

Road Closure Obstacles and Palestinian Economic Growth A Market Access Approach

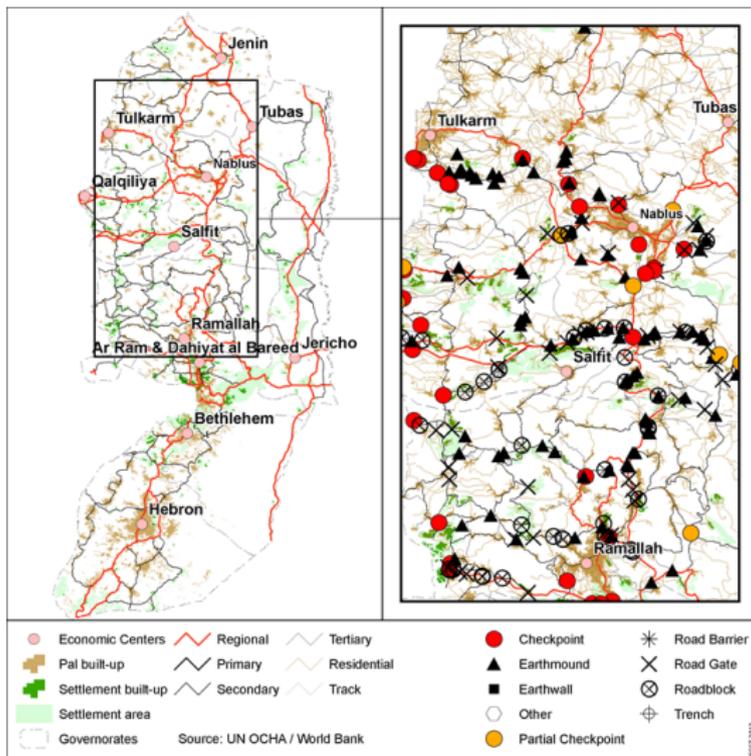
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How valuable is market access?

- ▶ Hard to assess: Market access generally evolves slowly and non-randomly
- ▶ Existing studies exploit variation in:
 - ▶ Provision of transportation infrastructure (e.g. Akerman, 2012; Banerjee et al., 2012; Baum-Snow et al., 2013; Donaldson, 2016; Faber, 2014; Jedwab and Moradi, 2014)
 - ▶ Placement of borders (e.g. Redding and Sturm, 2008; Brulhart et al., 2012)
 - ▶ Transportation costs (e.g. Storeygard, 2016; Volpe et al., 2014)
- ▶ Do short-term changes in market access impact economic growth (proxied by night-time-lights (NTL)) in the West Bank?
 - ▶ Exploit variation due to mobility restrictions imposed by Israel

A map of the West Bank



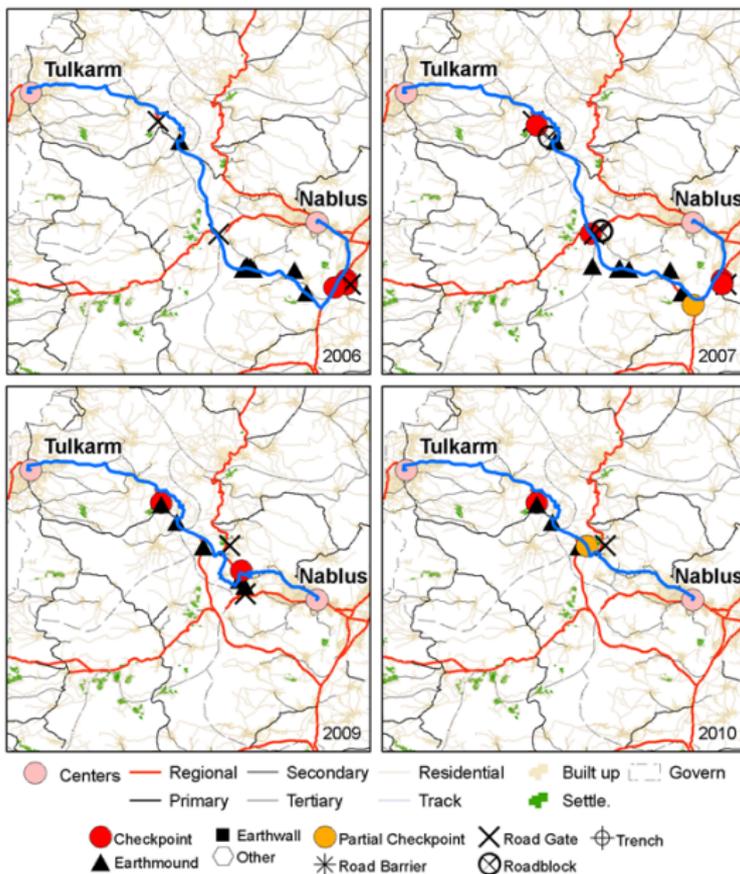
Israel's Closure Policy

- ▶ Israel deploys obstacles to mobility *inside* the West Bank
 - ▶ Checkpoints, trenches, road blockades, a barrier wall
- ▶ These serve to protect Israel and Israeli settlements from attacks, not to regulate economic performance
 - ⇒ **Exogeneity**
- ▶ Number, intensity and configuration of obstacles changes frequently and unexpectedly
 - ⇒ **spatial and temporal variation in market access**

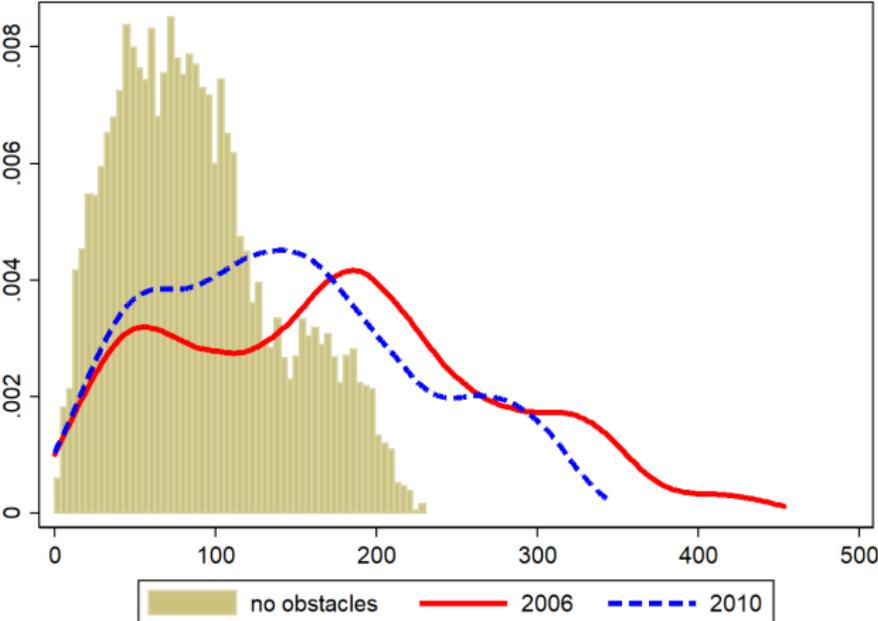
Data used

- ▶ Road network data (incl. travel speeds) - from OCHA
- ▶ Road closure obstacles data (incl. wait times) - from OCHA
- ▶ Populated area data (incl. population counts) - from PCBS
- ▶ Night-time-lights data - from NOAA
- ▶ Stock price data - from PEX
- ▶ Fatalities data (both Palestinian and Israeli) - from B'Tselem

Optimal (commercial) routes between localities



Distribution of Travel Times (in minutes)



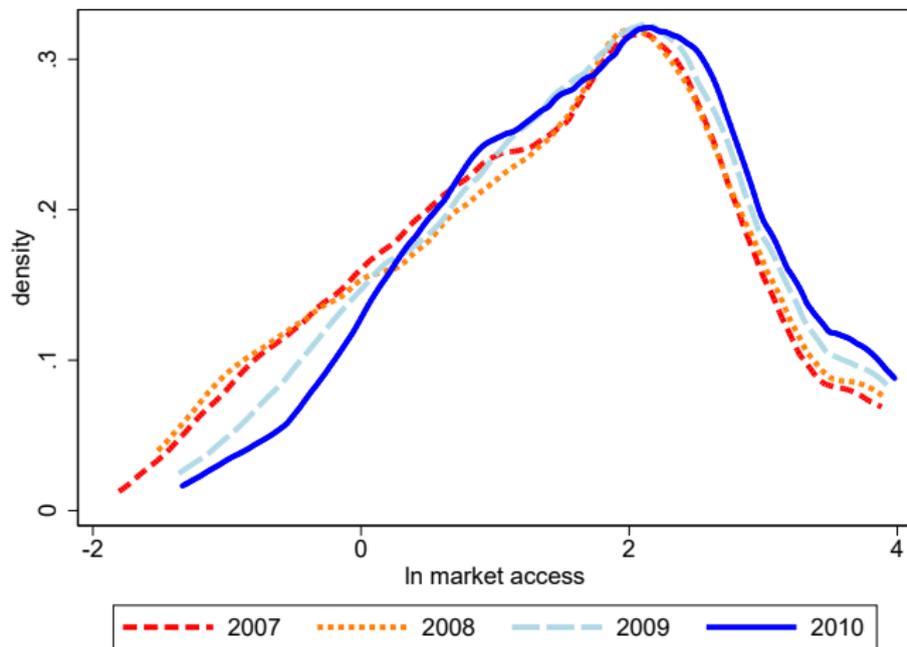
Measuring market access

$$MA_{it} = \sum_j P_{jt} h(T_{ijt}),$$

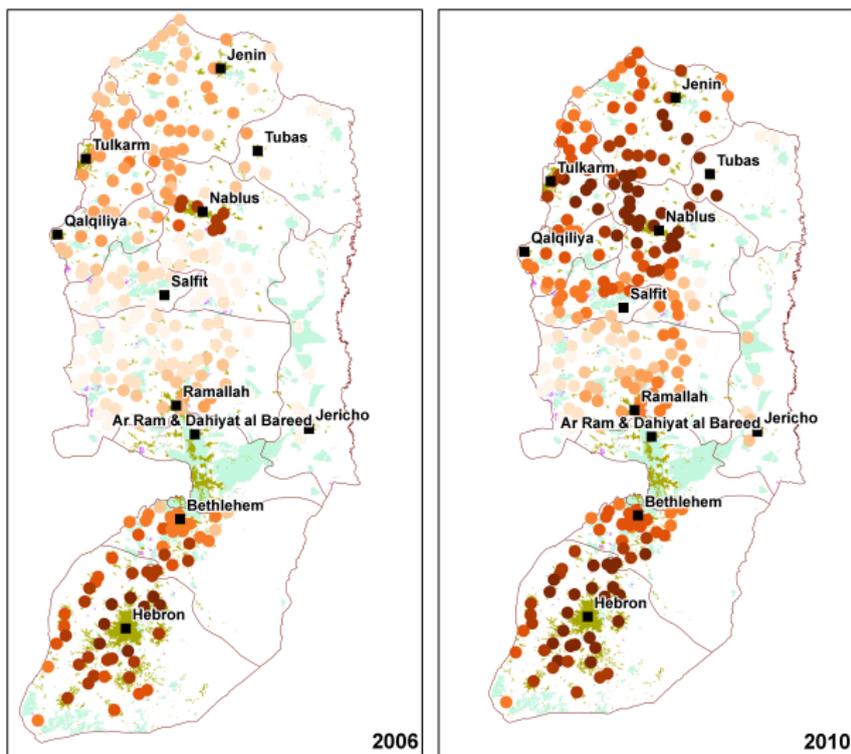
where

- ▶ MA_{it} is market access at locality i and time t
- ▶ $h(T) = T^{-\theta}$ is the “distance function” with distance decay parameter θ
- ▶ T_{ijt} is the travel time between origin i and destination j (at time t)
- ▶ P_{jt} is the population in destination j (at time t)
- ▶ The set of destinations comprise the governorate capitals

Density of market access ($\theta = 3$)



Market access by locality: 2006 (left) versus 2010 (right)



Night Time Lights (NTL) - a proxy for economic output

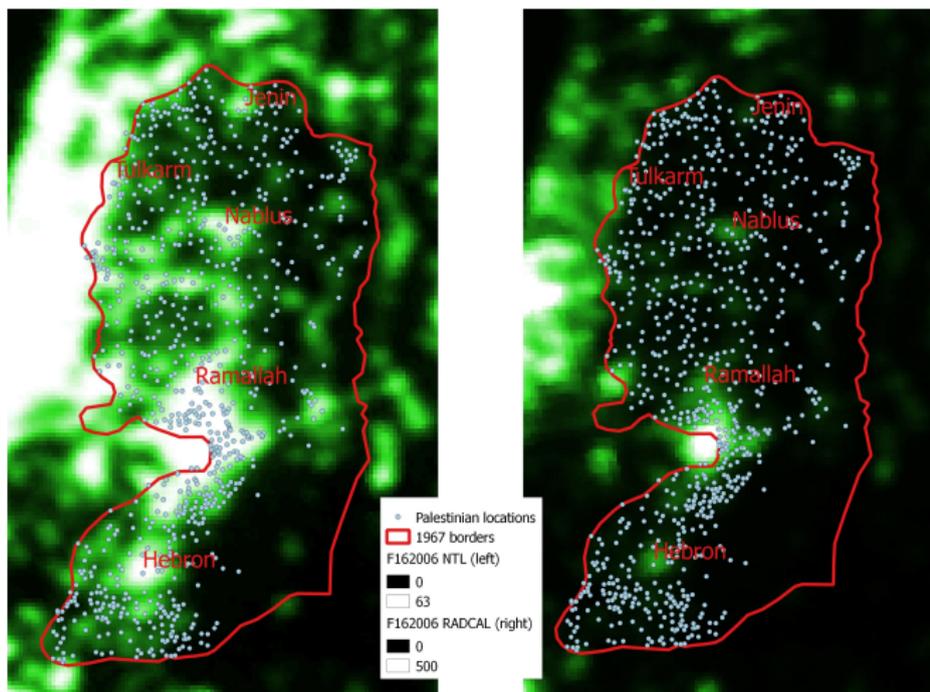
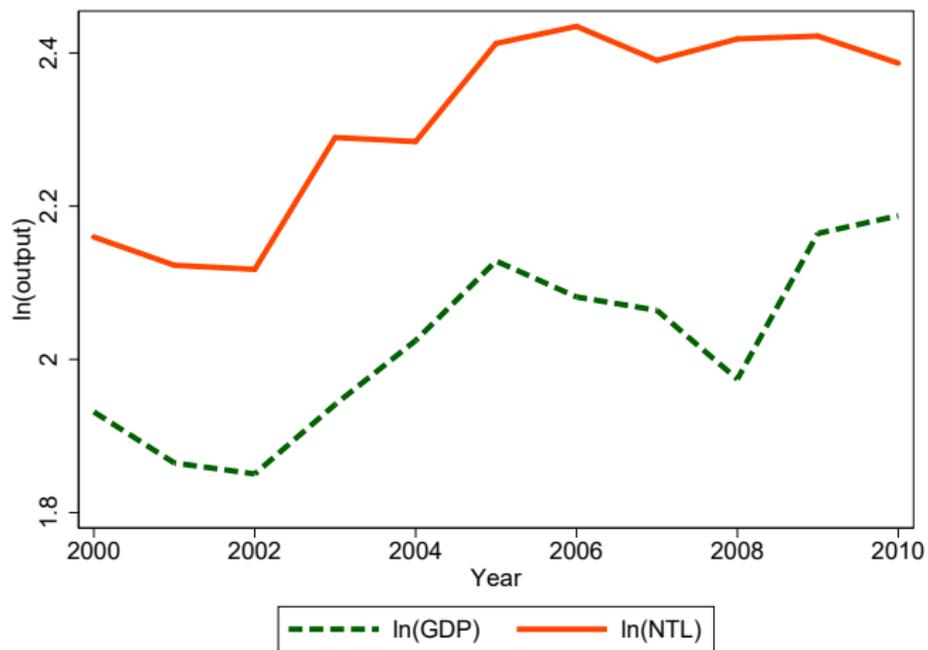


Figure: Top-coded (left) vs. bottom-coded (right) Night Time Lights (2006)

NTL versus GDP



Main empirical specification

$$\ln Y_{it} = \beta \ln MA_{it} + \gamma X_{it} + \lambda_i + \delta_t + \varepsilon_{it},$$

where:

- ▶ Y_{it} : NTL per capita at location i and time t
- ▶ X_{it} : \ln fatalities (within 5km radius)
- ▶ λ_i : locality fixed effects
- ▶ δ_t : time fixed effects

Identification

- ▶ OLS estimates of β may be **biased**
 - ▶ complementary penalties \Rightarrow positive bias
 - ▶ fixed checkpoints being replaced by flying checkpoints (not captured in our database) \Rightarrow negative bias
 - ▶ measurement error in MA \Rightarrow negative bias

- ▶ **Instrument** number of checkpoints located in a radius between 10 and 25 km from the locality
 - ▶ Correlated with MA , but orthogonal to local conditions

First stage

	(1)	(2)	(3)
	ln Market Access	ln Market Access	Checkpoints 10-25km
	OLS	OLS	OLS
Checkpoints 10-25km	-0.0276*** (3.62)	-0.0276*** (3.65)	
ln(1+Pal.Fat.<5km)		0.0147 (0.52)	0.0720 (0.62)
ln(1+Isr.Fat.< 5km)		-0.00446 (0.06)	-0.00354 (0.01)
Year FE	Yes	Yes	Yes
Locality FE	Yes	Yes	Yes
<i>N</i>	1920	1920	1920
<i>R</i> ²	0.375	0.375	0.479

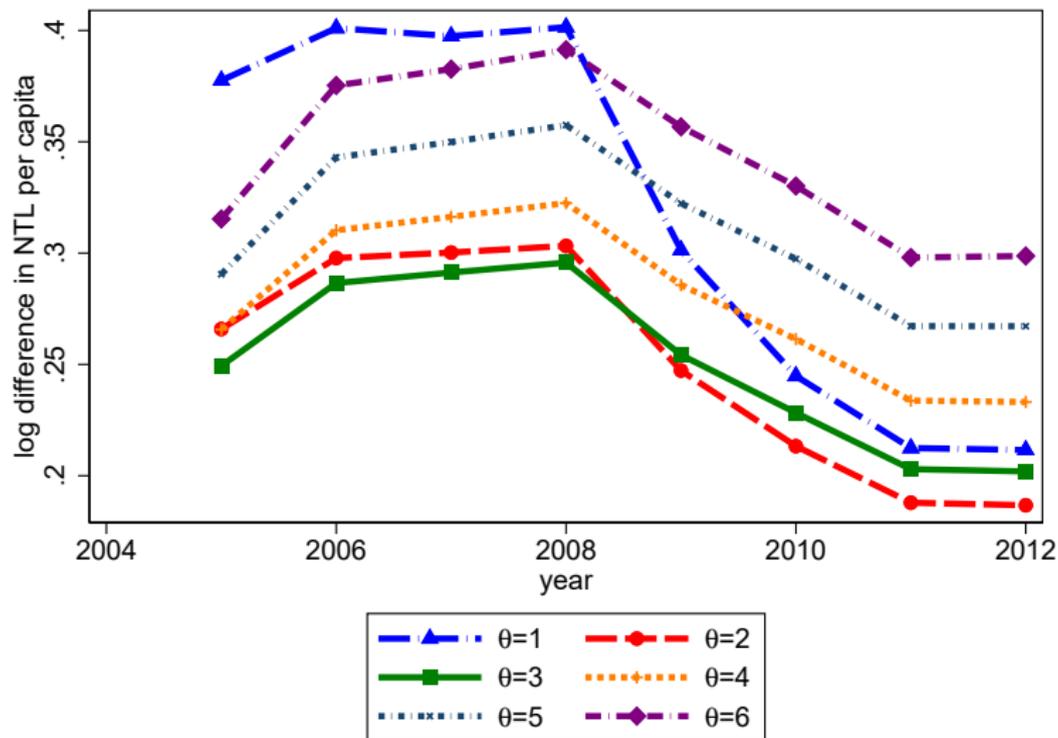
Main results

	(1)	(2)	(3)	(4)
	ln NTL pc OLS	ln NTL pc OLS	ln NTL pc IV	ln NTL pc IV
ln Market Access	0.0399** (2.58)	0.0396** (2.56)	0.263** (2.56)	0.264*** (2.61)
ln(1+Pal.Fat.<5km)		0.00955 (1.12)		0.00670 (0.63)
ln(1+Isr.Fat.<5km)		0.0170 (1.01)		0.0180 (0.80)
Year FE	Yes	Yes	Yes	Yes
Locality FE	Yes	Yes	Yes	Yes
<i>N</i>	1920	1920	1920	1920
<i>R</i> ²	0.467	0.468	0.312	0.311

Difference-in-Difference Regressions 2006-2010

	(1)	(2)	(3)	(4)
	Top Coded		Bottom Coded	
	$\Delta \ln$ NTL pc	$\Delta \ln$ NTL pc	$\Delta \ln$ NTL pc	$\Delta \ln$ NTL pc
	OLS	IV	OLS	IV
$\Delta \ln$ Market Access	0.0457** (2.04)	0.323** (2.20)	0.0161 (0.71)	0.342** (2.16)
$\Delta \ln(1+\text{Pal.Fat.}<5\text{km})$	-0.00884 (-0.42)	-0.0936* (-1.83)	0.0694*** (3.00)	-0.0301 (-0.56)
$\Delta \ln(1+\text{Isr.Fat.}<5\text{km})$	0.0740** (2.29)	0.0945** (2.12)	-0.0679* (-1.81)	-0.0438 (-0.71)
Constant	0.0464 (0.49)	-1.096* (-1.82)	-0.324*** (-3.41)	-1.666** (-2.57)
N	239	239	239	239
R^2	0.031	0.207	0.071	0.323

Counterfactual growth upon removing all obstacles



Conclusion

- ▶ Exploiting quasi-experimental variation in market access generated by the deployment of Israeli army obstacles this paper demonstrates that short-run fluctuations in market access impact local economic performance.
- ▶ Israel's closure policy reduced GDP per capita in the West Bank between 6.0% and 7.5% each year between 2006 and 2012
- ▶ Preliminary estimates obtained using firm-census data suggests that changes in market access primarily impact the manufacturing sector