

# Phoenix from the Ashes: Bombs, Homes, and Unemployment in Germany, 1945-2011

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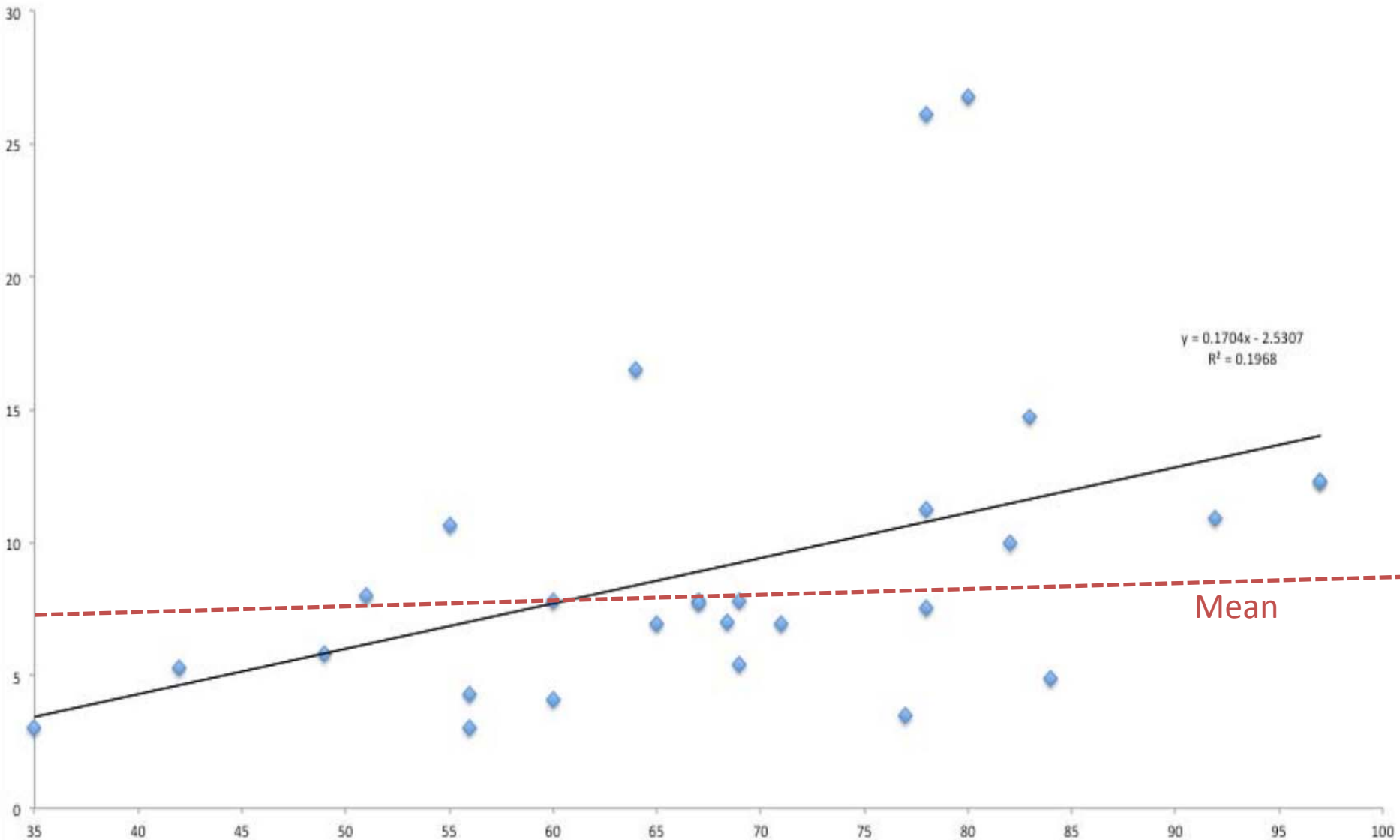
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# Unemployment (%) vs Home-ownership (%) EU28, OECD, Switzerland (Feb, 2013)



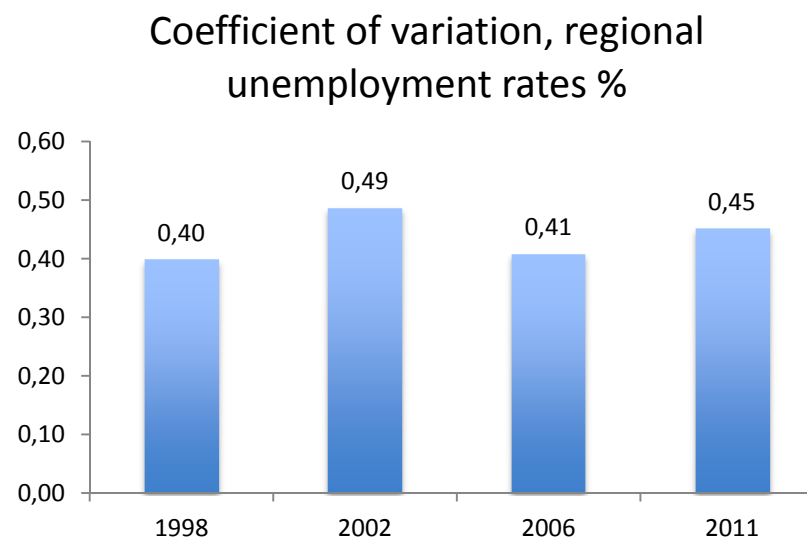
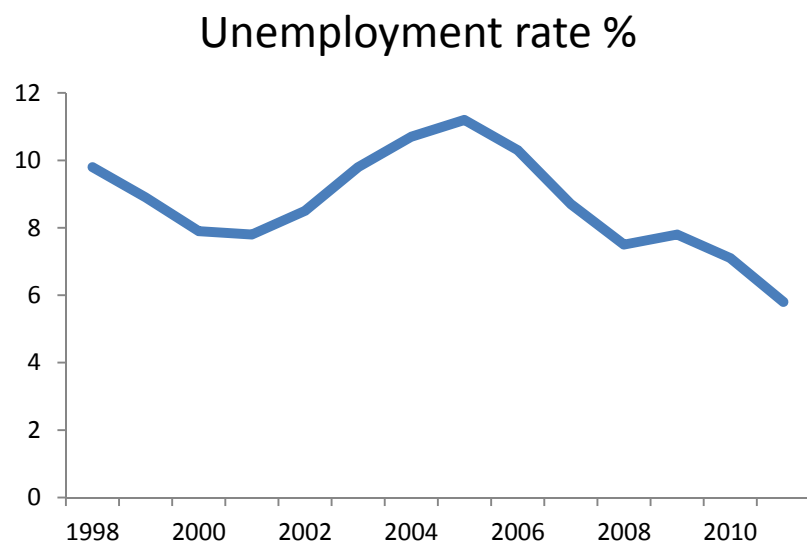
# Research Question

- Does the housing market impair the labour market?
  - If so, why?
    - **Macro:** housing affects macro fluctuations, affecting labor demand etc.
    - **Micro/ this paper:** home ownership restricts labour mobility, reducing an economy's ability to deal with labour demand shocks (“Oswald Hypothesis”)

# Does Germany's low home ownership have anything to do with...

1. Its recently declining national-level unemployment rate, and
2. Its stable dispersion of regional unemployment rates?

German home-ownership is 53% vs 79% in Spain



# What we do

- **Data:**
  - Repeated cross-sections for 1998, 2002, 2006, 2011.
  - Migration as flows from region to region rather than movements within region.
- **Results:**
  - *OLS*: Move from 1<sup>st</sup> to 2<sup>nd</sup> quartile of home-ownership increases unemployment growth rate by 22%.
  - *WW2 Bombing as IV*: Move from 1<sup>st</sup> to 2<sup>nd</sup> quartile of home-ownership increases unemployment growth rate by 89%.
  - *Matching*: supports OLS and IV estimates.
  - Mechanism: home-ownership negatively associated with gross outflows, but not inflows or net migration, in line with Oswald (1996).

# Limited empirical work

- Rajan (2010), *Fault Lines*, “anecdotal evidence” that home ownership restricts labor mobility...
- Laamanen (2013): IV analysis of Finnish counties supports hypothesis. IV is rental market deregulation.
  - External validity?
  - Is IV exogenous?
- Mian and Sufi (2014), *House of Debt*, No *net* migration response from severely housing crisis-hit counties...
- Demyanyk, Hrysko, Luengo-Prado, Sorensen (2015): great US micro-data
  - Little evidence that housing debt impairs mobility, rather vice versa, only within owners
  - Mechanism?

# The German Case

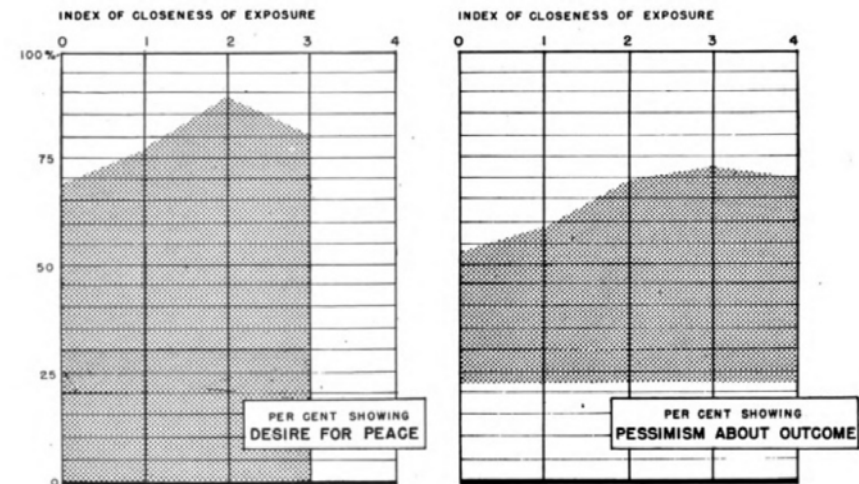
- 1) **Germany has very low levels of home-ownership & unemployment.**
- 2) **Bombing as shock to ownership**
  - USAAF & RAF “Area Bombing”/ “dehousing” 1942-45: 53% of all raids on cities. All told, 20% of Germany’s housing stock destroyed, another 20% damaged.
  - In part, area bombing is response of inability to target specific factories or army buildings.
  - Along with refugees from East, created 4.5million home shortage by 1950.
  - Capital scarcity made govt intervention necessary: by 1959, 50% of all new houses built with public funds. **Houses are rental.**

**Table 1** Bomber Command targets in the European theatre, October–December 1944

Attacks on cities	53%
Attacks on railways and canals	15%
Attacks on oil target	14%
Attacks on enemy troops and fortifications	13%
Attacks on naval and other objectives	5%

Source: J. Terraine (1985). *The Right of the Line*. Hodder and Stoughton: London, p 675.

## CHANGES IN MORALE WITH CLOSENESS OF EXPOSURE TO BOMBING



Morale Division, US Strategic Bombing Survey, *The Effects of Strategic Bombing on German Morale* Vol. II, Dec. 1946, p. 12.

# Post-WWI Housing Policies

- Unlike, say, UK, focus has been on influencing rent rather than building.
  - Construction subsidized, tax breaks provided only if rental accommodation supplied; housing allowances; strict tenancy laws; and rent control.
  - **1950** “1. Wohnungsbaugesetz”: first housing construction law; included rent control and tax incentives; focus on construction of rental apartments.
  - **1956** “2. Wohnungsbaugesetz”: second housing construction law; focus on family houses (“Eigenheim”).
  - **1960** “Gesetz über den Abbau der Wohnungszwangsbewirtschaftung”: law on the reduction of forced regulation for housing): stated that a landlord has to accept a tenant if a municipal residential company decides so.
  - **1970s** “Miethöhegesetz” (law on the amount of rent)



# Persistence of low home-ownership

- German home-ownership today: 53% vs 79% in Spain.
  - Large rental market share due to post-war social housing policies.
  - High quality of social housing, and inclusion of private investors in subsidization schemes, created large private housing market.
    - *“social housing even attracted tenants from the middle classes...income limits were generous since social housing was intended for broad sections of the population and the tenants’ income was only checked when they moved in. If the income rose during the term of the rental agreement, it had no consequences for the tenant...it was to the financial advantage of the rising middle class in particular to stay in these dwellings and defer potential plans to create homeownership.”* (Voigtländer 2009, 359).
  - German home-owners were not given high subsidies (cheap mortgages, etc) as in Spain, the Netherlands or US.
  - German house prices remained stable over long period of time.

# Instrument

$$\text{Bomb} = \text{Tonnage}_{i, 1942-5} \times \text{Months Last Raid}_{i,t-1942-5}$$

- **Tonnage**: tonnage of bombs dropped by RAF and USAAF during “area bombing” raids, aggregated by our regions.
- **Months Last Raid**: inverse months since last raid.
- Captures extent of bombing damage and recovery time.
- Home ownership lower in more heavily and more recently bombed areas

	<b>Tonnage</b>	<b>Months</b>
<b>Min.</b>	100	637
<b>Max.</b>	121,400	777
<b>Std. Dev.</b>	26,754	7
<b>Mean</b>	17,801	696

# Results: OLS

- Tendency to national convergence in regional unemployment rates...
  - ~6% per annum, with “half-life” of ~15 yrs.
- ...but unemployment growth faster when home-ownership higher
  - That is, home ownership acts as a **break on the convergence** of unemployment levels across Germany.

Dep. Var.	$\Delta \ln \text{Un. Rate.}_t$	$\Delta \ln \text{Un. Rate.}_t$	$\Delta \ln \text{Un. Rate.}_t$
Sample:	All	All	All
$\ln \text{Un. Rate}_{t-1}$	-0.779*** [0.112]	-0.661*** [0.126]	-0.585*** [0.129]
$\ln \text{Owner rate}_{t-1}$	0.503** [0.206]	0.881*** [0.193]	0.731*** [0.184]
$\ln \text{Owner rate}_{t-2}$		1.428*** [0.229]	1.067*** [0.232]
$\ln \text{HighSchool dropouts}_{t-1}$			0.121** [0.039]
$\ln \text{Herfindahl Emp. Index}_{t-1}$			2.687*** [0.656]
$\ln \% \text{ age } 65>_{t-1}$			-0.423 [0.272]
$\ln \text{Pop. Density}_{t-1}$			-0.789 [0.658]
Year FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
N	262	174	166
within-R <sup>2</sup>	0.905	0.974	0.982

Notes: Robust standard errors clustered by region in brackets (\*\*\*) p < 0.01).  
Estimated over four-year intervals.

# Results: IV

- Effect of ownership larger when identified – exogenous portion of variation not biased downwards by confounding variation – but imprecision also greater:

	Coefficient	s.e.	Lower	Upper	t-ratio
IV	2.98	1.41	0.22	5.73	2.11
OLS	0.77	0.18	0.42	1.12	4.40

- Included controls:
  - Region and Year FEs
  - Population density
  - Herfindhal index of employment
  - High school dropouts.
  - % of population >65

	OLS	Second Stage
	$\Delta \ln \text{Un. Rate.}_t$	$\Delta \ln \text{Un. Rate.}_t$
$\ln \text{Un. Rate}_{t-1}$	-0.773*** [0.119]	-0.984*** [0.186]
$\ln \text{Owner rate}_{t-1}$	0.771*** [0.175]	2.975** [1.408]
N	250	250
F-stat.	46.17	8.21
Under-ID		3.45
R <sup>2</sup>	0.575	0.121
First Stage		
		$\ln \text{Owner rate}_{t-1}$
<i>Bomb</i>		-9.30e-09** [3.25e-09]
N		250
R <sup>2</sup>		0.396

*Notes:* Robust standard errors in brackets; clustered by region in panels (\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ ). F-stat. is Kleibergen-Paap Wald rk F statistic. Under-ID is the Kleibergen-Paap rk LM statistic.

# Matching

- Concern that bombed regions were selected based on their high pre-bombing population density, which reflects home-ownership differences then and now.
- Not a perfectly matched sample, but has reduced differences in pre-War population density substantially:
  - T-stat. on difference in means between treatment and control 13.3 for unmatched sample and 6.5 for matched sample (-51%).
  - Regression of treatment on pre-War density for *matched sample* yields pseudo-R<sup>2</sup> of 0.22 versus 0.45 before matching (-51%).
  - Rosenbaum & Rubin (1985) standardized bias - difference in means of treatment and control groups as percentage of sample variances in both groups – down by 28% in matched sample.

**Treatment=bombed (1); Control=not bombed (0)**

Bomb Treatment	Freq.	Percent	
0	136	38.86	
1	214	61.14	
Total	350	100	

**Explain treatment as function of 1939 population density**

	Bomb Treatment
In Pop. Den. 1939	2.655** [0.275]
Const.	-12.351*** [1.288]
N	350
pseudo R <sup>2</sup>	0.4453

**Exclude outlying propensity scores (<0.21) to form matched sample**

	Bomb Treatment	
	0	1
MATCHED	64	214
UNMATCHED	136	214

# Results: Matching OLS

- Slightly smaller OLS coefficient, which goes from  $p < 0.001$  to  $p < 0.05$ .

Dep. Var. Sample:	$\Delta \ln \text{Un. Rate.}_t$	$\Delta \ln \text{Un. Rate.}_t$
	<b>MATCHED</b>	<b>UNMATCHED</b>
$\ln \text{Un. Rate}_{t-1}$	-0.723*** [0.138]	-0.585*** [0.129]
$\ln \text{Owner rate}_{t-1}$	0.622** [0.218]	0.731*** [0.184]
$\ln \text{Owner rate}_{t-2}$	0.901** [0.246]	1.067*** [0.232]
$\ln \text{HighSchool dropouts}_{t-1}$	0.087* [0.051]	0.121** [0.039]
$\ln \text{Herfindahl Emp. Index}_{t-1}$	2.626*** [0.654]	2.687*** [0.656]
$\ln \% \text{ age } 65 >_{t-1}$	-0.683* [0.360]	-0.423 [0.272]
$\ln \text{Pop. Density}_{t-1}$	-0.327 [0.725]	-0.789 [0.658]
Year FE	Yes	Yes
Region FE	Yes	Yes
N	134	166
within-R <sup>2</sup>	0.9824	0.982

Notes: Robust standard errors in brackets, clustered by region (\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ ).

# Results: Matching IV

- IV coefficient is the same in size and significance.

IV 2 <sup>nd</sup> stage	$\Delta \ln \text{Un. Rate.}_t$	$\Delta \ln \text{Un. Rate.}_t$
	<b>MATCHED</b>	<b>UNMATCHED</b>
$\ln \text{Un. Rate}_{t-1}$	-1.171*** [0.206]	-0.984*** [0.186]
$\ln \text{Owner rate}_{t-1}$	2.998** [1.508]	2.975** [1.408]
N	202	250
F-stat.	7.219	8.21
Under-ID	3.389	3.45
R <sup>2</sup>	0.862	0.121

Notes: IV table Includes full set of controls. Robust standard errors in brackets; clustered by region (\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01). F-stat. is Kleibergen-Paap Wald rk F statistic. Under-ID is the Kleibergen-Paap rk LM statistic.

# Is the effect meaningful?

According to our IV estimate, yes:

Movement between home-ownership quartiles:	Q1 - Q2	Q2 - Q3	Q3 - Q4
Change in mean home-ownership rate	35%	15%	12%
Effect on unemployment growth rate	89%	41%	33%
1998-2011 mean annual unemployment growth of -3.4% goes to...	-1.8%	-2.4%	-2.6%

Note: mean level of home-ownership in Q1 is 33.7%; 45.6% in Q2; 52.2% in Q3; and 58.4% in Q4.



# Mechanism – labour mobility

- No conceptual prediction on *how* mobility is restricted:

- Home-ownership can discourage people from leaving their home region in search of employment, especially after housing crises (Oswald 1996, Rajan 2010)
- Also possible that home-ownership discourages people from entering regions in search of employment, due to unavailability of rental accommodation (Blanchflower and Oswald 2013).

- We find support for the first point: *home-ownership is associated with lower gross outflows*.

- Net migration can mask effects. Could be why Mian and Sufi (2014) didn't find a labour mobility response to housing-crisis unemployment shocks – they used net migration.

Dep. Var.	Net migration per thousand	Inflows per thousand	Outflows per thousand
Sample:	All	All	All
ln Owner rate <sub>t-1</sub>	49.822*	38.28	-11.541**
	[26.566]	[25.48]	[4.883]
Year FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
N	257	257	257
within-R <sup>2</sup>	0.049	0.125	0.16

Notes: Clustered robust standard errors in brackets (\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01). Results hold with full set of controls.

# Conclusion

- Results consistent with hypothesis that homeownership impairs the labour market.
- This can link two facts for Germany – unusually low homeownership and low unemployment – and has wider implications.
- Europe's high homeownership countries (Spain, Italy) also have the highest rates of unemployment.