a linear month trend, which accounts for secular growth in the demand for stolen cars; X_{jt} is a vector of locality controls; and ϵ_{jt} is the locality error term. In all models we cluster standard errors at the locality level. In the SI, we also introduce estimates that leverage unit and time fixed effects. In the main analysis, the coefficient of interest is β_3.

Satisfying Identification Assumptions

The validity of our estimation strategy relies on two core assumptions. First, barrier construction must not coincide with possible changes in policy activity. We show the validity of this assumption in SI (Section C), where we analyze data we obtained from the Israeli police on both police deployment (Figures SI-2 and SI-3) and on suspects caught while operating stolen vehicles (Figures SI-4 and SI-5).

Second, as in all difference-in-differences estimations, we assume parallel trends in auto theft prior to wall construction. We visualize these trends in Figure 3 in which we plot the monthly mean of car theft (per 1,000 residents) by treatment group as a percentage of the group's pre-wall mean. The pre-wall trends in car theft across treatment groups appear parallel with some noisiness early in the study period. In the six months before and as wall construction begins, all regions have similar crime rates. Starting one month into wall construction, however, car theft in the North drops significantly to roughly 50% of the pre-wall average, while car theft in the South begins to steadily increase. As expected, we observe marginal fluctuations around the pre- (and post-) wall mean in the Outer localities. We present additional formal tests of the parallel trends assumption in the online appendix (Section E).

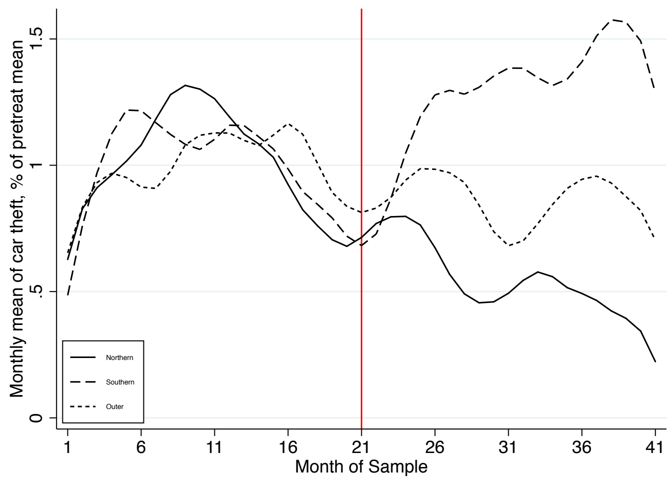

Figure 3: Trends in car theft (normalized by population) by treatment group, before and after wall construction (vertical line).

Results: Deterrence and Displacement

We find that auto theft significantly declined in Northern localities after the border wall was constructed compared to Southern localities (Table 1, column 1). This result, however, potentially incorporates two effects: deterrence and displacement. If the construction of the border wall causes significant externalities to southern localities, the baseline models would overstate the true treatment effect.

To address this concern, we (separately) compare car theft in the Northern and Southern localities to Outer localities, where the potential for crime spillovers should be limited. Results reported in Table 1 (see North vs. Outer and South vs. Outer columns) suggest that a substantial amount of the reduction in car theft in the protected Northern localities was displaced to Southern towns. In the post-wall period, car theft dropped in Northern localities by 0.4 vehicles per 1,000 residents compared to Outer areas, and the South experienced 0.3 additional stolen vehicles per 1,000 residents relative to Outer localities. These shifts are equivalent to a 41% decrease in car theft among Northern localities and a 34% increase across Southern localities. The grand mean in car theft does not shift substantially after the wall is constructed (.73 vs. .67), suggesting the reduction in auto theft in the North is almost entirely offset by an increase in the South.

Table 1: Barrier Construction and Auto Theft: Deterrence and Displacement

	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.097	0.267*	0.211**
	(0.114)	(0.142)	(0.098)
Post	0.186***	0.102**	-0.230***
	(0.056)	(0.044)	(0.048)
Treatment × Post	-0.671***	-0.415***	0.256***
	(0.079)	(0.071)	(0.057)
N	24985	23716	25069
Clusters	617	587	620

Note: Model estimates from diff-in-diff regressions formalized in equation 1. North vs. South column compares localities protected by the Northern part of the wall to unprotected areas west of the Southern border with the West Bank; North vs. Outer column compare instead Northern (protected) localities to unprotected Outer areas that are too far to be affected by wall construction; and South vs. Outer column reports the comparison between two types of unprotected areas: Southern (yet-to-be protected) localities that are exposed to spillovers and Outer localities that are not.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

In the online appendix, we introduce several robustness checks: (i) incorporate fixed effects into the baseline diff-in-diff specification; (ii) add lags of the outcome; (iii) drop pre-treatment periods with potential trend breaks; (iv) narrow the main sample to ten months prior to and after treatment; (v) incorporate district-specific time trends; (vi) cluster our standard errors to account for the industrial organization of crime; (vii) exclude potential outliers; (viii) incorporate mixed religion localities in our main sample; (ix) account for intensity of terrorist activity; (x) address changes in socio-economic development by locality; (xi) construct alternative treatment and control classifications. These results are highly consistent with our main findings.

Smuggling Route Disruption

Core criminal behavior models suggest that if the perceived risk of apprehension in locality j increases due to some visible prevention measure, criminal activity in that locality should be reduced or displaced (Chalfin and McCrary, 2017). The border wall introduced a *common shock* by forcing all thieves operating in localities west of the Northern part of the Green Line to drive through checkpoints when transporting stolen vehicles into the West Bank. However, the extent to which the construction of the wall disrupted routes previously taken by smugglers varied from one locality to another. This caused the risk of apprehension to shift as a function of *locality-specific shocks* (in addition to the common shock of barrier construction). In this section, we use granular road network data to investigate the distributional consequences of border fortification *within* the protected Northern zone.

To identify the degree to which trafficking routes were disrupted in newly secured Northern localities, we collect data on the road network connecting Israel and the West Bank from **Open Street Map** repositories. Based on secondary information and interviews with Israeli police officers and criminologists, we identify the locations where vehicles were most frequently taken to be dismantled. In the Northern West Bank, auto theft activity is concentrated out of the city of Nablus; in the West Bank's South, this activity is largely based around Hebron. With these data in hand we build on a route optimization problem detailed by Dell (2015) and calculate optimal paths from each locality to the nearest stolen vehicle destination.

We begin with a directed graph of all paved vehicular roads in Israel and the West Bank R, which is composed of intersections N and roadways E (so, $R = (N, E)$). Smugglers move stolen vehicles from Israeli localities to Palestinian chop shops, where vehicles are dismantled. Each smuggler attempts to minimize the risk of apprehension and input costs of transit. For simplicity, let each roadway $e \in E$ have a cost function determined by the length (l_e) of the road, so the risk and cost of traveling along a given road is equal to $c_e(l_e)$. If traversing $n \in N$ is costless, then the total cost of a potential smuggling route p is $V(p) = \sum_{e \in p} c_e(l_e)$. This term covers both the opportunity cost of crime, as well as the risk of apprehension.[9]

Let $P_{L,CS}$ denote the set of all possible routes between localities L and "chop shops" CS in the pre-construction period. Criminals optimize routes such that:

$$\underset{p \in P_{L,CS}}{min} V(p). \tag{2}$$

[9]The degree to which a route is disrupted—and lengthened—impacts both the risk of apprehension while transporting the vehicle (length of road driven in stolen vehicle) and opportunity costs of the criminal transaction (amount of time spent driving the vehicle).

After the construction of the wall, some (but not all) of these paths are disrupted. To calculate route disruptions, we constrain traffic in the post-construction period to cross from Israel proper to the West Bank using main roads and thus to necessarily pass through security checkpoints. That is, edges E in R that bisect the separation barrier $\mathbf{B}$ are eliminated from the set of roadways that could be utilized to pass from Israel to the West Bank. By implication, unpaved or semi-paved roads are dropped from the network after barrier construction. Denote the remaining traversable pathways and intersections as E' and N'.

Following the construction of the separation barrier, for every path p', the cost of travel is $V(p') = \sum_{e' \in p'} c_{e'}(l_{e'})$, where e' can only be drawn from E'. For some localities, potential smugglers employ the same route in the presence of the security barrier. To clarify, for these towns, the p in $P_{L,CS}$ and p' in $P'_{L,CS}$ that minimize transit costs are identical ($p = p'$). For other localities, introduction of the checkpoints constraint increases the cost of travel substantially. For these localities, $p < p'$. See Figure SI-11 for a visualization of the optimal smuggling routes, before and after barrier construction.

For all Northern localities, $\frac{p'}{p} \geq 1$. Under a binary treatment definition, route disruption is considered uniform. Yet disruption differentially raises the costs of auto theft when $\frac{p'}{p}$ > 1. To test if route disruption implies heterogeneous treatment effects, we calculate d, treatment intensity, simply as $\frac{p'}{p}$. Practically, d exceeds the binary treatment condition by the percentage of the pretreatment route length disruption. We note that just over a third of Northern localities have a value of $d > 1$.

How did idiosyncratic route disruption affect population normalized auto theft rates in the post-construction period? In Figure 4, we plot the differences in monthly car theft (left vertical axis) as a function of both p (horizontal axis) and d (right vertical axis). We find that auto theft reduction follows d very closely. Where the cost of criminal activity, d, is monotonically *increasing*—from the "border" until approximately 42 kilometers from Nablus—the *decrease* in auto theft is also growing larger. As the average rate of disruption begins *decreasing*—for localities that are located more than 42 kilometers from Nablus—the reduction in criminal activity is still substantial, but smaller in magnitude. This visual evidence suggests localities that experienced the greatest drop in auto theft activity are also those that benefitted from the largest increases in smuggling costs due to barrier-induced disruption of trafficking routes.

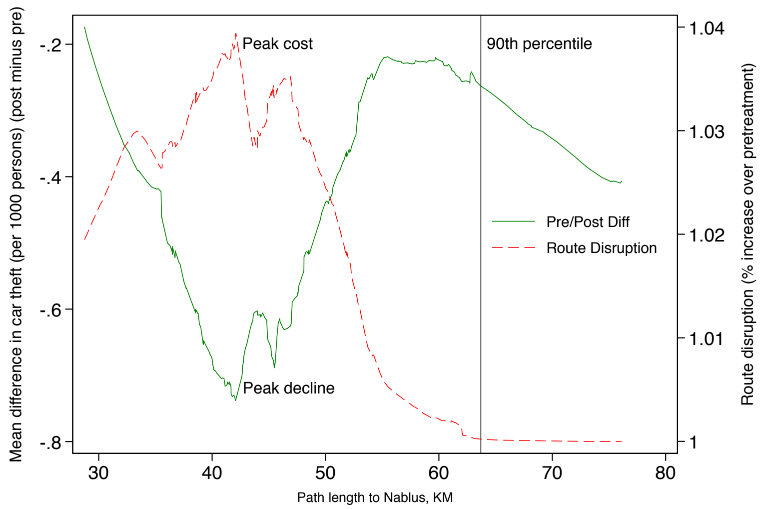

Figure 4: Impact of smuggling path disruption on auto theft intensity.

Decomposing Smuggling Shocks Effects

To estimate the effects of route disruption on car theft, we begin by comparing Northern and Outer localities using the same diff-in-diff model formalized in equation 1. The only difference is that $Treatment_j$ is now measured as d (i.e., $\frac{p'}{p}$). For northern localities with no shift in smuggling routes, $Treatment_j$ equals 1. For treated localities with a shift in smuggling routes, $Treatment_j$ exceeds 1 (with a max of 1.54, indicating a 54% increase in route length due to the border wall construction). In this specification, β_3 captures the aggregate (or average) effect of treatment intensity.

Effectively, this allows estimating the combined effect of the common shock (the construction of the barrier) and the disruption of smuggling routes. Here, the interaction takes the value 1 for Northern localities after the barrier is built if the preferred smuggling route does not change (i.e., the route happens to go through a checkpoint). If the route does change, we measure the degree of disruption as a percentage. Compared with the results in column 2 of Table 1, Table 2 column 1 suggests larger reductions in car theft as route disruption increases.

At the observed maximum disruption, car theft is reduced by roughly 60% (compared to 42% in the base specification). In column 2, we similarly estimate the effect of disruption in kilometers to ease interpretation. Each additional kilometer of the smuggling route is associated with a decrease in auto theft of roughly 6%.

Table 2: Impact of Smuggling Route Disruption on Auto Theft: Common Shock and Heterogenous Treatment Intensity

	North Vs. Outer		
	Aggregate Effect: Common shock + disruption	Degree of Disruption (KM)	Disaggregate Effects: Common shock vs. Common shock + disruption
Treatment ($d \geq 1$)	0.258*		
	(0.139)		
Post	0.103**	-0.078*	0.100**
	(0.044)	(0.040)	(0.044)
Treatment ($d \geq 1$) × Post	-0.408***		
	(0.070)		
Treatment (Δ KM)		0.022	
		(0.029)	
Treatment (Δ KM) × Post		-0.059***	
		(0.021)	
Treatment ($d = 1$)			0.081
			(0.134)
Treatment ($d = 1$) × Post			-0.319***
			(0.066)
Treatment with disruption ($d > 1$)			0.531**
			(0.230)
Treatment with disruption ($d > 1$) × Post			-0.546***
			(0.138)
N	23716	23716	23716
Clusters	587	587	587

Note: Model 1 allows the binary treatment status to exceed 1 in cases where routes are disrupted. The maximum observed increase in route length is 54%, so the maximum value of this measure is 1.54. The sample compares Northern and Outer localities. Notice that the estimated effect differs from Table 1 Column 2 because our treatment variable is no longer binary. The estimated effect represents an average across all treated Northern townships. Model 2 studies disruption using the absolute increase in route length in kilometers. Model 3 relaxes Model 1 and enables us to disaggregate treatment effects within Northern localities. "Treatment" takes the value 1 if a locality is in the treated zone (Northern) and does not experience an increase in route length (otherwise 0). "Treatment with disruption" takes the value of d (see text) if a locality is in the treated zone (Northern) and does experience an increase in route length (otherwise 0). All models control for locality factors as described in the main text.

- Robust standard errors in parentheses, clustered by locality.

* p<0.10, ** p<0.05, *** p<0.01

While informative, our baseline specification (Table 2 columns 1 and 2) is unsuited to capture possible heterogeneity across treated but undisrupted localities and those that did experience disruption. It is possible, for example, that the main effects are driven entirely by localities that experienced a route disruption and our aggregate specification simply masks these subgroup effects. To investigate this, we construct two treatments variables. The first takes the value 1 if a locality is treated but experiences no route shock (and 0 otherwise). The second takes the value of d if a unit is treated and experiences a route shock (and 0 otherwise). These classifications are exclusive (not nested) and allow us to estimate disaggregated heterogeneous effects more precisely (if they exist).

We find strong evidence that the barrier alone served to deter auto theft, at least locally (Table 2 column 3). Even if the preferred route did not change after the border wall was constructed, auto theft still declined significantly in the north as thieves needed to transport the vehicles through newly fortified checkpoints. For these localities, auto theft declined by roughly 0.32 vehicles per 1,000 residents (or 32% relative to the pre-construction auto theft levels). If, however, the barrier forced smugglers to reroute, the reduction in auto theft was further enhanced. At the maximum disruption level (54% increase in route length), disruption resulted in an additional drop of 0.51 auto thefts per 1,000 residents. In total, this shift represents an 83% decline in car theft.

Conclusion

In this paper, we study a highly salient but poorly understood public policy: border securitization. Drawing on novel microdata, we examine the distributional consequences of a border wall project in Israel that is comparable in scale and technology to the proposed expansion of the U.S. border wall. We use the initial phase of wall construction to estimate the impact of border fortification on cross-border smuggling. Importantly, the construction project was staggered in a manner unrelated to traffic exiting Israel, allowing us to draw causal inferences about the impact of border fortification on smuggling behavior.

We find evidence that the border wall lead to a notable reduction in vehicle theft in townships 'protected' during the initial phase of construction. However, smuggling activity was displaced to nearby border localities that were 'unprotected' by the wall. We also estimate township-specific changes in the costs of smuggling. These results clarify the mechanism linking border securitization to reduced localized smuggling in the fortified region. Taken together, these results help us better understand how the unintended consequences of policy-making can have uneven distributional effects.

In the online appendix, we use arrest records and data on home invasions to better understand the mechanisms driving the smuggling spillovers we observe in our main results. Our descriptive evidence suggests that smugglers from the northern part of the West Bank did not relocate after the partial wall was constructed (i.e., spillovers are due to increased production by southern gangs). Instead, they likely shifted from smuggling to other illicit activities, including burglaries, thereby increasing insecurity–the very reason for building the wall in the first place. Theoretically, these findings shed light on the strategic response of criminal gangs to border fortification, especially when such efforts only partially strengthen existing institutions. Our study's core findings—especially the minimal overall effect on smuggling, the redistributive implication of the wall construction, and the substitution by affected gangs to other forms of *domestic* crime—also have clear implications for current policy debates regarding the efficacy of border walls.

The fact that our study uses data from a single case naturally raises external validity concerns. Specifically, one may worry that our primary outcome of interest—car theft—is not representative of the class of smuggled goods. We believe, however, that the intuition of our argument applies to a range of illicit activity—including large-scale drug supply chains and human trafficking—where the costs of criminal operations may be influenced by border interventions that constrain traffic by vehicle. More so, even though car theft is generally a non-violent form of smuggling, other types of smuggling may involve or trigger violence.

We conclude by noting that many human activities beyond illicit smuggling are affected by extensive border securitization measures. In the Israeli case, the separation barrier has also made it more difficult for Palestinian households to access their arable land and to work in Israel and for families on both sides of the barrier to reunite. Thus any analysis of the impact of border fortification measures on aggregate welfare may need to take a more holistic approach than the limited focus on crime adopted herein.

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ONLINE APPENDIX
— Supporting Information for "Border Walls and Smuggling Spillovers" —

A Border Walls Around the World since 2000

The Israeli separation barrier is not unique. In fact, dozens of countries around the world have invested in border fortification in the last two decades. Figure SI-1 depicts the initiators of these walls and their target countries. The map is based on data from Hassner and Wittenberg (2015) and Carter and Poast (2017). Table SI-1 lists the fortifications combined from these two data sources.

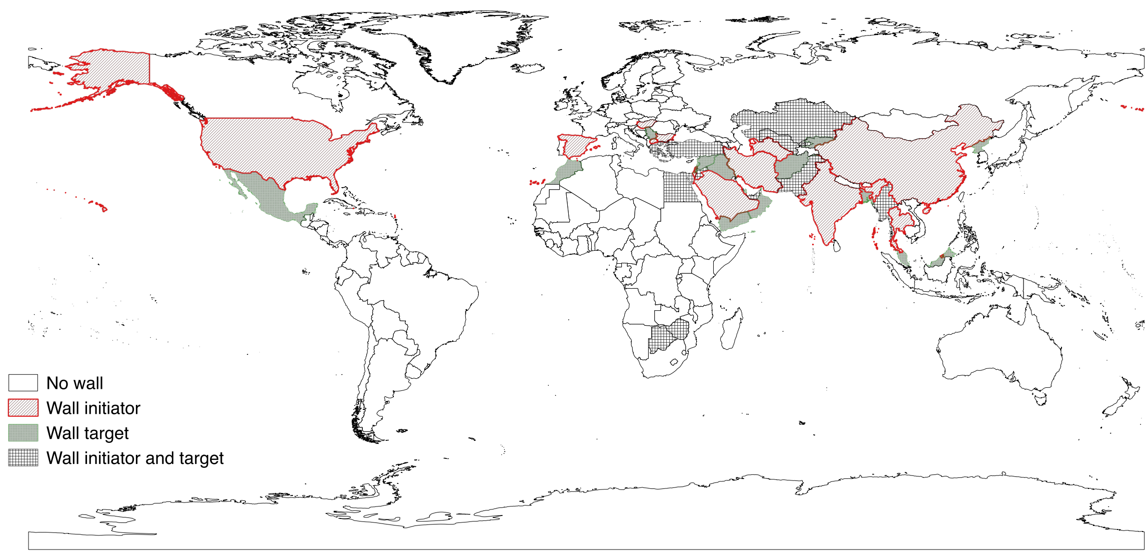


Figure SI-1: Map of walls constructed since 2000, based on data from Hassner and Wittenberg (2015); Carter and Poast (2017), and additional news sources. See Table SI-1 for details.

Initiator	Target	Start Year	Source
Egypt	Gaza	2000	1
Israel	Gaza	2000	1
Israel	Lebanon	2000	2
Spain	Morocco	2001	1
India	Pakistan	2001	1
Thailand	Malaysia	2001	1,2
Turkmenistan	Uzbekistan	2001	1,2
Uzbekistan	Afghanistan	2001	1
Israel	West Bank	2002	1
Botswana	Zimbabwe	2003	1,2
India	Burma	2003	1,2
Zimbabwe	Botswana	2003	2
Saudi Arabia	Yemen	2004	1,2
United Arab Emirates	Oman	2004	1,2
Brunei	Malaysia	2005	1,2
India	Bangladesh	2005	1
Pakistan	Afghanistan	2005	2
United Arab Emirates	Oman	2005	1
United States	Mexico	2005	1,2
China	North Korea	2006	1,2
Jordan	Iraq	2006	2
Kazakhstan	Uzbekistan	2006	1,2
China	North Korea	2007	1,2
Iran	Pakistan	2007	1,2
Pakistan	Afghanistan	2007	1
Burma	Bangladesh	2009	1,2
Saudi Arabia	United Arab Emirates	2009	2
Saudi Arabia	Iraq	2009	1,2
Saudi Arabia	Oman	2009	2
Saudi Arabia	Qatar	2009	2
Greece	Turkey	2011	2
Israel	Jordan	2011	2
Bulgaria	Turkey	2015	3
Hungary	Serbia	2015	4
Turkey	Syria	2016	5
Macedonia	Greece	2015	6

Sources: 1=Hassner and Wittenberg (2015), 2=Carter and Poast (2017), 3=link to a news article, 4=link to a news article, 5=link to a news article, 5=link to a news article.

Table SI-1: List of Border Fortifications since 2000.

B Data

To implement our empirical strategy, we use data on auto theft and the separation barrier construction sequence, and combine them with locality-level indicators.

Unit of Analysis

Our unit of analysis is locality-month, and we examine the period from October 2000 through January 2004. Localities are local administrative units that the Israeli Ministry of Interior classified as municipalities, local councils, or regional councils. The latter are comprised of smaller communities in the same region. The main factor that affects this designation is a locality's number of residents. Municipalities are relatively large cities (usually above 20,000 residents), whereas local councils are usually smaller urban townships (between 2,000 and 20,000 residents). Rural communities and villages with fewer than 2,000 residents are often grouped together with other similarly small communities in their area into regional councils. These thresholds apply for most local authorities, with a few exceptions. Some relatively large towns with above 20,000 residents remain local councils to preserve their small community character (for example, the town of Ramat HaSharon). In other cases, small communities of historical importance, but with fewer than 2,000 residents, are still designated as local councils and not merged with others into a regional council to maintain their independent status (for example, Metula).

Dependent Variable — Property Crime

Our main dependent variable is auto thefts per 1,000 residents in locality j in month t. We obtained these data from the Israeli police using the Freedom of Information Law. Police records encompass the entire universe of reported auto thefts in Israel. These records are comprehensive because reporting to the police is required in order to file an insurance claim. A further advantage of our data is that we have the number of stolen vehicles reported in every locality-month. This allows us to conduct a very disaggregated test of how the progress of barrier construction affects auto theft in geographically-disaggregated units.

For our purposes, we use data on all Jewish and mixed localities in Israel, excluding Israeli Arab localities and Israeli settlements in the West Bank. We exclude non-Jewish localities because crime reporting may be incomplete and underreported. Indeed, the mean number of vehicle thefts per 1,000 residents in mixed and Jewish localities is 0.70, and it is 0.53 in non-Jewish localities. In addition, we exclude West Bank settlements because the effect of the barrier on auto theft may be different in these places. In our main estimations, we use Jewish Israeli localities, and in robustness checks we also include mixed localities (Jewish-Arab). The number of localities varies over the years, and in our sample there are between 914 and 1,050 localities in each year.

Explanatory Variable — Border Wall

Our main independent variable of interest is whether locality i is protected by the barrier in month t. We obtained data and maps on the different stages of barrier construction. We received the data from the GIS unit at the United Nations Office for the Coordination of Humanitarian Affairs (OCHA oPt) and from Peace Now (an NGO that monitors the Israeli-Palestinian conflict). In addition, we consulted the Israeli Ministry of Defense webpage that describes the process of barrier construction.[10]

Using these data, we assigned Israeli localities to one of three groups: Northern, Southern, or "Outer" (see Figure 2). The Northern zone includes Israeli localities approximately 25 kilometers to the west and north of the barrier in the Northern part of the West Bank (the distance was chosen to reflect the distance to the coastline). The Southern zone includes all Israeli localities within 40 kilometers to the west and south of the West Bank. The greater distance in the South reflects the fact that the coastline there is farther away from the West Bank than in the Northern zone. We classify Outer localities as units below the Southern region and above the Northern region. Treatment classifications are also described in the main text (see "Data and Variable Description").

Control Variables

We control for a number of factors that can affect auto theft. First, we identify Jewish and mixed localities using the data in the Local Authorities datasets (Central Bureau of Statistics, 1998-2004), and we limit our investigation to Jewish and mixed localities, as explained above. Second, we control for one-year lagged population size (in 10,000). Number of residents is directly related to the number of vehicles in a locality, and thus can account for the number of stolen vehicles. Third, we include an indicator for urban localities based on locality coding of the Central Bureau of Statistics (CBS). We control for urban localities because it may be easier to steal a vehicle in urban settings than in rural communities where residents tend to

[10] Israel's Security Fence, Retrieved June 21, 2016 (`http://bit.ly/1dKc4AG`).

know each other and can easily spot an outsider. Fourth, we control for whether a locality is part of a regional council because, similarly to rural localities, it may be easier to steal a vehicle in small communities. Finally, we also control for locality's distance to the West Bank by including the distance in kilometers (and distance squared).

In the robustness checks detailed below, we control for locality-specific socio-economic status using the CBS coding of the socio-economic cluster that ranges from 1 (the least wealthy) to 10 (the most wealthy). The main indicators that the CBS uses to measure the socio-economic level of localities are: financial resources of residents, housing, home appliances, motorization level, schooling and education, employment, socio-economic distress, and various demographic characteristics.[11] This variable is available for municipalities, local councils, and regional councils, not for the small localities that are parts of regional councils (in some cases, these are small communities of several dozen families). For these small localities, we use the regional council cluster, and assume all small localities within the same regional cluster have the same socio-economic status.

We also show that our results are consistent while controlling for terrorist activity. We use two measures of terrorist activity: the number of suicide attacks and the number of all terror attacks in a locality and in a locality's district. Data on attacks was coded using the archive of the Israeli news website Ynet. Our suicide attacks data is comparable to other dataset of suicide attacks in Israel that do not contain information on the location of the attack (for example, Benmelech, Berrebi and Klor (2010)).

Summary statistics are presented inTable SI-2.

[11] http://www.cbs.gov.il/publications/local_authorities06/pdf/e_mavo.pdf.

Table SI-2: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Northern localities (Treatment)					
Auto thefts pre-barrier (per 1k residents)	1.02	1.68	0	14.64	11232
Auto thefts post-barrier (per 1k residents)	0.56	0.92	0	11.21	11232
Population (10k)	0.29	1.22	0.01	14.34	11232
Part of a regional council	0.89	0.31	0	1	11232
Urban locality	0.12	0.33	0	1	11232
Distance to the West Bank (km)	11.66	7.89	0.21	33.94	11232
Socio-economic level	6.19	1.18	2	10	11205
Number of suicide attacks in locality	0	0.05	0	1	11232
Number of suicide attacks in district	0.35	0.63	0	4	11232
Number of all attacks in locality	0.01	0.11	0	3	11232
Number of all attacks in district	1.83	1.99	0	12	11232
Southern localities (Control)					
Auto thefts pre-barrier (per 1k residents)	0.87	0.97	0	7.49	12519
Auto thefts post-barrier (per 1k residents)	1.07	1.07	0	8.51	12519
Population (10k)	0.27	1.33	0	14.94	12519
Part of a regional council	0.92	0.28	0	1	12519
Urban locality	0.09	0.28	0	1	12519
Distance to the West Bank (km)	16.36	11.08	0.11	48.15	12519
Socio-economic level	5.68	1.34	2	10	12480
Number of suicide attacks in locality	0	0.01	0	1	12519
Number of suicide attacks in district	0.22	0.62	0	5	12519
Number of all attacks in locality	0.01	0.15	0	8	12519
Number of all attacks in district	3.51	3.71	0	25	12519
Outer localities					
Auto thefts pre-barrier (per 1k residents)	0.34	0.71	0	8.44	11427
Auto thefts post-barrier (per 1k residents)	0.29	0.47	0	4.07	11427
Population (10k)	0.51	2.15	0	16.32	11427
Part of a regional council	0.87	0.33	0	1	11427
Urban locality	0.12	0.32	0	1	11427
Distance to the West Bank (km)	49.16	32.04	2.44	198.19	11310
Socio-economic level	5.60	1.27	2	10	11388
Number of suicide attacks in locality	0	0.03	0	2	11427
Number of suicide attacks in district	0.23	0.49	0	4	11427
Number of all attacks in locality	0	0.07	0	4	11427
Number of all attacks in district	1.74	2.08	0	12	11427

Note: These summary statistics refer to the sample of localities we use in our main estimation: Jewish-Israeli localities between October 2000 and January 2004, where the unit of analysis is the locality-month.

C Police Deployment as an Alternative Explanation for our Findings

In this section, we show that our findings are not due to police deployment. To measure police deployment, we use official figures on the number of police officers and the number of police cruisers in each police district in Israel. These measures capture the manpower and key resources available to the police to respond to vehicle theft events. We supplement these with an investigation of arrest trends.

Deployment trends

To rule out that police deployment drives our results, we match each police district to our locality classifications (Northern, Southern, and Outer). We then examine whether there are changes in police deployment in these areas–measured using data on police officers and relevant police vehicles–during the construction of the barrier.[12]

Figure SI-2 depicts the changes in the number of police officers in the Northern and Southern zones. The figure shows that there are no substantial changes after 2002, and the growth rate in police force scale appears to be similar in both areas.

Similarly, Figure SI-3 suggests that police resources—as measured using the number of police cruisers—do not explain the decrease in car thefts in the Northern region.

[12] The data on police figures come from the annual budget of the Ministry of Public Security, available online at `https://mof.gov.il/BudgetSite/statebudget/Pages/Fbudget.aspx`, accessed September 13, 2018.

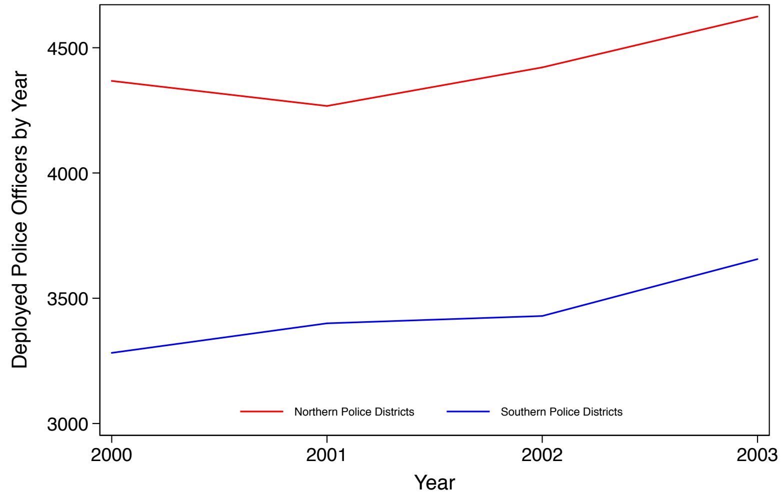


Figure SI-2: Annual number of police officers in the North and in the South.

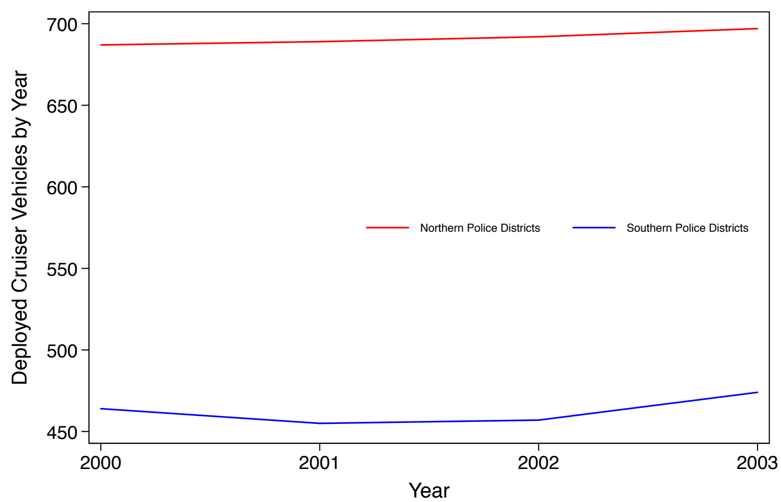


Figure SI-3: Annual number of police cruisers in the North and in the South.

Arrest Trends

In Figures SI-4 and SI-5 we corroborate the above evidence about police deployment using arrest data. Specifically, we plot the apprehension rate of Israeli and West Bank suspects that were arrested for car theft. Notice that only border localities in the treated (walled) zone see a significant increase in apprehension. The probability of apprehension peaks at roughly double the pre-wall mean in border localities. No similar shifts are observed in other regions, including localities in the North that are not within five kilometers of the barrier.

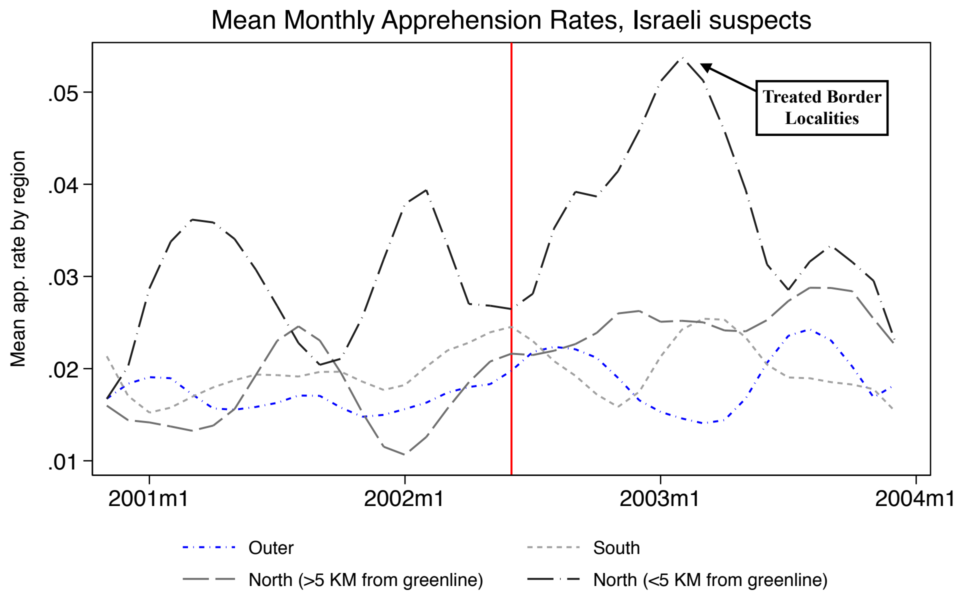


Figure SI-4: Apprehension rates for car theft suspects, by region of origin and capture (Israeli suspects).

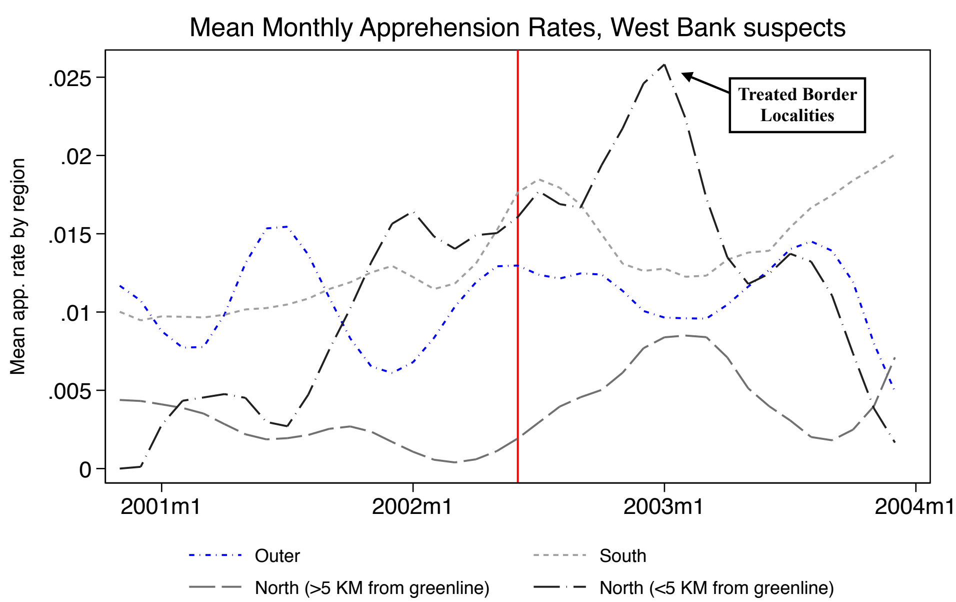


Figure SI-5: Apprehension rates for car theft suspects, by region of origin and capture (West Bank suspects).

D Crime Deterrence vs. Incapacitation of Criminals

The border wall can affect crime not only by deterring auto theft in the north, but also by making it harder for criminals from the West Bank to enter Israel and steal vehicles in localities protected by the barrier. In other words, our findings might reflect an incapacitation effect rather than deterrence due to higher opportunity cost of crime (Chalfin and McCrary, 2017, pp. 10-11). While we acknowledge that the barrier has made it harder for Palestinians to cross the border, the evidence at hand suggests that incapacitation alone cannot account for our findings. Using data on all auto-theft-related arrests in Israel and the West Bank, we show in Table SI-3 that the vast majority of car-theft suspects arrested in the North area are from Israel and not from the West Bank, and that the share of West Bank arrestees increases slightly after the introduction of the barrier, but they still constitute a small fraction of all arrestees.[13]

Although these figures are based on arrest data, the low percentage of West Bank suspects suggests that incapacitation is not the main mechanism that explains how the barrier affects car theft. Furthermore, as we demonstrate in Figure SI-4 and Figure SI-5, the largest increases in car theft apprehension occur among Israeli suspects in Northern border regions. We find similar patterns for West Bank suspects, but at lower rates (roughly half).

Table SI-3: Origin of Car-Theft Suspects Arrested Before and After Barrier Construction

Suspect's origin	**Pre-barrier period** (October 2000-May 2002)	**Post-barrier period** (June 2002-January 2004)	**Total**
West Bank	13% (38)	16% (45)	14% (83)
Israel	87% (251)	84% (241)	86% (492)
Total	100% (289)	100% (286)	100% (575)

Note: All suspects arrested in the Northern zone on auto-theft related charges before and after the barrier construction, based on data obtained from the Israeli police.

[13] According to arrests data, West Bank suspects arrested in the North constitute only 13% of those arrested for car-theft related charges in the pre-barrier period, and 16% in the post-barrier period. The distribution of suspects' origin is similar for suspects arrested in the South and the Outer areas.

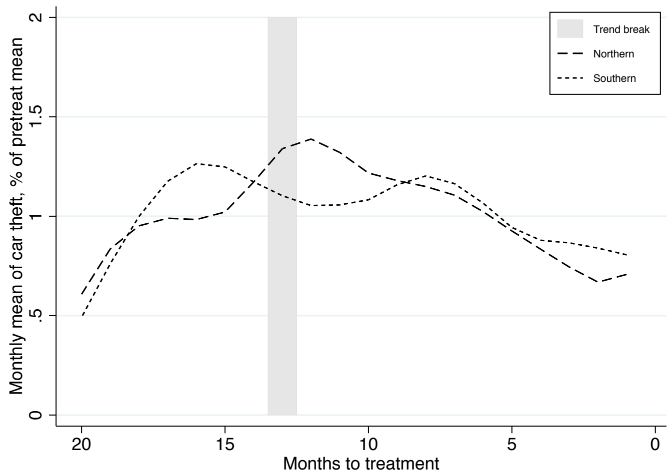
E Parallel trends in criminal activity

Because it is difficult to visually assess parallel trends, we investigate whether one region's month-over-month trends are statistically distinguishable from one another at the 10% level. To calculate these breaks, we use a difference-in-slopes test (equation 3) to estimate whether the change in car theft in one region from month-to-month is statistically different from another region's trend during the same two periods. Suppose locality l is either a treated unit t (directly or, separately, by spillover) or control unit c. We compare trends across all t and c for all pairs of sequential time periods prior to treatment. These periods P range from 1 to n. For simplicity, we show the two period case, for P equals 1 and 2. Our difference-in-slopes test is expressed as:

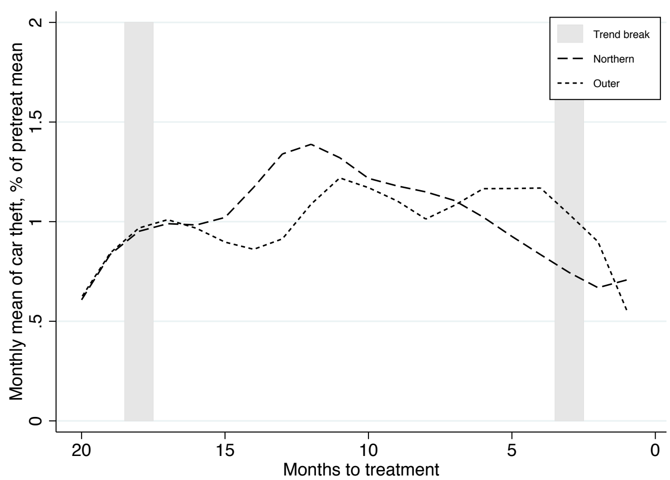
$$diff_{P=2} = (crime_{t2} - crime_{t1}) - (crime_{c2} - crime_{c1}), \tag{3}$$

Where we estimate if $diff_{p=2}$ is significantly different from 0 (Figure SI-6). In the figure, grey bars indicate if these differences are significant at or below the 10% level. We repeat this test for all subpopulations we compare. In Figure SI-6, top panel, there is one month with evidence of a trend break (a pretreatment period when our trends are not parallel). In the bottom two panels, there is evidence of two trend breaks, where each break moves in opposite directions. Among all subgroup combinations, ∼10% (or less) of the pretreatment trends appear statistically non-parallel, giving us confidence in the main results. We also reestimate our main results without these pretreatment 'breaks'. Our results are unaffected (results available upon request).

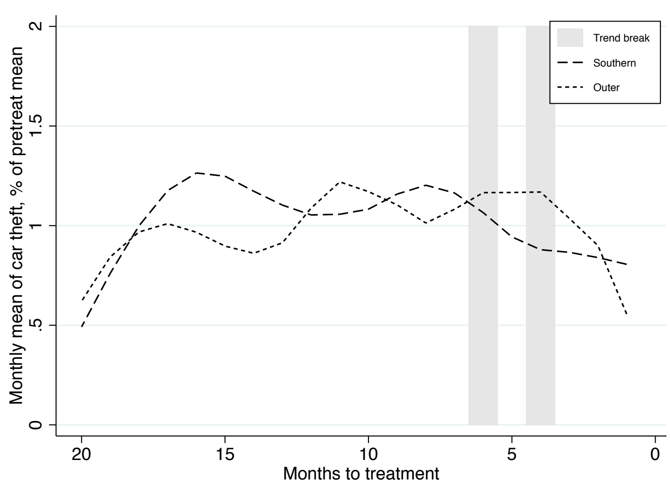
As a further examination of the parallel trends assumption, we follow Autor (2003) and generate leads and lags of the effect of border fortification on car theft. A coefficient is estimated for each period (month) relative to the six months prior to our main sample. In Figure SI-7, the pretreatment estimates are largely statistically indistinguishable from zero. After fortification, however, our lagged treatment estimates become consistently precise and follow the effects estimated in our main specification.



(a) North vs. South

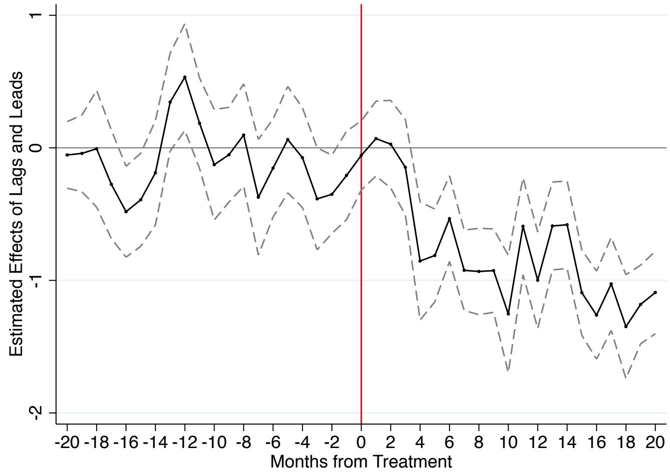


(b) North vs. Outer

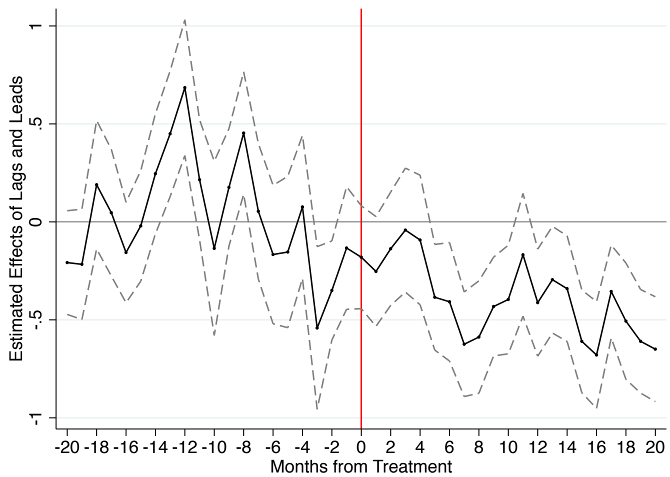


(c) South vs. Outer

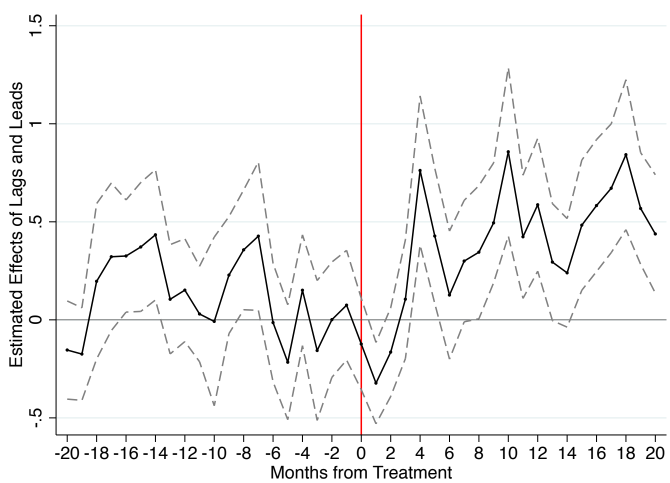
Figure SI-6: Empirical evaluation of parallel trends assumption across pretreatment periods.



(a) North vs. South



(b) North vs. Outer



(c) South vs. Outer

Figure SI-7: Empirical evaluation of parallel trends using estimated leads and lags following Autor (2003).

F Robustness Checks

We consider several robustness checks. In Table SI-4, we add unit and time fixed effects to our baseline model. To address potential concerns about parallel trend breaks, we incorporate lags of our outcome variable in Table SI-5 and drop periods that our difference-in-slopes tests suggests may be inconsistent across treatment and control regions in Table SI-6. We further assess our main results using just the ten months prior to and after treatment (in Table SI-7), when our parallel trends look most consistent, and incorporate district-specific time trends in Table SI-8. We adjust our analysis for potential spatial dependence. In particular, one might be concerned that the criminal organizations operating in various parts of the treated and control regions may adjust their tactics across a number of localities, such that the cross-section of localities cannot be considered independent observations. We address this concern by first identifying all Arab Israeli towns that are known to be central to auto theft organized activity, and then clustering localities that are closest to each these towns using Thiessen polygons. We adjust our standard errors using these spatial clusters and report results in Table SI-9. Second, we exclude potential outliers from the main analysis. In Table SI-10 we report results when dropping Be'er Sheva—a hotspot for auto theft—from the sample and in Table SI-11 we exclude the densely populated localities—known as "Gush Dan"—that lie between the Northern and Southern localities. Also, in Table SI-12, we expand our sample to include localities with mixed populations. As these results clarify, our findings are robust to these modifications.

Previous research provides compelling evidence that suicide bombings and other forms of terrorism can affect the allocation of police units to affected areas, which in turn affects crime (Gould and Stecklov, 2009). The separation wall was built to address these security concerns, but insurgent activity continued during and after construction. The wall thwarted some, but not all, attempts to carry out acts of terrorism. To address potential covariance concerns in barrier construction and terrorism, we gather georeferenced data on suicide and conventional attacks. We aggregate the number of terrorist events by locality- and district-month. There are reasons to believe that reshuffling of police and military units might correspond to some but not all forms of terrorism. We remain agnostic and account for measures of each type of violence. These results are presented in tables SI-13 through SI-16. Importantly, our findings are robust to all four measures of local terrorist activity. In SI-17 we show that our results also hold when controlling for localities' socio-economic status.

Finally, we consider alternative treatment and control classifications. Our spatial overlay design uses bounding boxes to classify villages into treatment groups. This design has the benefit of being motivated by the geography of the areas surrounding the border region. There are, however, alternative means of defining protected and unprotected border villages as well as remote localities. We focus on a straightforward approach: distance to the West Bank border. In Figure SI-9, we replicate the benchmark difference-in-difference models presented in Table 1. We redefine Northern (treatment) and Southern (control) units as villages less than 25 kilometers from the border, and estimate the treatment effect of border fortification. We repeat this process sequentially, increasing the distance threshold by one kilometer, until we reach 40 kilometers. For these models, we define Outer units as localities more than 50 kilometers from the West Bank border. Alternatively, we could hold the treatment and control (South) units fixed and vary our definition of the Outer control units. These results are presented in Figure SI-10. The relevant estimated treatment effect from our main results is plotted as a red line. Notice that our main results are consistently well within the 90% confidence intervals of these alternative specifications. These results give us confidence that our core results are not driven by the particular scaling of our spatial overlay design.

Table SI-4: Barrier Construction and Auto Theft: Deterrence or Displacement – Incorporating Unit and Time Fixed Effects

	Fixed Effects		
	North vs. South	North vs. Outer	South vs. Outer
Treatment × Post	-0.671***	-0.414***	0.256***
	(0.079)	(0.071)	(0.057)
N	24985	23716	25069
Clusters	617	587	620

Note: Model estimates produced using a standard diff-in-diff regression with unit and time fixed effects (base terms are absorbed). All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

Table SI-5: Barrier Construction and Auto Theft: Deterrence or Displacement – Addressing Breaks in Parallel Trends with Lags of Outcome

	Diff-in-Diff North vs. South	North vs. Outer	South vs. Outer
Treatment	0.018	0.095***	0.119***
	(0.044)	(0.034)	(0.045)
Post	0.208***	0.098***	-0.083**
	(0.038)	(0.027)	(0.034)
Treatment × Post	-0.301***	-0.147***	0.164***
	(0.034)	(0.028)	(0.034)
N	24969	23698	25051
Clusters	609	578	611

Note: Model estimates produced using a standard diff-in-diff regression. Lags of the outcome variable included as a regressor. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

Table SI-6: Barrier Construction and Auto Theft: Deterrence or Displacement – Addressing Breaks in Parallel Trends by Dropping Unparallel Periods

	Diff-in-Diff North vs. South	North vs. Outer	South vs. Outer
Treatment	0.074	0.299**	0.218**
	(0.114)	(0.144)	(0.103)
Post	0.177***	0.106**	-0.257***
	(0.056)	(0.042)	(0.050)
Treatment × Post	-0.647***	-0.437***	0.250***
	(0.079)	(0.071)	(0.059)

Note: Model estimates produced using a standard diff-in-diff regression. Main sample excludes periods where the difference-in-slopes test suggests inconsistency in pretreatment trends. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

Table SI-7: Barrier Construction and Auto Theft: Deterrence or Displacement – Using a Narrow Timing Window around Wall Construction

	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.018	0.217	0.201**
	(0.142)	(0.146)	(0.086)
Post	0.154**	0.199***	-0.237***
	(0.071)	(0.062)	(0.062)
Treatment × Post	-0.437***	-0.222**	0.216***
	(0.096)	(0.088)	(0.062)
N	12789	12138	12831
Clusters	609	578	611

Note: Model estimates produced using a standard diff-in-diff regression. Main sample is limited to the ten months prior to and after treatment. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

Table SI-8: Barrier Construction and Auto Theft: Deterrence or Displacement – Incorporating District-Specific Time Trends

	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.995***	0.534***	-0.269*
	(0.221)	(0.169)	(0.140)
Post	0.168***	0.106**	-0.220***
	(0.056)	(0.044)	(0.048)
Treatment × Post	-0.635***	-0.423***	0.237***
	(0.077)	(0.072)	(0.056)
N	24985	23716	25069
Clusters	617	587	620

Note: Model estimates produced using a standard diff-in-diff regression. The model specification includes district-specific time trends. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

Table SI-9: Accounting for Unobserved Industrial Organization of Crime with Arab Localities

	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.097	0.267	0.211
	(0.268)	(0.313)	(0.217)
Post	0.199**	-0.057	-0.053
	(0.097)	(0.039)	(0.039)
Treatment × Post	-0.671***	-0.415**	0.256**
	(0.184)	(0.160)	(0.105)
N	24985	23716	25069
Clusters	47	40	22

Note: A novel map is constructed to address potential clustering in the industrial organization of crime (Figure SI-8). A Voronoi method is used to assign localities to one of several dozen crime zones hotspots. Model estimates produced using a standard diff-in-diff regression. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by Arab locality zone.
* p<0.10, ** p<0.05, *** p<0.01

Table SI-10: Excluding Be'er Sheva from Main Analysis

	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.100	0.267*	0.203**
	(0.114)	(0.142)	(0.098)
Post	0.200***	-0.057*	-0.053
	(0.047)	(0.033)	(0.033)
Treatment × Post	-0.671***	-0.415***	0.256***
	(0.079)	(0.071)	(0.057)
N	24944	23716	25028
Clusters	616	587	619

Note: This analysis excludes the locality Be'er Sheva, an auto theft hotspot. Model estimates produced using a standard diff-in-diff regression. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

Table SI-11: Excluding Central Localities from Main Analysis

	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.097	0.697***	0.547***
	(0.114)	(0.132)	(0.081)
Post	0.199***	-0.020	-0.016
	(0.047)	(0.027)	(0.027)
Treatment × Post	-0.671***	-0.452***	0.219***
	(0.079)	(0.069)	(0.054)
N	24985	21664	23017
Clusters	617	536	569

Note: This analysis excludes central localities, located between the treatment and control bounding boxes, from the set of Outer localities. Model estimates produced using a standard diff-in-diff regression. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

Table SI-12: Including Mixed Religion Localities in Estimating Sample

	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.095	0.264*	0.205**
	(0.113)	(0.140)	(0.096)
Post	0.202***	-0.057*	-0.053*
	(0.047)	(0.032)	(0.032)
Treatment × Post	-0.672***	-0.413***	0.259***
	(0.079)	(0.071)	(0.057)
N	25149	23921	25356
Clusters	621	592	627

Note: This analysis adds non-Jewish, mixed communities to the main analysis. Model estimates produced using a standard diff-in-diff regression All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

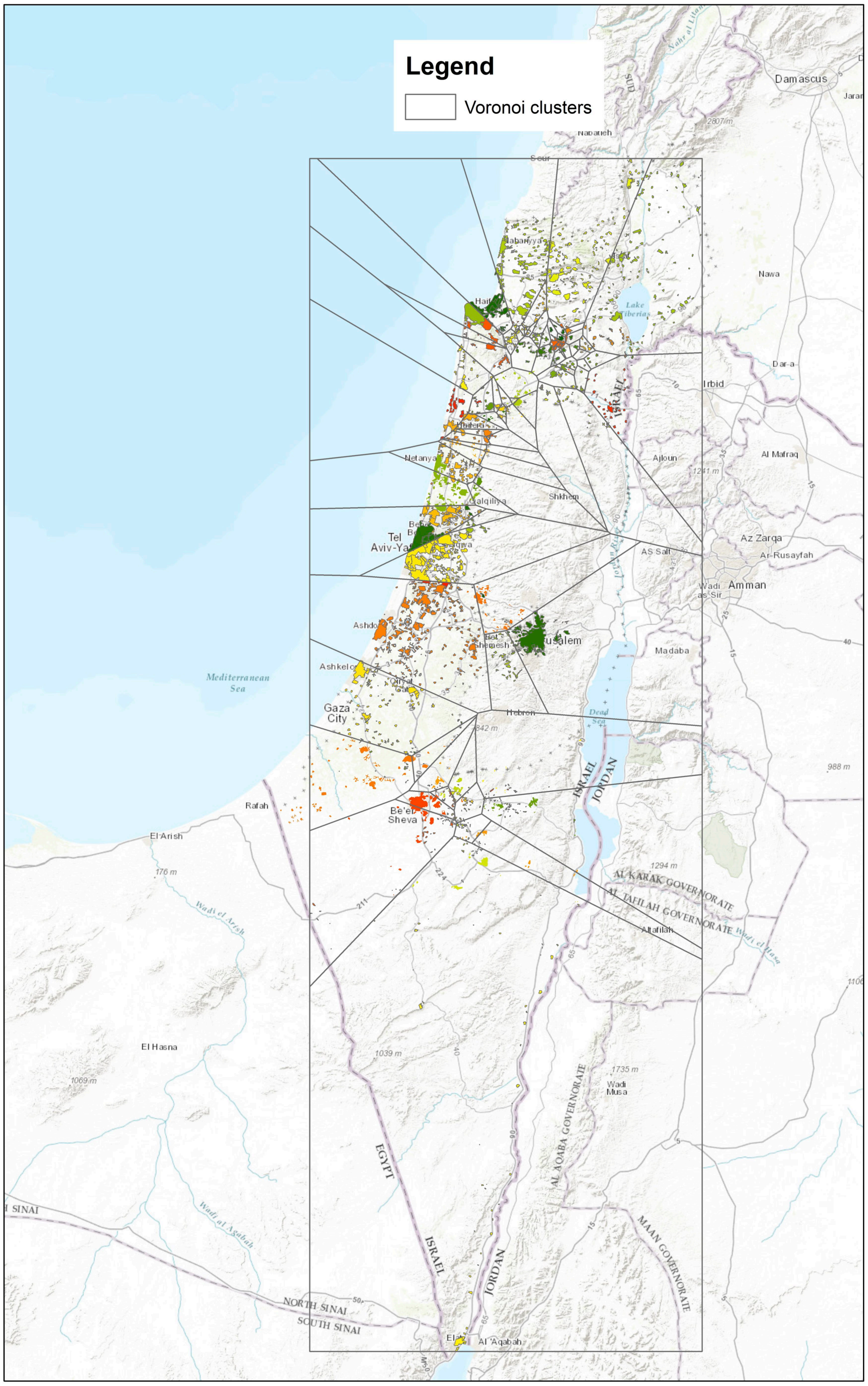


Figure SI-8: Figure shows clustering of localities in Israel using the Voronoi method.

Table SI-13: Accounting for intensity of terrorist attacks, suicide bombings within-locality

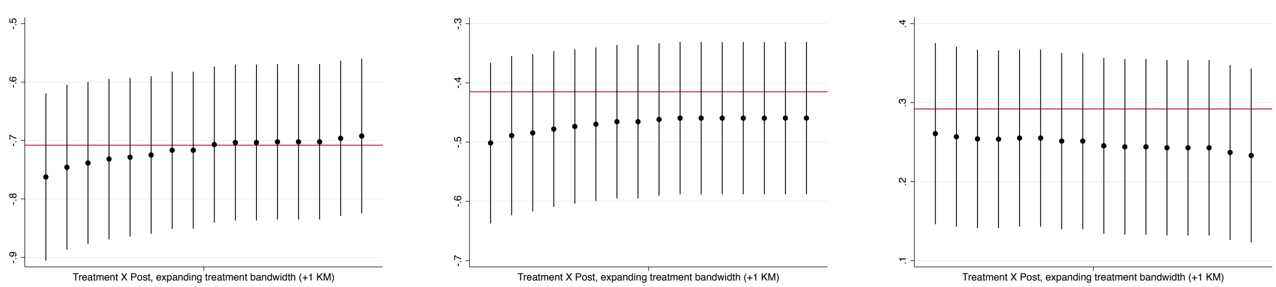
	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.097	0.268*	0.211**
	(0.114)	(0.142)	(0.098)
Post	0.199***	-0.057*	-0.053
	(0.047)	(0.033)	(0.033)
Treatment × Post	-0.670***	-0.415***	0.256***
	(0.079)	(0.071)	(0.057)
N	24985	23716	25069
Clusters	617	587	620

Note: This analysis adds a control for the total number of suicide attacks within-locality, by month. Model estimates produced using a standard diff-in-diff regression. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

Table SI-14: Accounting for intensity of terrorist attacks, suicide bombings within-district

	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.100	0.265*	0.200**
	(0.113)	(0.141)	(0.098)
Post	0.197***	-0.056*	-0.056*
	(0.047)	(0.033)	(0.033)
Treatment × Post	-0.672***	-0.410***	0.252***
	(0.079)	(0.070)	(0.057)
N	24985	23716	25069
Clusters	617	587	620

Note: This analysis adds a control for the total number of suicide attacks within-district, by month. Model estimates produced using a standard diff-in-diff regression. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01



(a) North vs. South (b) North vs. Outer (c) South vs. Outer

Figure SI-9: Alternative Northern and Southern group classifications based on distance to West Bank border (<25 KM to <40 KM), while Outer defined as >50 KM. Baseline treatment effect plotted as red line from Table 1.

Table SI-15: Accounting for intensity of terrorist attacks, attacks within-locality

	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.097	0.268*	0.211**
	(0.114)	(0.142)	(0.098)
Post	0.199***	-0.058*	-0.053
	(0.047)	(0.033)	(0.033)
Treatment × Post	-0.671***	-0.415***	0.256***
	(0.079)	(0.071)	(0.057)
N	24985	23716	25069
Clusters	617	587	620

Note: This analysis adds a control for the total number of terrorist attacks within-locality, by month. Model estimates produced using a standard diff-in-diff regression. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

Table SI-16: Accounting for intensity of terrorist attacks, attacks within-district

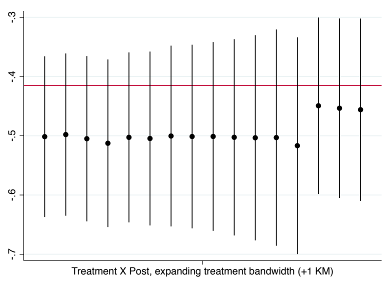
	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.109	0.265*	0.227**
	(0.117)	(0.141)	(0.096)
Post	0.211***	-0.026	-0.068*
	(0.050)	(0.036)	(0.035)
Treatment × Post	-0.673***	-0.408***	0.249***
	(0.080)	(0.070)	(0.057)
N	24985	23716	25069
Clusters	617	587	620

Note: This analysis adds a control for the total number of terrorist attacks within-district, by month. Model estimates produced using a standard diff-in-diff regression. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

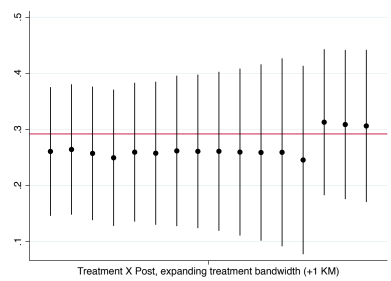
Table SI-17: Accounting for changes in socio-economic development

	Diff-in-Diff		
	North vs. South	North vs. Outer	South vs. Outer
Treatment	0.033	0.214	0.215**
	(0.109)	(0.139)	(0.097)
Post	0.184***	-0.083**	-0.061*
	(0.047)	(0.034)	(0.034)
Treatment × Post	-0.667***	-0.404***	0.258***
	(0.079)	(0.071)	(0.057)
N	24917	23648	24987
Clusters	616	586	618

Note: This analysis adds a control for year-over-year variation in economic and social development, by zone. Model estimates produced using a standard diff-in-diff regression. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01



(a) North vs. Outer



(b) South vs. Outer

Figure SI-10: Alternative Outer group classifications based on distance to West Bank border (>50 KM to >65 KM), while Northern and Southern zones are defined as <25 KM. Baseline treatment effect plotted as red line from Table 1.

G Path optima

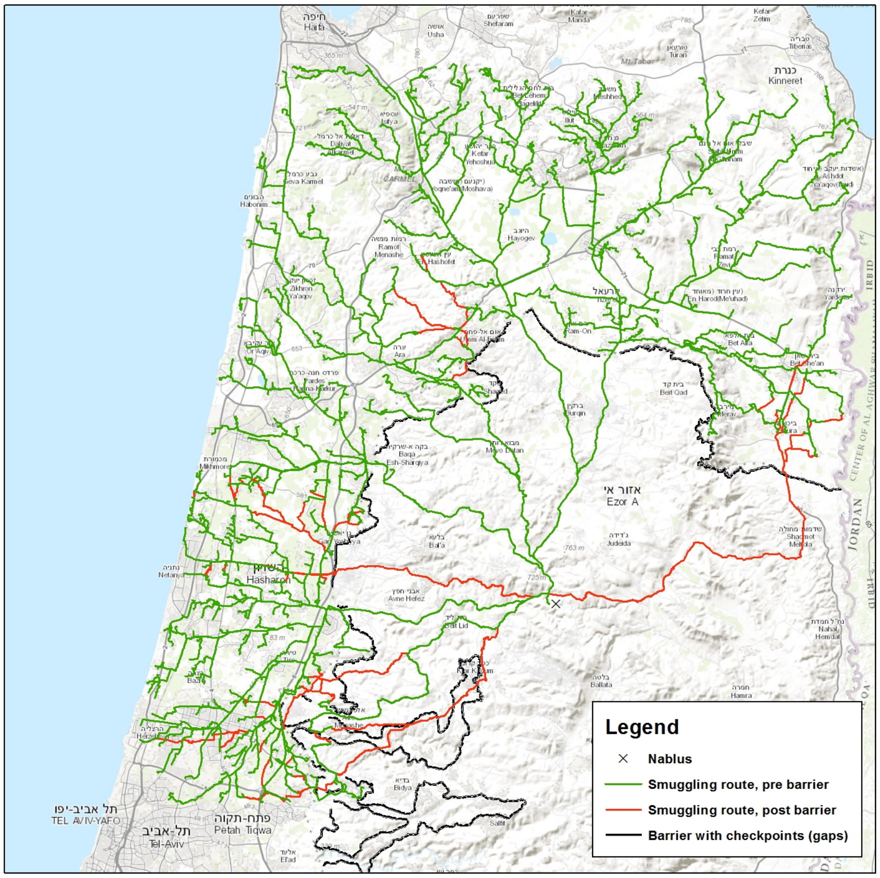


Figure SI-11: Network of shortest path smuggling routes, with disrupted paths (red)

H Spillover Mechanisms

In this section, we introduce additional descriptive evidence that clarifies the mechanisms linking border fortification to smuggling spillovers and substitution away from smuggling into related criminal enterprises. These analyses are important for providing a comprehensive assessment of the general effects of border wall policies on criminal behavior. We consider two related questions: (1) do smugglers relocate to unprotected regions? (2) if not, how do smugglers cope with the rising costs of cross-border travel?

Smuggling Relocation

In our main results, we observe a substantial spillover of smuggling activity from protected regions to unprotected border townships. However, it remains unclear whether smugglers from the protected region are relocating their activities to the not-yet-protected border area or if the increase in vehicle smuggling we observe in the unprotected region is driven by increased predation by criminals from the region. To investigate this further, we rely on individual arrest records, which include information about the origin of the car smuggler and the location where the arrest took place. We plot trends in the arrest data in Figure SI-12. We find no evidence of an increase in the rate of apprehension of smugglers originating in the protected region. This suggests that smugglers are not relocating. Instead, we observe a notable increase in the rate of apprehension for smugglers from the unprotected region in early 2003.

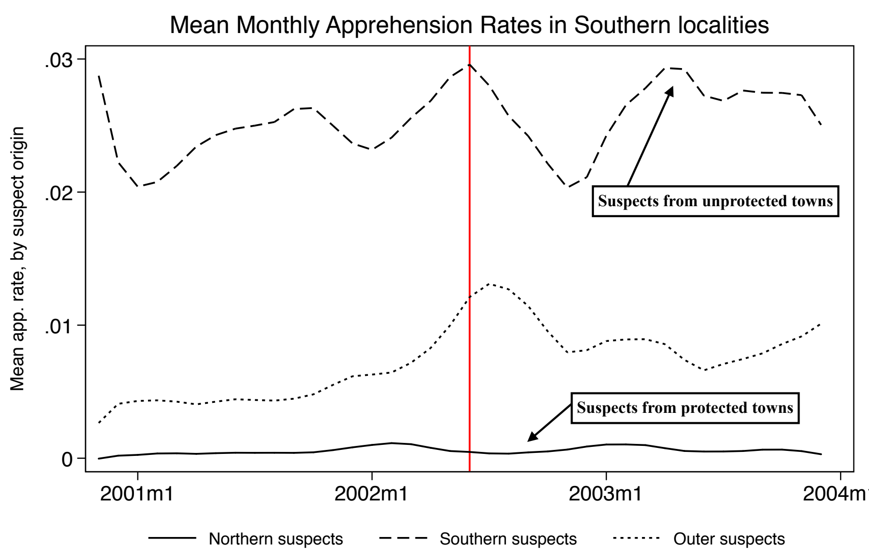


Figure SI-12: Trend in apprehension rates of suspects in Southern localities, by suspect's origin

Substituting from Smuggling

Smugglers are not relocating to the unprotected region, likely because encroaching on other gangs' turf carries a high risk of violent retaliation (Lessing, 2017). In this case, how do (northern) smugglers cope with the rising costs of cross-border travel? One possible mechanism is through substitution from cross-border activities to criminal enterprises that do not require the (former) smuggler to exit the location where their criminal activity takes place. We consider one such activity—home invasions—which enable thieves to steal and liquidate a good without crossing into the West Bank (i.e., stolen goods are sold in Israel). Home invasions are useful because they are well-reported (for insurance purposes) and, in the context we study, they covary with vehicle theft as crimes of opportunity.

We begin by testing the assumption that car thefts and break-ins covary positively by simply regressing home invasions per capita on car thefts per capita in locality j in month t. Table SI-18 Panel A shows that when broken down by treatment subgroup, or pooled across subgroups, home invasions are indeed increasing in car theft activity.[14] Importantly, if smugglers substitute from vehicle theft to home invasions after the construction of the border wall, this elasticity should flip for protected Northern localities but remain unchanged for Southern and Outer areas. We use two strategies to test this possibility.

First, for each locality we construct a measure of the mean difference in house break-ins per capita before and after the construction of the separation barrier and regress it on equivalent mean difference in per capita car theft. Results, reported in columns 1-3 in Table SI-18 Panel B show that only among the protected Northern localities does a reduction in the mean car theft not lead to reduction in mean home invasions. Second, and closely related, we regress home invasions per capita in levels on the mean difference in car theft per capita (post and pre-barrier construction). Results reported in column 1 in Table SI-18 Panel C suggest that protected localities with the greatest reduction in smuggling have the highest levels of home invasions. We find additional evidence consistent with our argument in the Southern region (column 2), but not in the Outer localities.

These findings strongly suggest that smugglers that do not relocate after border fortification may be substituting into other criminal enterprises. Such coping strategies should be viewed as part of criminal organizations' menu of actions that help keep gang members from defecting (Kostelnik and Skarbek, 2013). The externalities discussed herein could further destabilize border regions, and thus must be taken into account when considering the overall effect of border fortification policies.

[14] Pooled sample results available upon request.

Table SI-18: Elasticities of property crime

Panel A: Levels of break-ins reg. on levels of car theft			
	Northern	Southern	Outer
Car thefts per capita	0.166***	0.130***	0.184**
	(0.035)	(0.018)	(0.090)
N	11816	13169	11900
Clusters	292	325	295

Panel B: $\bar{\Delta}$ in break-ins reg. on $\bar{\Delta}$ in car theft			
	Northern	Southern	Outer
Mean change in car theft	0.059*	0.266***	0.208***
(post — pre)	(0.035)	(0.065)	(0.079)
N	288	321	290
Clusters	288	321	290

Panel C: Levels of break-ins reg. on $\bar{\Delta}$ in car theft			
	Northern	Southern	Outer
Mean change in car theft	-0.174***	0.333***	0.080*
(post — pre)	(0.045)	(0.078)	(0.042)
N	6048	6741	6090
Clusters	288	321	290

Note: Panel A is a simple correlation. Panel B evaluates the pre/post difference in means for home invasions and car thefts per capita for each locality across treatment subgroups. Panel C evaluates the pre/post difference in means for car thefts per capita on home invasions in levels. All models control for locality factors as described in the main text.
- Robust standard errors in parentheses, clustered by locality.
* p<0.10, ** p<0.05, *** p<0.01

I Where Crime Goes in the Unprotected South

We have shown that most of the reduction in auto theft in the North has been displaced to the South, and that this displacement likely represents a sharp increase in car theft by Southern gangs. Here we examine the logic of such spatial displacement. Specifically, we examine site selection; i.e., "where crime goes" when it gets displaced and why.

While crime displacement and reduction follow similar logics—criminals still respond to smuggling costs—-expanding predation imposes two additional constraints: 'carrying capacity' and rival operations. First, localities relatively close to Hebron likely have reached their carrying capacity of theft in the pre-treatment period and could not sustainably bear additional theft.[15] In the absence of a substantial increase in the number of vehicles in these

[15]Carrying capacity is a function of localities' (finite) supply of vehicles that are in demand in the 'black' market for spare parts, and of private and public security measures that are endogenous responses to localities'

locations or a change in private security provision that coincides with barrier construction, criminals should opt to predate relatively more among localities further away from Hebron. Second, if criminals are concerned about inter-network conflict over zones of activity, they may be willing to absorb an increase in transit costs and associated risks of apprehension to avoid intense contact with rival gangs.

We find support for this logic when examining displacement trends in the South following construction of the Northern section of the barrier. In Figure SI-13 we plot the pre/post differences in mean monthly number of stolen vehicles. We find that the largest increases in criminal activity in localities unprotected by the barrier did not occur near the border. Quite the contrary, auto theft in the South generally *increases* until about 65 kilometers from Hebron, before dropping down.

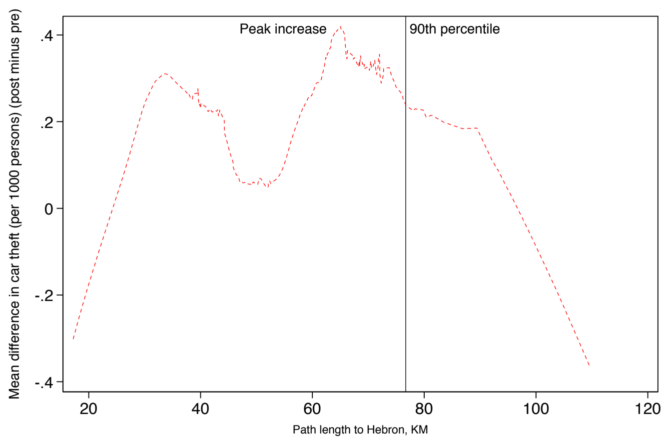


Figure SI-13: Impact of smuggling path disruption on predicted mean change in auto theft intensity.

Only among townships far from the West Bank—localities that suffered from limited auto theft in the pre-construction period—is auto theft decreasing in distance to the center of stolen vehicle dismantling operations. In other words, only where we neither expect inter-gang competition nor anticipate carrying capacity has been reached, do smuggling costs (i.e., distance) dominate gang's choice of theft location. By contrast, where carrying capacity is high and inter-gang competition is a genuine concern, route length is only a secondary consideration for gang's target selection.

level of predation.