War-Time Destruction and the Persistence of Economic Activity

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Work in Progress

- The potential for multiple equilibria and multiple steady-states is a central feature of theoretical work in many fields of economics.
- A prominent example with a long tradition reaching back at least to Marshall (1920) are multiple equilibria in the spatial location of economic activity.
- The key idea is that the location of economic activity is not uniquely determined by fundamentals.
- Instead historical accidents and random shock determine in part the spatial distribution of economic activity.

- A successful empirical test of whether the location of economic activity has multiple equilibria requires an exogenous shock which has two properties:
 - The shock is sufficiently large to move economic activity from one equilibrium to another
 - The shock is ultimately temporary
- If such a temporary shock resulted in a permanent shift in the location of economic activity, this would be powerful evidence in favor of multiple equilibria.

- A number of different natural experiments have been used to test for the empirical relevance of multiple equilibria.
- In seminal work Davis and Weinstein (2002, 2008) use the Allied bombing of Japanese cities as a large but temporary shock.
- The same approach has been used by Brackman et al. (2004) and Miguel and Roland (2011) for West Germany and Vietnam.
- These papers find that war-time destruction is typically rebuilt after a few decades and conclude that multiple equilibria must be of primarily theoretical interest.

- In this paper we use a different natural experiment to revisit the question whether war-time destruction can permanently shift the distribution of economic activity.
- In particular, we consider the cities that were part of pre-war Germany and become part of Poland after the Second World War.
- This natural experiment has a number of attractive features:
 - Some but not all of these cities are heavily destroyed
 - Essentially the entire pre-war population is expelled and all social networks are eliminated
 - All property rights are invalidated
 - There was no motivation to rebuild the pre-war status quo for patriotic reasons

The Division of Germany after the Second World-War



- Data
- Empirical strategy
- Basic empirical results
- Why are cities rebuilt?

- We have collected data on the 53 pre-war Germany cities that had at least 10,000 inhabitants in 1919 and became part of Poland after the Second World War.
- The basic dataset consists of population and employment in four sectors at the city level covering the period 1919 to 2010.
- We also have information on the percent of the housing stock that was destroyed during the Second World War.
- Finally, to account for large changes in city boundaries we aggregate cities that merge during the sample period in all years.

- Our basic empirical strategy follows Davis and Weinstein (2002).
- In particular we compare population losses over the period 1939-1946 to population gains after the war.
- The estimating equation is

$$s_{i88} - s_{i46} = \beta_0 + \beta_1(s_{i46} - s_{i39}) + \beta_2 X_i + \varepsilon_i$$

where s_{it} is the natural logarithm of the share of the population of city *i* in total population across all cities in year *t* and X_i are controls.

• We follow Davis and Weinstein (2002) and instrument $s_{i46} - s_{i39}$ with war-time destruction.

The Degree of Destruction



measured as the percentage of the housing stock destroyed.

Change in Population 1939-1946 and 1946-1988



Population Changes over Different Time Horizons



Table 1 : Basic Results

	1946-1950		1946-1960		1946-1988		1946-2010	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
s ₃₉ – s ₄₆	-0.344**	-0.382**	-0.607**	-0.607**	-0.814**	-0.852**	-0.859**	-0.911**
	0.064	0.053	0.039	0.045	0.063	0.065	0.062	0.072
intercept	-0.021	-0.029	0.059†	0.059†	0.092*	0.085†	0.096†	0.085†
	0.034	0.038	0.031	0.032	0.046	0.046	0.052	0.051
N	53	53	53	53	53	53	53	53
R ²	0.818	0.818	0.823	0.823	0.798	0.796	0.784	0.781
F-Stat		90.23		90.23		90.23		90.23

†:10% *:5% **:1%

Population change 1939-1946 and war-time destruction



- Our results suggest that the former German cities that became part of Poland fully recover their pre-war population shares.
- The recovery cannot be driven by patriotism, continuing social networks or legal titles
- This leaves two possibilities:
 - Long-run city size is determined by fundamentals.
 - Rebuilding even heavily destroyed cities is easier than starting from scratch.
- We cannot definitively rule out either of these explanations.
- However, historical accounts suggest that Polish settlers moving into these areas were keen to reuse surviving buildings and infrastructure.

- In this paper we revisit the question whether war-time destruction can permanently shift the distribution of economic activity.
- We find that even the German cities that became part of Poland after the war recover their relative population size.
- This recovery cannot be driven by feelings of patriotism, continuing social networks or legal titles.
- This leaves either fundamentals or the value of surviving structures as possible explanations why war-time destruction has no long-run impact on city sizes.