The Economic Impact of Social Ties: Evidence from German Reunification

By Konrad B. Burchardi & Tarek A. Hassan
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Saisawat Samutpradit

Empirical Microeconomics

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Motivation

- Social ties between individuals may be an important determinant of economic performance.
- Social ties may serve as "social" collateral for economic transactions or reduce informational frictions.
- As a result, social ties may improve economic performance at micro (e.g. firm) or macro level (e.g. region)

Example

- Indian engineers (Saxenian, 1999)
  Indian migrants in the US helped connecting Silicon Valley firms to low-cost and high-quality labor in their regions of origin
  $\rightarrow$ their regions became major hubs in information technology

Research question

To show that personal relationships which individuals maintain for noneconomic reasons can boost regional economic growth.

Main results

- West German regions that have households with social ties to the East exhibit higher regional growth in income per capita after the fall of Berlin Wall.
- The presence of households with social ties to the East boost entrepreneurial activity at regional level, and the likelihood that local firms invest in East Germany.
- Households with social ties to the East experience rise in personal incomes.

Overview

1. Literature and background
2. Data
3. Regional economic growth
   - Empirical specification
   - Results
   - Validity of the Exclusion Restriction
   - Channels
4. Household income
   - Empirical specification
   - Results
5. Conclusion

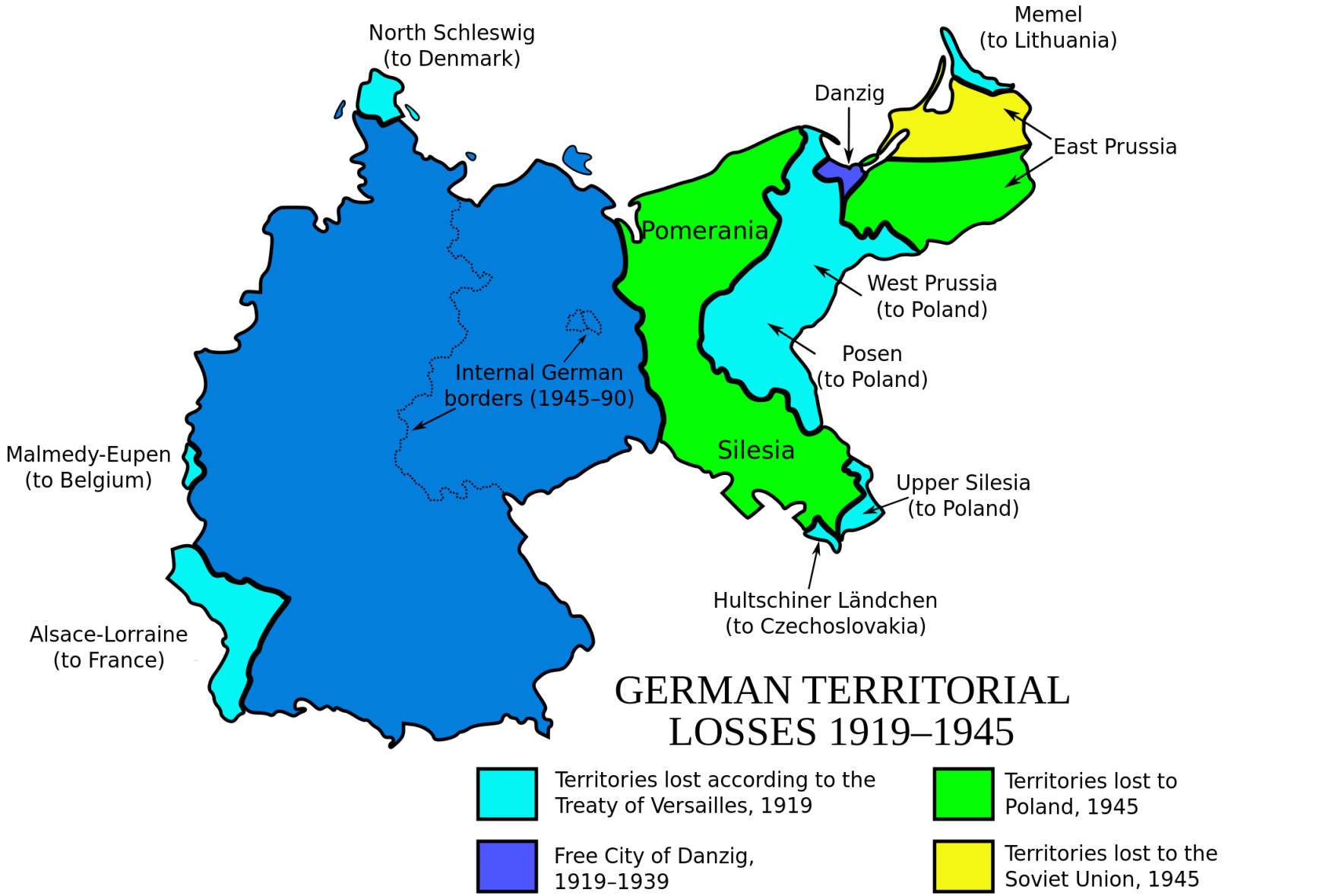
Overview

Literature

- Specification difficulties: Social ties are not exogenous
  - Individuals may form social ties in anticipation of future economic benefits.
  - Individuals may strategically settle in regions in which they see the best future prospects.
  - Individuals with social ties may have common unobserved characteristics.
- To tackle with this problem, we need to find social ties that were not expected to help improve economic performance until certain period.
- $\rightarrow$ natural experiment around the fall of Berlin Wall

Historical Background

- 1945 German residents were expelled from Pomerania, Silesia, and East Prussia and allocated to areas which became West and East Germany according to quotas fixed in the Potsdam Agreement.
- 1949 East German state was founded.
- 1952 East and West border was completely sealed
- 1961 Construction of Berlin Wall; Refugees who moved to the East before WW2 fled to the West.
- 1989 Berlin Wall was opened.



Source:

https://www.quora.com/Why-didnt-Germany-get-broken-up-and-redistributed-after-WWII-like-the-British-did-to-India

Why Berlin Wall?

- Because partition of Germany was thought to be permanent, west Germans maintaining social ties with East Germans did so for purely noneconomic reasons.
- Whether a region has ties to East Germany is exogenous based on its extent of destruction during the war i.e. not on economic prospects migrants see.

Overview

Data

- Data at household, firm, and regional levels

Region-level data

- 1961 census
  - number of expellees who arrived directly in West Germany
  - number of expellees who arrived in West Germany after registering a residence in the Soviet sector
- (Source ambiguous)
  - share housing destroyed in 1946
  - amount of rubble in cubic meters per inhabitant in 1946
- German *Mikrozensus* (survey of 1% of the population)
  - income per capita from 1985–1995
  - average income of entrepreneurs & non-entrepreneurs
  - share of entrepreneurs among respondents
  - share of population working in different sectors in 1989
- GIS data
  - distance of the center of each district to the former inner East German border

Descriptive statistics

	(1) All	(2) Low Destr.	(3) High Destr.
Panel A: Region-level data			
Share Expellees (Soviet Sector) '61	0.048	0.050	0.047
	(0.019)	(0.022)	(0.016)
Share Expellees (Direct) '61	0.120	0.144	0.096
	(0.045)	(0.041)	(0.036)
Share Ties to Relatives '91	0.297	0.321	0.274
	(0.140)	(0.156)	(0.122)
Share Housing Destroyed '46	0.318	0.149	0.487
	(0.210)	(0.105)	(0.143)
Rubble '46 (m^3 p.c.)	0.088	0.034	0.143
	(0.069)	(0.028)	(0.055)
Distance to East (100 km)	1.769	1.543	1.994
	(1.074)	(1.060)	(1.070)
Income 1985 (DM, p.c.)	1595	1570	1620
	(125)	(140)	(106)
Income 1989 (DM, p.c.)	1760	1752	1768
	(132)	(147)	(118)
Income 1995 (DM, p.c.)	2222	2231	2210
	(154)	(166)	(143)
N	70	35	35

Firm-level data

- ORBIS dataset
  - location of firm headquarters
  - location of firm branches and subsidiaries
  - NACE code (whether firm is in agriculture, manufacturing, services, or government)

Descriptive statistics

Panel B: Firm-level data			
S. & B. in West Germany (log)	0.444	0.437	0.450
	(0.743)	(0.729)	(0.756)
S. & B. in East Germany (Dummy)	0.078	0.083	0.073
S. & B. in Non-EU Countries (Dummy)	0.010	0.011	0.008
N	19,387	9,706	9,681

Household-level data

- German Socioeconomic Panel (SOEP)
  - household income 1985–2001
  - 29 socioeconomic characteristics
  - information on whether any household member had lived in East Germany prior to 1961

Descriptive statistics

Panel C: Household-level data	All	Ties	No Ties
Age '90	51.0	50.5	51.2
	(14.3)	(13.4)	(14.7)
Gender	0.23	0.17	0.26
Years of Education '89	12.3	12.5	12.2
	(1.85)	(1.89)	(1.83)
Income 1989 (SOEP)	3,307	3,460	3,236
	(1,822)	(1,600)	(1,911)
Capital Income '89	879	822	907
	(1,811)	(1,438)	(1,966)
Entrepreneur '89	0.048	0.053	0.046
Not Employed '89	0.052	0.046	0.055
N	1,857	583	1,274

Overview

Strategy

- Instrumental variables
- Extent of housing destruction $\rightarrow$ How much social ties to the East that region has $\rightarrow$ Economic Growth

Specification

1st stage:

$$T_r^{89} = \gamma W_r^{46} + Z_r' \zeta^{fs} + \upsilon_r$$

2nd stage:

$$Y_r^{95} - Y_r^{89} = \alpha T_r^{89} + Z_r' \zeta + \epsilon_r$$

T_r^{89} : Measure of social ties in region r
W_r: Measure of wartime destruction
Z_r : vector of controls containing:

- state fixed effects
- Y_r^{89}
- distance from region r to inner-German border

Y_r^t : log income per capita in region r in year t

Variables explanation

- **Social ties**:
  - share of expellees via the Soviet sector '61
  - share of expellees (direct) '61
- **Wartime destruction**:
  - share of housing destroyed in 1946
  - amount of rubble in cubic meters per inhabitant

Overview

First stage

TABLE II

WARTIME DESTRUCTION, SOCIAL TIES, AND INCOME GROWTH

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: First stage			*Share Expellees (Sov. Sector) '61*			
Share Housing Destroyed '46	−0.019***	−0.020***		−0.020***	−0.021***	−0.020***
	(0.004)	(0.004)		(0.005)	(0.004)	(0.005)
Distance East (100km)	−0.005***	−0.005***	−0.005***		−0.004***	−0.005***
	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)
Income 1989 (p.c., log)	0.042***	0.047***	0.043***	0.048***	0.025*	0.047***
	(0.011)	(0.012)	(0.014)	(0.014)	(0.015)	(0.013)
Income '89/'85 (p.c., log)		−0.026	−0.020	−0.032	−0.029	−0.026
		(0.024)	(0.024)	(0.026)	(0.026)	(0.024)
Rubble '46 (m^3 p.c.)			−0.044***			
			(0.013)			
Migration from East '91–'95						−0.006
						(0.210)
R^2	0.918	0.920	0.904	0.988	0.931	0.920

Share expellees and share housing destroyed

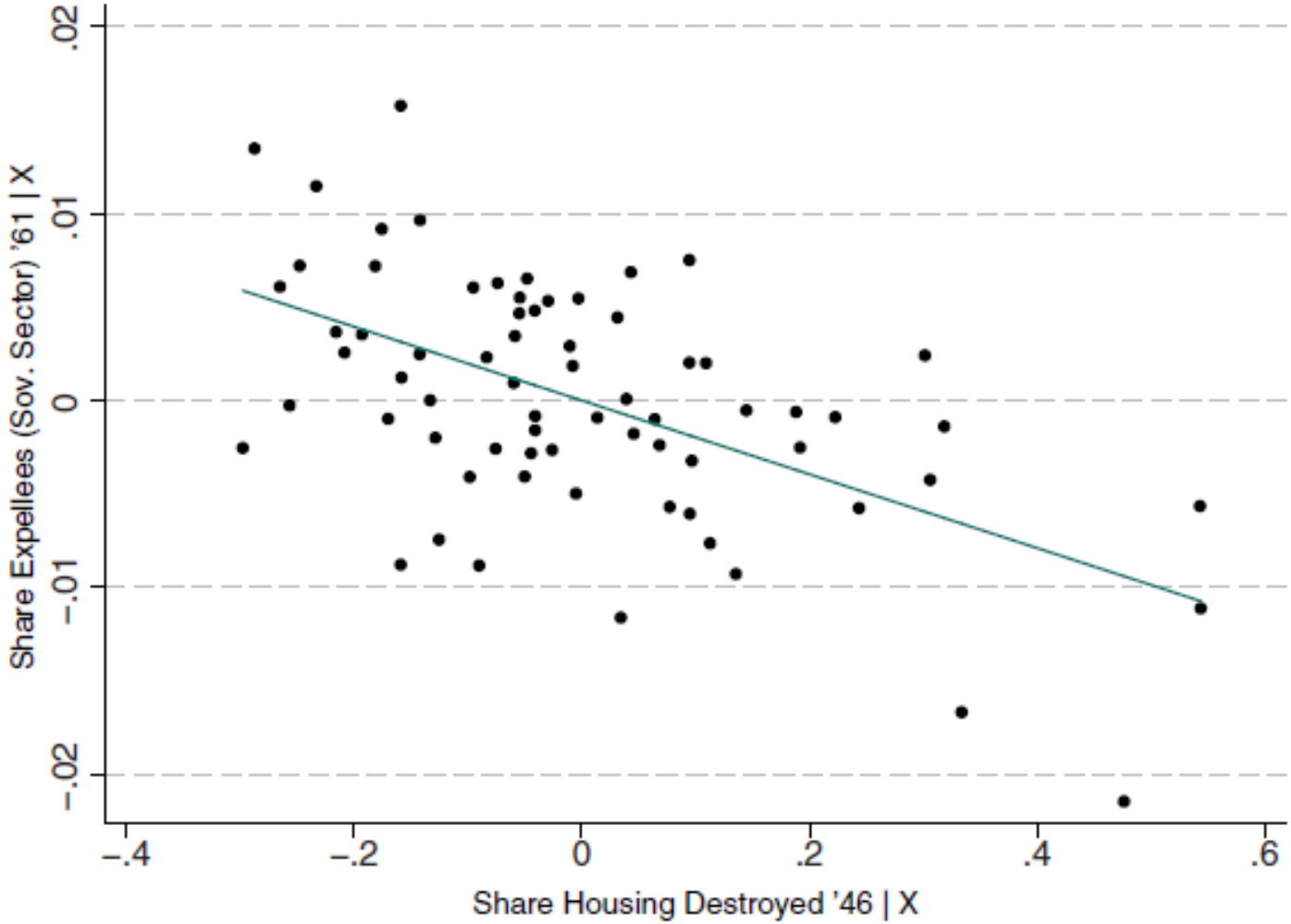


FIGURE II

Share Expellees and Share Housing Destroyed (Conditional Scatterplot)

Second stage

TABLE III

SOCIAL TIES AND INCOME GROWTH

	(1) (IV)	(2) (OLS)	(3) (IV)	(4) (IV)	(5) (IV)	(6) (IV)	(7) (IV)
Panel A: Main Results				*Income '95/'89 (p.c., log)*			
Share Expellees (Sov. S.) '61	2.169**	1.963***	2.442***	2.453***	2.473***	2.772***	2.366***
	(0.940)	(0.570)	(0.874)	(0.871)	(0.880)	(0.848)	(0.872)
Distance East (100 km)	0.011**	0.008**	0.011**	0.011**		0.012***	0.011**
	(0.004)	(0.003)	(0.004)	(0.004)		(0.004)	(0.004)
Income 1989 (p.c., log)	–0.267***	–0.189***	–0.209***	–0.209***	–0.214***	–0.305***	–0.206***
	(0.068)	(0.059)	(0.059)	(0.059)	(0.063)	(0.071)	(0.062)
Income '89/'85 (p.c., log)		–0.362***	–0.355***	–0.355***	–0.381***	–0.278***	–0.353***
		(0.082)	(0.085)	(0.085)	(0.089)	(0.083)	(0.086)
Sh. Employed in Agricult. '89						–0.115	
						(0.293)	
Sh. Employed in Manufact. '89						–0.301	
						(0.281)	
Sh. Employed in Services '89						0.145	
						(0.288)	
Sh. Employed in Governm.'89						–0.522	
						(0.394)	
Migration from East '91–'95							0.349
							(1.122)
R^2	0.504	0.597	0.589	0.589	0.573	0.641	0.592

Overview

Validity of the Exclusion Restriction

Exclusion restriction implies that the degree of wartime destruction affected economic growth *only through* migrants social ties to the East.

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Exclusion restriction implies that the degree of wartime destruction affected economic growth *only through* migrants social ties to the East. It is violated if...

1. wartime destruction had a lasting effect on income growth OR
2. there are some omitted variables which affect the pattern of wartime destruction and income growth after 1989 independently.

These, however, cannot be tested directly so falsification tests are conducted.

Is there lasting effect of wartime destruction?

- Dependent variable is the changes in growth rate of income per capita after 1989. The standard specification also controls for the pre-existing trend (1985-1989 income growth).

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Is there lasting effect of wartime destruction?

- Dependent variable is the changes in growth rate of income per capita after 1989. The standard specification also controls for the pre-existing trend (1985-1989 income growth).
- Assuming population growth proxies for income growth, wartime destruction had a strong negative impact on population during the war (1939–1945) but no effect after that.
- Income growth prior to 1989 is uncorrelated with wartime destruction
  - income growth between 1985 and 1989, and 1982 and 1985 as dependent variables.

Lasting effect of wartime destruction: Placebo test

TABLE III
(CONTINUED)

	(1) (IV)	(2) (OLS)	(3) (IV)	(4) (IV)	(5) (IV)	(6) (IV)	(7) (IV)
Panel B: Placebo				*Income '89/'85 (p.c., log)*			
Share Expellees (Sov. S.) '61	—	0.656	0.560	0.557	0.656	0.443	0.790
	—	(0.598)	(1.016)	(1.022)	(0.926)	(1.093)	(1.034)
N	70	70	70	70	70	70	70
Distance quartile fixed effects	—	—	—	—	yes	—	—
Instruments	Housing	—	Housing	Housing & rubble	Housing	Housing	Housing

Omitted variables 1

- Example 1 the Allies may have targeted areas that were focused on manufacturing and manufucturing sector may have experienced a decline after 1989 $\rightarrow$ Column 6

Composition of workforce

TABLE III

SOCIAL TIES AND INCOME GROWTH

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Share Expellees (Sov. S.) '61	2.169**	1.963***	2.442***	2.453***	2.473***	2.772***	2.366***
	(0.940)	(0.570)	(0.874)	(0.871)	(0.880)	(0.848)	(0.872)
Distance East (100 km)	0.011**	0.008**	0.011**	0.011**		0.012***	0.011**
	(0.004)	(0.003)	(0.004)	(0.004)		(0.004)	(0.004)
Income 1989 (p.c., log)	–0.267***	–0.189***	–0.209***	–0.209***	–0.214***	–0.305***	–0.206***
	(0.068)	(0.059)	(0.059)	(0.059)	(0.063)	(0.071)	(0.062)
Income '89/'85 (p.c., log)		–0.362***	–0.355***	–0.355***	–0.381***	–0.278***	–0.353***
		(0.082)	(0.085)	(0.085)	(0.089)	(0.083)	(0.086)
Sh. Employed in Agricult. '89						–0.115	
						(0.293)	
Sh. Employed in Manufact. '89						–0.301	
						(0.281)	
Sh. Employed in Services '89						0.145	
						(0.288)	
Sh. Employed in Governm.'89						–0.522	
						(0.394)	
Migration from East '91–'95							0.349
							(1.122)
R^2	0.504	0.597	0.589	0.589	0.573	0.641	0.592

Omitted variables 2

- Example 2 After 1989, high-skilled workers from East Germany may have migrated to the same area their relatives settled before 1961, and this migration may have increased the average wage paid in these regions. $\rightarrow$ Column 7

Migration from East 1991–1995

TABLE III

SOCIAL TIES AND INCOME GROWTH

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Distance East (100 km)	0.011**	0.008**	0.011**	0.011**		0.012***	0.011**
	(0.004)	(0.003)	(0.004)	(0.004)		(0.004)	(0.004)
Income 1989 (p.c., log)	–0.267***	–0.189***	–0.209***	–0.209***	–0.214***	–0.305***	–0.206***
	(0.068)	(0.059)	(0.059)	(0.059)	(0.063)	(0.071)	(0.062)
Income '89/'85 (p.c., log)		–0.362***	–0.355***	–0.355***	–0.381***	–0.278***	–0.353***
		(0.082)	(0.085)	(0.085)	(0.089)	(0.083)	(0.086)
Sh. Employed in Agricult. '89						–0.115	
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						(0.288)	
Sh. Employed in Governm.'89						–0.522	
						(0.394)	
Migration from East '91–'95							0.349
							(1.122)
R^2	0.504	0.597	0.589	0.589	0.573	0.641	0.592

Omitted variables 3

- Example 3 Other unobservable omitted variables that may be correlated with pattern of wartime destruction and changes in regional growth post 1989 through some channels other than social ties.

Omitted variables 3

- Example 3 Other unobservable omitted variables that may be correlated with pattern of wartime destruction and changes in regional growth post 1989 through some channels other than social ties.
- Compare the effects of
  - expellees via the Soviet sector
    - ★ came in 1946
    - ★ have ties to East Germany
  - expellees who arrived directly from annexed areas
    - ★ came in 1961
    - ★ no ties to East Germany
- Note that wartime destruction should affect settlement pattern of both groups of expellees.

- If the result is driven by an omitted variable that is correlated with wartime destruction and income growth after 1989, share of both group of expellees should be correlated with income growth after 1989.
- When regress income growth on the share of both groups, the coefficient on share of
  - expellees via Soviet sector: $+$, 2.131, significant
  - direct expellees: -, ≈ 0, not significant

Overview

Possible channels

TABLE IV

SOCIAL TIES AND ENTREPRENEURIAL ACTIVITY

	Income '95/'89 (p.c., log)		Share Entrepreneurs 1995–89
	(1)	(2)	(3)
	Entrepreneurs (3SLS)	Nonentrepreneurs (3SLS)	(IV)
Share Expellees (Sov. Sec.) '61	4.612***	1.270*	0.334**
	(1.733)	(0.686)	(0.163)
Inc. Entrepreneurs '89 (p.c., log)	−0.677***		
	(0.173)		
Inc. Entrepreneurs '89/'85 (p.c., log)	0.072		
	(0.112)		
Inc. Nonentrepreneurs '89 (p.c., log)		−1.977***	
		(0.473)	
Inc. Nonentrepreneurs '89/'85 (p.c., log)		−0.444	
		(0.440)	
Share Entrepreneurs '89			−0.461***
			(0.106)
Share Entrepreneurs '89–'85			−0.156
			(0.122)
R^2	0.581	0.663	0.560
N	70	70	70
Standard region-level controls	yes	yes	yes

	(1)	(2)	(3)	(4)	(5)
Panel A: Reduced form		*S. & B. in East Germany (Dummy)*			
Share Housing Destroyed '46	−0.030***	−0.029**	−0.026**	−0.026**	−0.030***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
S. & B. in West Germany (log)	0.119***	0.119***	0.119***	0.119***	0.119***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Distance to East (100 km)		−0.013***		−0.014***	−0.015***
		(0.004)		(0.004)	(0.004)
Income 1989 (p.c., log)		0.002	−0.035	0.060	−0.003
		(0.030)	(0.037)	(0.064)	(0.030)
Income '89/'85 (p.c., log)		−0.010	0.038	−0.052	−0.019
		(0.050)	(0.051)	(0.056)	(0.051)
Migration from East '91–'95					−1.559
					(1.223)
Panel B: Second stage					
Share Expellees (Sov. Sector) '61	1.579**	1.496**	1.252**	1.316**	1.548**
	(0.689)	(0.673)	(0.583)	(0.639)	(0.671)
Panel C: Second stage		*S. & B. in Poland or Cz. Rep. (Dummy)*			
Share Expellees (Sov. Sector) '61	0.278*	0.295**	0.310**	0.314**	0.306**
	(0.146)	(0.144)	(0.141)	(0.148)	(0.140)
Panel D: Placebo		*S. & B. in Old EU Countries (Dummy)*			
Share Expellees (Sov. Sector) '61	0.060	0.403	0.417	0.549	0.400
	(0.580)	(0.506)	(0.471)	(0.462)	(0.498)
Panel E: Placebo		*S. & B. in New EU, exc. Poland or Cz. Rep. (Dummy)*			
Share Expellees (Sov. Sector) '61	0.220	0.213	0.201	0.198	0.248
	(0.197)	(0.205)	(0.192)	(0.222)	(0.199)
Panel F: Placebo		*S. & B. in Non-EU Countries (Dummy)*			
Share Expellees (Sov. Sector) '61	0.034	0.123	0.116	0.128	0.138
	(0.304)	(0.291)	(0.274)	(0.308)	(0.284)
N	19,387	19,387	19,387	19,387	19,387
Firm-level sector fixed effects	yes	yes	yes	yes	yes
Distance quartile fixed effects	—	—	yes	—	—
Region-level sector controls	—	—	—	yes	—

Overview

Estimation equation

$$\hat{y}_{ir}^{95} - \hat{y}_{ir}^{89} = \beta t_{ir}^{89} + \mathbf{z}_{ir}'\zeta^{hh} + \mu \hat{Y}_{r}^{95} + \sigma T_{ir}^{89} + \mathbf{Z}_{r}'\zeta + \epsilon_{ir}$$

where

$\hat{y}_{ir}^{95} - \hat{y}_{ir}^{89}$: household income growth between 1989–1995

t_{ir}^{89} : dummy indicating whether households have relatives in East Germany

$\mathbf{z}_{ir}$: household-level controls

$\hat{Y}_{r}^{95}$: region average income

T_{ir}^{89} : region average social ties

$\mathbf{Z}_{r}$: region-level controls

Estimation equation

$$\hat{y}_{ir}^{95} - \hat{y}_{ir}^{89} = \beta t_{ir}^{89} + \mathbf{z}_{ir}'\zeta^{hh} + \mu \hat{Y}_{r}^{95} + \sigma T_{ir}^{89} + \mathbf{Z}_{r}'\zeta + \epsilon_{ir}$$

where
$\hat{y}_{ir}^{95} - \hat{y}_{ir}^{89}$: household income growth between 1989–1995
t_{ir}^{89} : dummy indicating whether households have relatives in East Germany
$\mathbf{z}_{ir}$: household-level controls
$\hat{Y}_{r}^{95}$: region average income
T_{ir}^{89} : region average social ties
$\mathbf{Z}_{r}$: region-level controls

β : main effect
μ, σ : spillover effects

Overview

Results

	Income '95/'89 (log)			
		Household (SOEP)		
Level (source)	Region (MZ)			
	(1)	(2)	(3)	(4)
Ties to Relatives '91		0.067***	0.058***	
		(0.024)	(0.021)	
Ties to Relatives '91 – Share Ties '91				0.076**
				(0.032)
Share Ties to Relatives '91	0.338*			1.116
	(0.197)			(2.509)
Income 1989 (log, SOEP)		−0.225***	−0.293***	−0.238***
		(0.028)	(0.035)	(0.033)
Income '89/'85 (log, SOEP)		−0.145***	−0.186***	−0.133***
		(0.035)	(0.032)	(0.034)
Distance to East	0.019			0.054
	(0.012)			(0.134)
Income 1989 (p.c., log, MZ)	−0.198**			−0.089
	(0.098)			(0.882)
Income '89/'85 (p.c., log, MZ)	−0.334**			−0.491
	(0.153)			(0.711)
Age '90			−0.018***	
			(0.005)	
(Age '90)^2			0.000**	
			(0.000)	
Gender			−0.076***	
			(0.024)	
N	70	1,857	1,857	1,729
Fixed effects	State	Region	Region	State

Underlying mechanism of household-level effect

- It can be argued that households do not benefit from social ties but from knowing the places and economy.
  - Look at household heads who were younger than 11 years old at the time of migration: $+$, significant (column 1)
- Wealthier households benefit more from social ties (e.g. by borrowing and lending money)
  - no significant impact (column 2,3)
- Ties to the East raise income of entrepreneurs
  - large and significant impact (column 4)

HETEROGENEOUS EFFECTS

	Income '95/'89 (log)			
	(1)	**(2)**	**(3)**	**(4)**
Ties × Age Group below 40	0.121**			
	(0.057)			
Ties × Age Group 40–51	–0.028			
	(0.035)			
Ties × Age Group 52–62	0.076			
	(0.049)			
Ties × Age Group above 62	0.067**			
	(0.034)			
Ties to Relatives '91		0.050**	0.051**	0.050**
		(0.024)	(0.024)	(0.020)
Ties × Capital Income '89 (75th cent.)		0.031		
		(0.046)		
Ties × Capital Income '89 (95th cent.)			0.031	
			(0.053)	
Ties × Entrepreneur '89				0.168**
				(0.078)
R^2	0.285	0.277	0.276	0.276
N	1,857	1,857	1,857	1,857

Overview

Conclusion

Approaches when dealing with social ties

1. Theorists
   - models incorporating network-based interactions
2. Empiricists
   - Double reverse causality problem
     - ★ how individuals form social ties
     - ★ how they choose to live in particular region

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Main results

- West German regions that have households with social ties to the East exhibit higher growth in income per capita after the fall of Berlin Wall.
- The presence of households with social ties to the East boost entrepreneurial activity at regional level, and the likelihood that local firms invest in East Germany.
- Households with social ties to the East experience rise in personal incomes.