How do regional labor markets adjust to immigration? A dynamic analysis for post-war Germany¹

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¹The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the Deutsche Bundesbank, the Eurosystem, or its staff.

Research questions

By 1950, 7.7 million German expellees (forced migrants) had arrived in West Germany as the result of territorial losses after World War II.

Expellees were very unevenly distributed across two West German regions.

Drawing on two decades of data, we exploit this large and uneven expellee inflow to study:

- 1. How fast, and by which margins, did regional labor markets in West Germany adsorb the expellee inflow?
- 2. How did the inflow affect natives' labor income along the transition path?

Motivation

Quantify labor market dynamics in a *specific* historical episode, i.e. one of the largest forced population movements in human history.

Quantify *generic* labor market dynamics after asymmetric labor supply shock, as sheer magnitude of historical shock promises strong identification.

Inform the in-depths policy debate on economic consequences of the sharply rising numbers of international forced migrants.

Overview and preview of results

Draw on two decades of historical data to show how two regional labor markets in West Germany adjusted after expellee inflow.

Calibrate adjustment costs in dynamic search/matching model to match facts.

Results

- 1. It took regional labor markets a decade to adjust to expellee inflow.
- 2. Adjustment initially via non-employment, then via regional migration.
- **3.** Large decline in natives' *per period* labor income, especially early on.
- 4. More modest decline in natives' lifetime income.

Historical background

From final stages of WW II until 1950, expellees were displaced from former Eastern territories of the German Reich to re-settle in West Germany.



Asymmetric labor supply shock in West Germany

By 1950, 7.7 million expellees re-settled in West Germany (16.3% pop).

Initially, expellees were very unevenly distributed across regions:

- Expellees initially fled to regions close to their former homelands.
- French initially refused to accept expellees in their zone.
- Expellees and native West Germans could hardly change residence until 1949.

Initial distribution not driven by regional labor market conditions, as expellees were generally unable to choose initial destination (Braun & Kvasnicka 2014).

Two stylized regions in West Germany

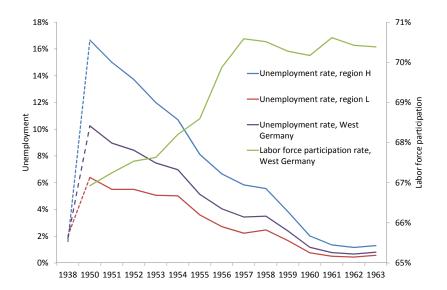
		Population 1939	Population 1950	Expellees per
		(in 1000)	(in 1000)	1950 population
Region H	SH/NI/BY	13,213	18,597	25.1%
Region L	HH/HB/NW/HE/RP/BW	26,140	28,596	10.5%
	Federal Republic	39,353	47,194	16.3%

Note: Expellees are defined as German nationals or ethnic Germans who on 1 September 1939 lived in the former German territories East to the Oder-Neisse line or abroad.

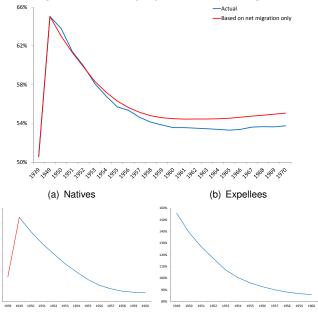
► Details on regional pre-war differences and war destructions

Expellees and natives were close substitutes on the labor market.

Unemployment and labor force participation rates, 1938-63



Population in region H over population in region L, 1939-70



55%

54%

53%

52%

51%

50%

Two-region search and matching model to explain facts

- Expellees enter a region exogenously as non-employed workers.
- Non-employed workers can participate, or not, in the labor market.
- Non-employed workers can move endogenously between labor markets.

- ▶ In each region, firms use labor and capital for production.
- Native workers and expellees are perfect substitutes in production.
- Firms and workers Nash-bargain wage in each period.
- Workers face migration/participation costs, firms face adjustment costs.

Model calibration

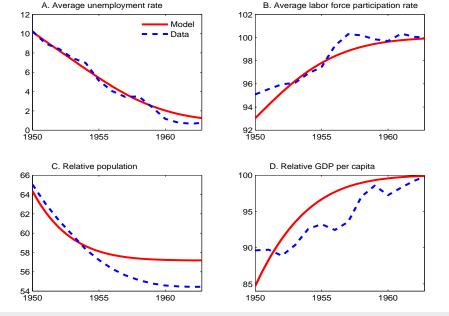
Parameter Description		Value
$\frac{1}{k_{-1}/k}$	War-related damage of K_{-1}	81%
P_{-1}/P_{-1}^{\star}	Relative regional population	54.4%
$X_0/(P_0+P_0^{\star})$	Expellee inflow in region H	9.9%
$X_0^{\star}/(P_0+P_0^{\star})$	Expellee inflow in region L	6.4%

Propensity parameters, i.e.,

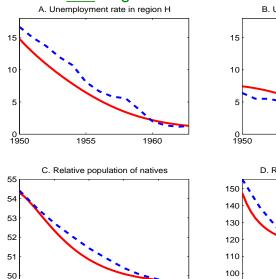
- workers' propensity to migrate,
- workers' propensity to participate, and
- firms' propensity not to adjust employment,

are selected so as to minimize distance between model and data.

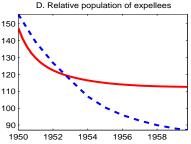
Model fit of targeted historical data



Model fit of non-targeted historical data







Plausibility of calibration and robustness

Plausibility

- **1.** Model-implied short-run wage elasticity is between [-0.12, -0.16].
- **2.** Elasticity estimated using 1951 wage data is between [-0.13, -0.21].
- 3. Calibrated propensity parameters are plausible given existing estimates.

Robustness

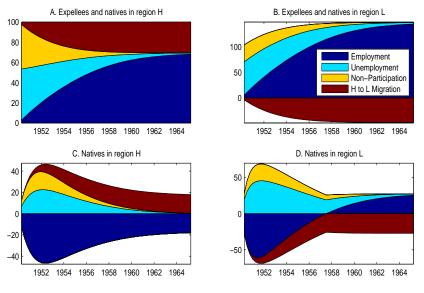
- 1. Asymmetric regional level of initial capital stocks.
- 2. Regional productivity gap.
- 3. Alternative data classification.
- 4. Initial capital stocks at steady state.
- 5. Discount data on relative GDP per capita in calibration.

How did regional labor markets adsorb the expellee inflow?

$$1 = \frac{\sum_{t=0}^{T} \Delta N_t}{X_0} + \frac{\sum_t \Delta U_t}{X_0} + \frac{\sum_t \Delta R_t}{X_0} + \frac{\sum_t G_t}{X_0}.$$

Decomposition shows cumulative change in, say, employment N at each point in time T and per expellee inflow in region H.

Using the structural model, we express this decomposition relative to a corresponding decomposition in a counterfactual w/o expellee inflow.



- ▶ After 2.25 years, 4.65 natives "lost" their job for any 10 expellees.
- ≥ 2.23 turn unemployed, 1.59 leave labor force, 0.83 migrate to region L.

How did expellee inflow affect natives' labor income?

Literature focuses on (short / long-run) wage elasticity of immigration.

Our dynamic model implies

- a time profile for the wage elasticity, governed by size of adjust. costs.
- ▶ that workers can evade wage losses by turning to alternative incomes.

A static wage elasticity does not capture these dynamic effects.

Therefore, we focus on (per-period and lifetime) labor income.

How did expellee inflow affect natives' labor income?

Expected discounted income of average native worker in both regions is

$$\begin{split} Z_0 &= \sum_{t=0}^{\infty} \beta^t \bigg\{ \left(\frac{P_{Nt}}{P_{Nt} + P_{Nt}^{\star}} \right) \left[\left(\frac{N_{Nt}}{P_{Nt}} \right) w_t + \left(\frac{U_{Nt}}{P_{Nt}} \right) z + \left(1 - \frac{L_{Nt}}{P_{Nt}} \right) \bar{h}_t - \left(\frac{G_{Nt}}{P_{Nt}} \right) \bar{\mu}_t \right] \\ &+ \left(\frac{P_{Nt}^{\star}}{P_{Nt} + P_{Nt}^{\star}} \right) \left[\left(\frac{N_{Nt}^{\star}}{P_{Nt}^{\star}} \right) w_t^{\star} + \left(\frac{U_{Nt}^{\star}}{P_{Nt}^{\star}} \right) z^{\star} + \left(1 - \frac{L_{Nt}^{\star}}{P_{Nt}^{\star}} \right) \bar{h}_t^{\star} - \left(\frac{G_{Nt}^{\star}}{P_{Nt}^{\star}} \right) \bar{\mu}_t^{\star} \right] \bigg\} \,. \end{split}$$

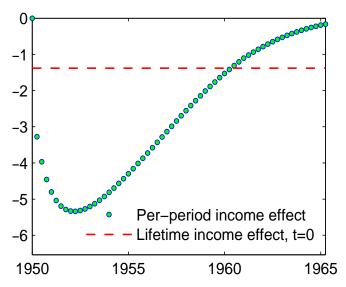
Lifetime income effect:

$$\mathcal{T}_0 = 100(Z_0 - \widetilde{Z}_0)/\widetilde{Z}_0.$$

 Z_0 is expected discounted income in model without expellee inflow.

Per-period income effect \mathcal{PT}_t fulfills $\mathcal{T}_0 = (1 - \beta)(\mathcal{PT}_0 + \beta\mathcal{PT}_1 \cdots)$.





Lifetime income effect is -1.38%; per-period effect can be four times larger. Lifetime effect needs a decade to realize; per-period effect not monotone.

How did expellee inflow affect natives' labor income?

	Contribution (in %) to treatment effect			
	Region H	Region L	Both regions	
Wage income	220.24	-21.40	198.84	
Unemp. benefits	-20.83	-30.38	-51.21	
Home benefits	-23.68	-24.28	-47.96	
Migration costs	0.33	0	0.33	
Total	176.06	-76.06	100	

Wage losses are mitigated as workers turn to other income sources.

Counterfactual immigration scenarios Political



	Overall treatment effect on EDI (in %) of native in			Income of avg. expellee ¹	Duration of adjustment ²
	Both regions	Region H	Region L	(in %)	(# quarter)
	(1)	(2)	(3)	(4)	(5)
Historical scenario	-1.38	-1.73	-1.19	-2.14	35
A. Magnitude of exp	pellee inflow				
$\frac{X_0 + X_0^{\star}}{P_0 + P_c^{\star}} = 0.032$	-0.30	-0.43	-0.22	-0.54	28
$\frac{X_0 + X_0^{\star}}{P_0 + P_0^{\star}} = 0.013$	-0.12	-0.18	-0.09	-0.25	27
B. Initial regional di	stribution of ex	pellees			
$\frac{X_0}{X_0 + X_0^*} = 0$	-1.35	-0.93	-1.58	-2.24	35
$\frac{X_0}{X_0 + X_0^*} = 0.352$	-1.41	-1.41	-1.41	-1.99	34
	-1.24	-2.00	-0.82	-2.81	37
C. Gradual expellee	inflow over tim	e			
Over three years		-1.38	-0.88	-1.39	39
Over ten years	-0.65	-0.86	-0.53	-0.81	54
D. Migration costs					
a = 1e + 4	-1.36	-2.14	-0.94	-2.33	36
a = 1e - 4	-1.41	-1.40	-1.42	-1.99	34

Conclusion

- After expellee inflow, regional unemployment gap and migration rate increased dramatically, to decline only gradually thereafter.
- A dynamic two-region search and matching model closely fits this data.
- Lifetime income losses of native workers equal 1.38%, but per-period income losses are up to four times as large.
- Economic immigration policy can reduce income losses and dampen adjustment dynamics (e.g. by distributing inflow over time and space).

Table: Socio-demographics expellees & natives in West Germany, Sept. '50

	Expellees ^a	Rest of the
	·	population ^b
% females	52.9	53.2
Age structure		
% aged 0-17	29.7	27.7
% aged 18-24	11.3	10.1
% aged 25-44	30.0	27.9
% aged 45-59	17.9	19.9
% aged 60 and above	11.1	14.3
Marital status (aged 18 and above)		
% single	25.7	23.4
% married	60.4	64.0
% widowed or divorced	14.0	12.5
Education (born 1885-1927) ^c		
Years of schooling ^d	8.5	8.4
% vocational training	37.3	37.6
% university degree	3.5	2.9



Pre-war differences / war destruction in West German states

	Expellee inflows		Pre-war differences				War damage
	1949	% expellees	Population	1938 un-	Share of 1939	1936 national	Share of
	population	in 1949	change,	employment	labor force in	income per	destroyed
	(in 1,000s)	population	1925-39 (%)	rate $(\%)^2$	agriculture (%)	capita (RM) ³	dwellings (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bavaria	9,158	21.1	9.9		38.0		12.5
+ Lower Saxony	6,790	27.3	13.1		36.6		12.0
+ Schleswig-Holstein	2,649	33.3	8.1		28.9		10.5
Region H	18,597	25.1	10.7	1.6	36.5	898	12.1
Baden-Wüerttemberg	6,318	12.5	10.3		31.5		10.4
+ Hesse	4,280	16.4	9.3		27.8		13.7
+ Rhineland-Palatinate	2,908	3.1	8.1		38.1		16.3
Region L'	13,506	11.7	9.4	1.6	32.1		12.8
+ North Rhine-Westphalia	12,988	9.8	8.8		14.1		30.0
+ Bremen	544	8.1	37.0		3.9		41.0
+ Hamburg	1,558	6.6	15.4		2.1		49.1
Region L	28,596	10.5	10.0	2.0	21.8	974	24.2
Federal Republic	47,194	16.3	10.3	1.9	27.0	955	20.3

