Labor Market Effects of Migration in Germany: Examining Skill Groups

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Abstract

The paper analyzes the labor market impact of migration by exploiting variation in the labor supply of foreigners across groups of workers with the same level of skills but different work experience. Estimates on the basis of German register data for the period 1975-97 do not confirm the hypothesis that penetration of migrants into skill-experience cells has a significant negative effect on the earnings and employment opportunities of native men. The results indicate that a 10 percent rise of the share of immigrants in the workforce would in general reduce wages by less than one percent and not increase unemployment. Though adverse effects appear stronger for less-qualified and older workers, the evidence altogether contrast that from a parallel study for the United States indicating a consistent and substantial negative impact of an immigrant labor supply shock on native competitors.

Motivation

Old Debate

What is the impact of immigration on labor market opportunities for natives?

Friedberg and Hunt (JEcPersp, 1995):

"... the effect of immigration on the labor market outcomes of natives is small."
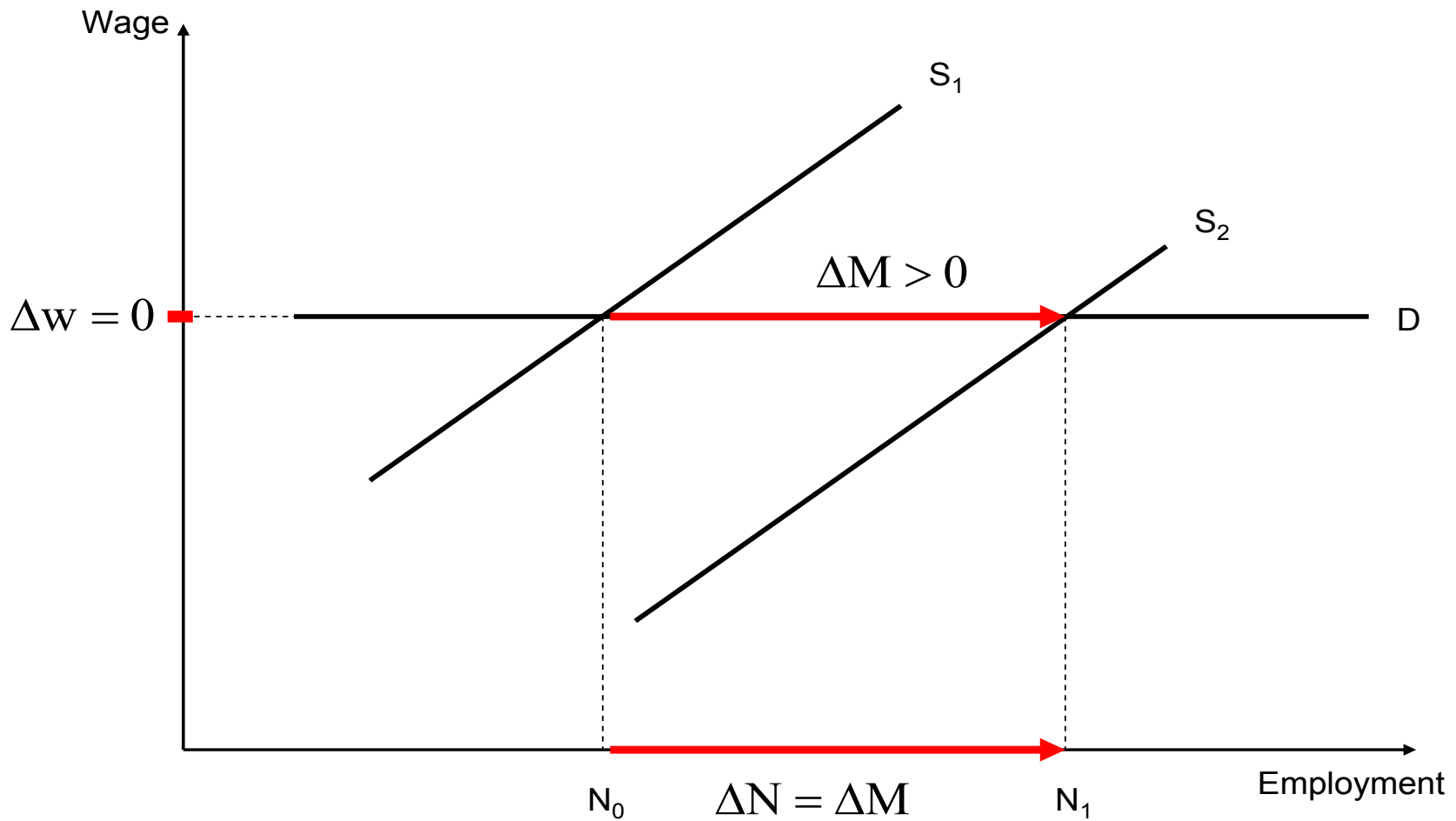
Borjas (QJE, 2003):

"An immigrant influx that increases the supply of workers with particular skills by 10 percent lowers the wage of natives in that group by 3 to 4 percent, ..."

Immigration and the Labor Market - Borjas' Result

$\Delta M > 0$

$\Delta w < 0$

S_1

S_2

w_0

w_1

N_0 $\Delta N < \Delta M$ N_1

Wage

Employment

D
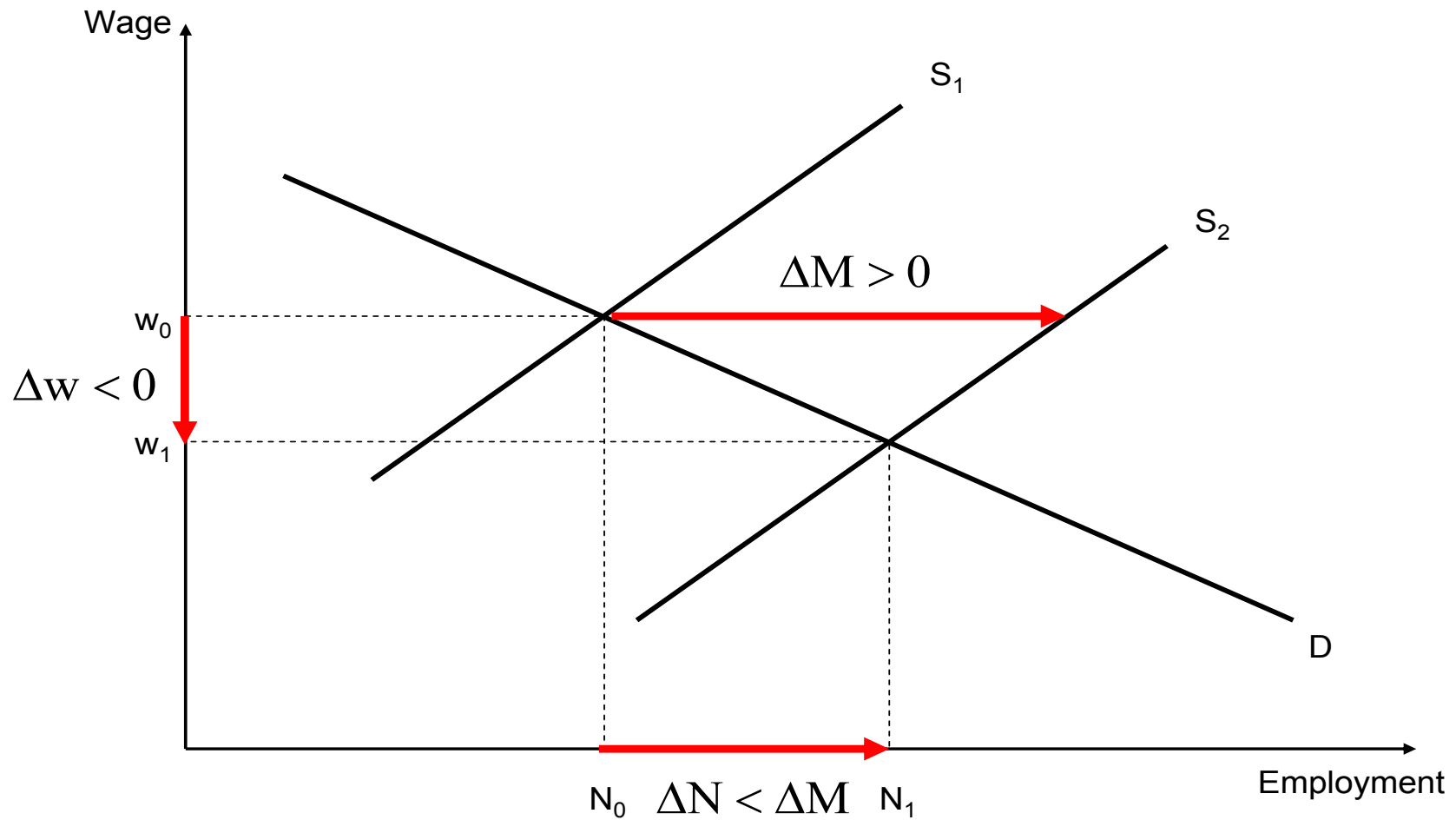
Immigration and the Labor Market - Common Result

Spatial Approach – Card (1990) etc.

Assumptions

Native and migrant workers compete in labor markets

- where immigrants penetrate randomly

- that are geographically closed

$\Rightarrow$ **correlation** between native wage in a locality and number of immigrants in locality is **typically negative but weak**

Disadvantages

- endogenous regional clustering of migrants

- (out-)flows of native factors may reequilibrate labor market
  $\Rightarrow$ immigrant shock does not affect just the locality

Skill Group Approach

Assumptions

Workers with same education but different level of work experience participate

- in a national labor market

- are not perfect substitutes

If immigrants are not evenly balanced across

- schooling groups

- experience groups

- time $\Rightarrow$ identifying variation

Advantage

Size of native workforce in each skill group comparatively fixed

$\Rightarrow$ Native flows do not contaminate results

This Study ...

... replicates the skill group approach proposed by Borjas (2003) using register data for West Germany covering 1975-1997

Findings

- evidence for adverse impact of migrant supply shock on labor market opportunities for natives remains inconclusive

- largest significant estimates indiciate

    - 0.2 elasticity of native wages

    - 0.1 semi-elasticity of native unemployment rate (post-unification effect)

- heterogenous effects along the skill-experience-time dimensions

Net Migration of Foreigners to Germany 1975-1997
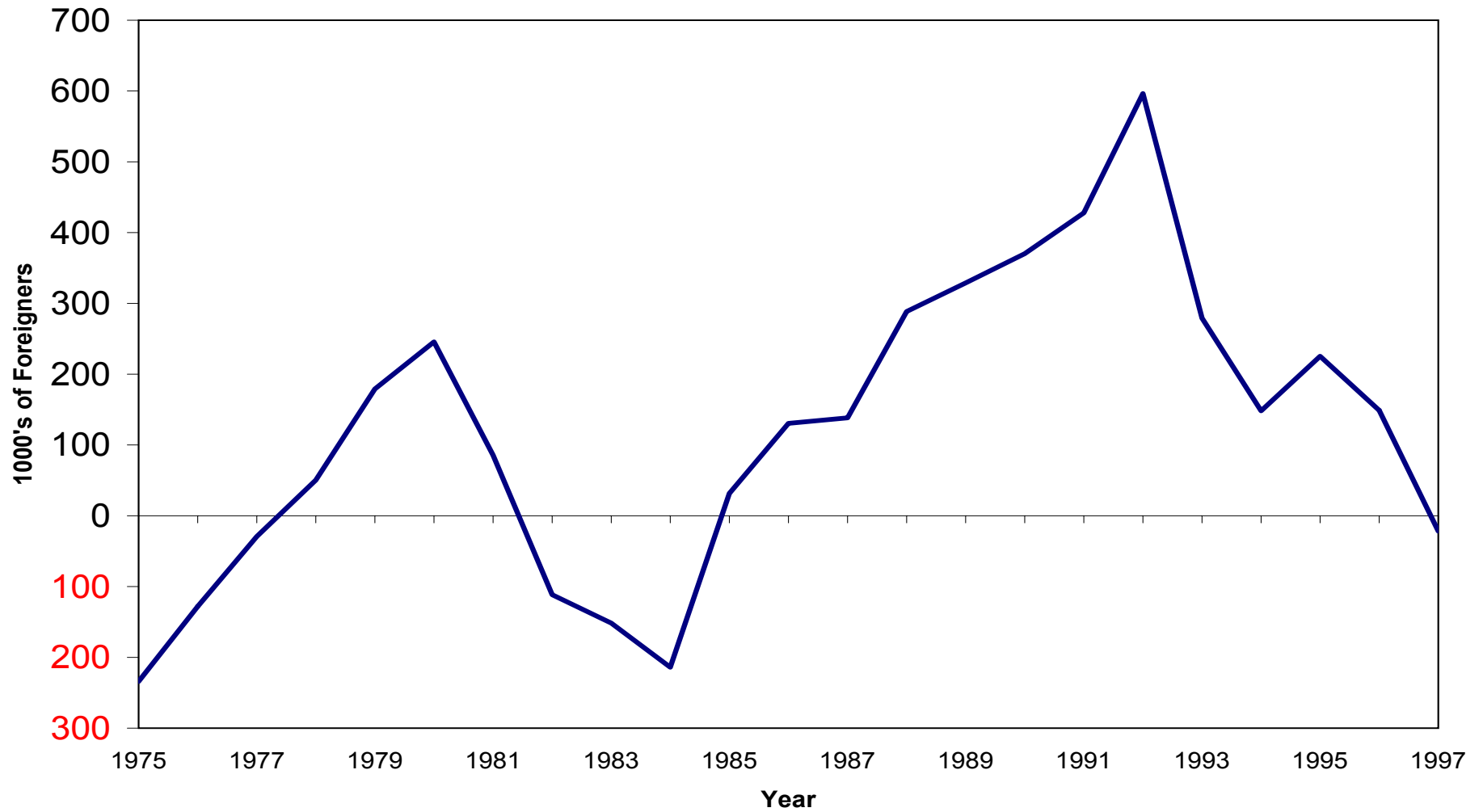
Population Share of Immigrants
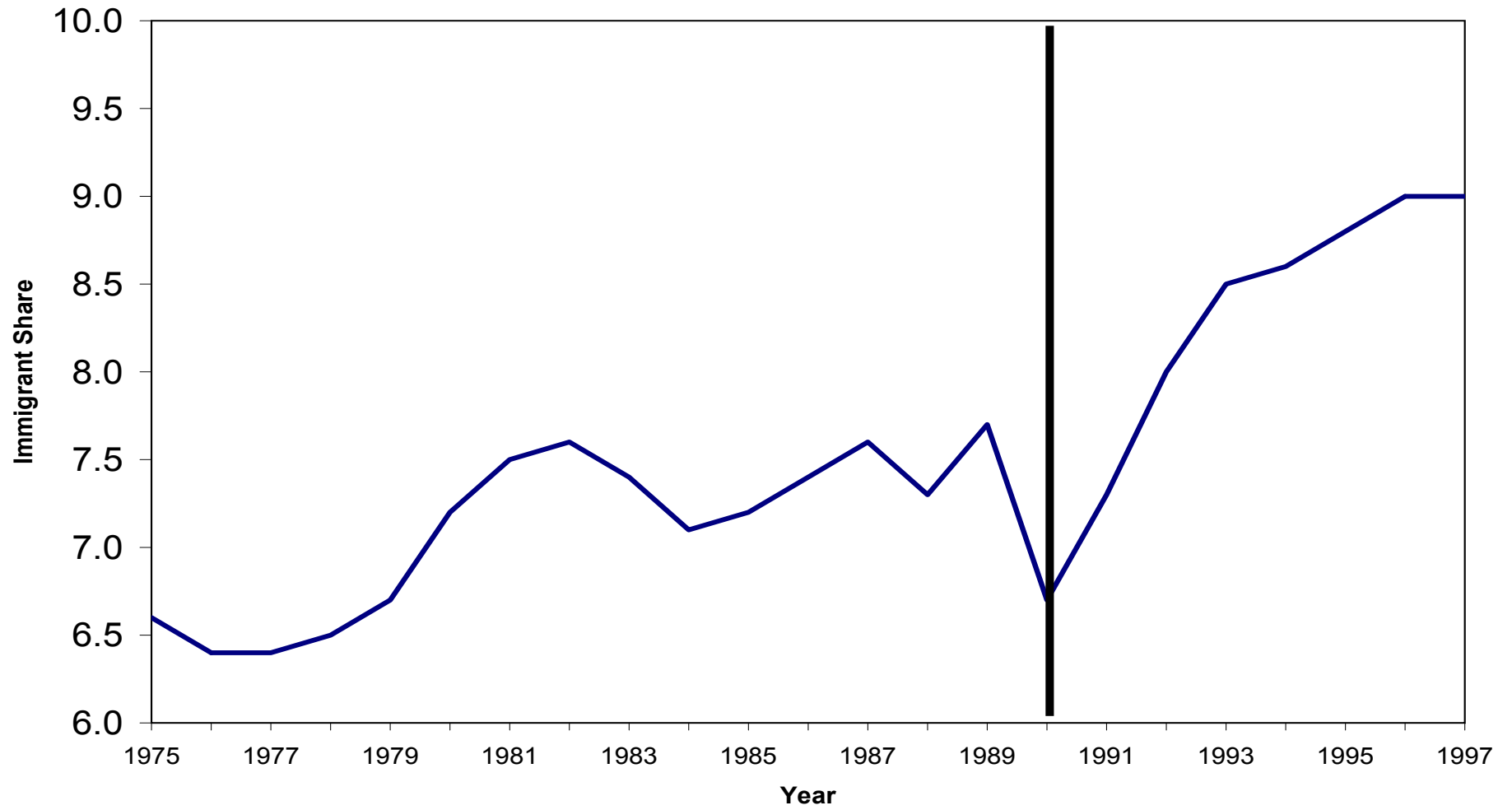
Data

Regional File of IAB-Employment Sample (IABS-R)

- one percent sample of employed or unemployed population drawn social insurance registers

- event history for period 1975-1997

- covers all indviduals insureded at least once during the period

- exludes self-employed and civil servants

- representative for both native and foreign population

- information on gross earnings, employment status, age, completed education

Data Problems

Fundamental issues:

- Migrants identified by nationality, not by entry to Germany

- Participation identified by employment or receiving UI benefits

Less fundamental issues:

- Left-censoring of very low earnings in minor jobs
  ($\Rightarrow$ probably different segment of the labor market)

- Right-censoring of wages ($\Rightarrow$ bias as natives are better skilled?)

- education missing for $\sim 15\%$ of sample, possibily mis-recording, perhaps not at random

- unemployment records suffer from under-recording, but probably at random

Sample and Definitions

Men with at most 35 years of labor market experience:

Educational attainment	Assumed Age at Labor Market Entry	Maximum Age Observed
without apprenticeship training	16	51
with apprenticeship training	19	54
college, vocational school	21	56
university	24	59

Experience groups: 1-5 years, $\cdots$, 31-35 years

Wages: log gross earnings per day, evaluated at Sep 1

Imputed wages: (1) tobit wage regression using age, education, occupation, sector, job type variables

                       (2) Random draws from conditional truncated distribution for censored individuals

Definitions

M_{ijt} — Numer of <u>migrants</u> who are

N_{ijt} — Numer of <u>natives</u> who are

$$
\begin{array}{lll}
\text{in skill group} & i & = & 1, \cdots, 4 \\
\text{in experience group} & j & = & 1, \cdots, 7 \\
\text{observed in year} & t & = & 75, \cdots, 97
\end{array}
$$

N_{ijt}^e — Number of native wage recipients in (i,j,t)-cell

N_{ijt}^u — Number of native benefit recipients in (i,j,t)-cell

$\Rightarrow$ <u>Unemployment rate</u>

$$
\mu_{ijt} = \frac{N_{ijt}^u}{N_{ijt}^u + N_{ijt}^e}
$$

$\Rightarrow$ <u>Migrant supply shock</u>

$$
p_{ijt} = \frac{M_{ijt}}{N_{ijt} + M_{ijt}}
$$

Summary Statistics

|			Period		
	75-79	80-84	85-89	90-97	75-97
log wages	4.87	4.93	5.00	5.09	4.99
	(.291)	(.306)	(.336)	(.330)	(.330)
imputed log wages	4.89	4.95	5.03	5.11	5.01
	(.317)	(.332)	(.373)	(.369)	(.363)
unemployment rate	—	4.2	4.7	4.9	4.6
Average skills					
Migrants	1.416	1.452	1.505	1.562	1.497
Natives	1.874	1.915	1.967	2.041	1.965
Average age					
Migrants	34.8	36.4	38.1	37.3	36.7
Natives	36.3	37.2	37.8	38.4	37.6
Workforce					
Annual growth from Migrants	2.08	-4.18	0.80	1.51	0.54
Annual growth from Natives	3.40	0.72	1.29	-1.32	0.78
N (average per year)	89 500	96 300	99 800	103 800	98 200

p_{ijt} − Migrant Share in Workforce
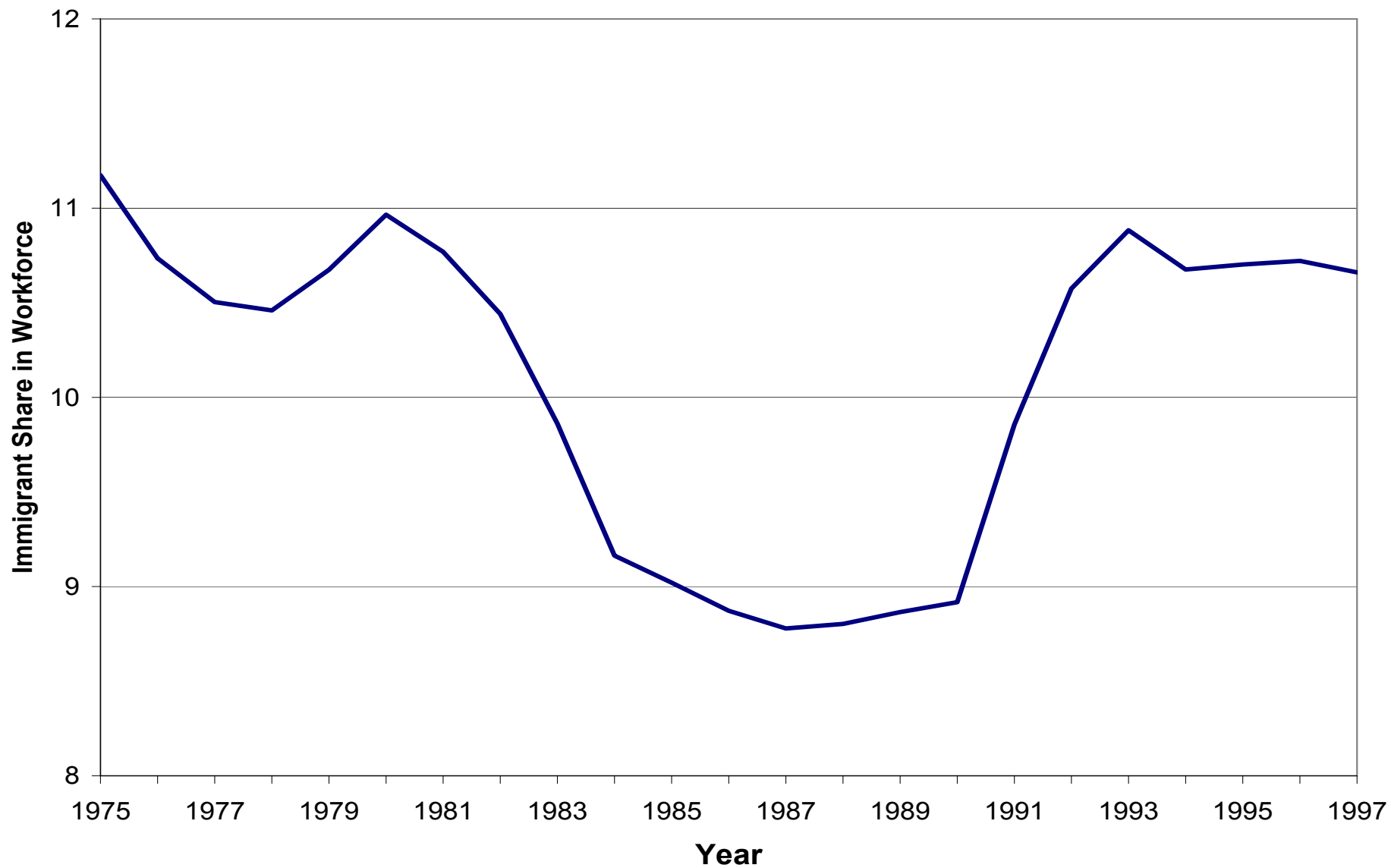
Immigrant Supply Shocks

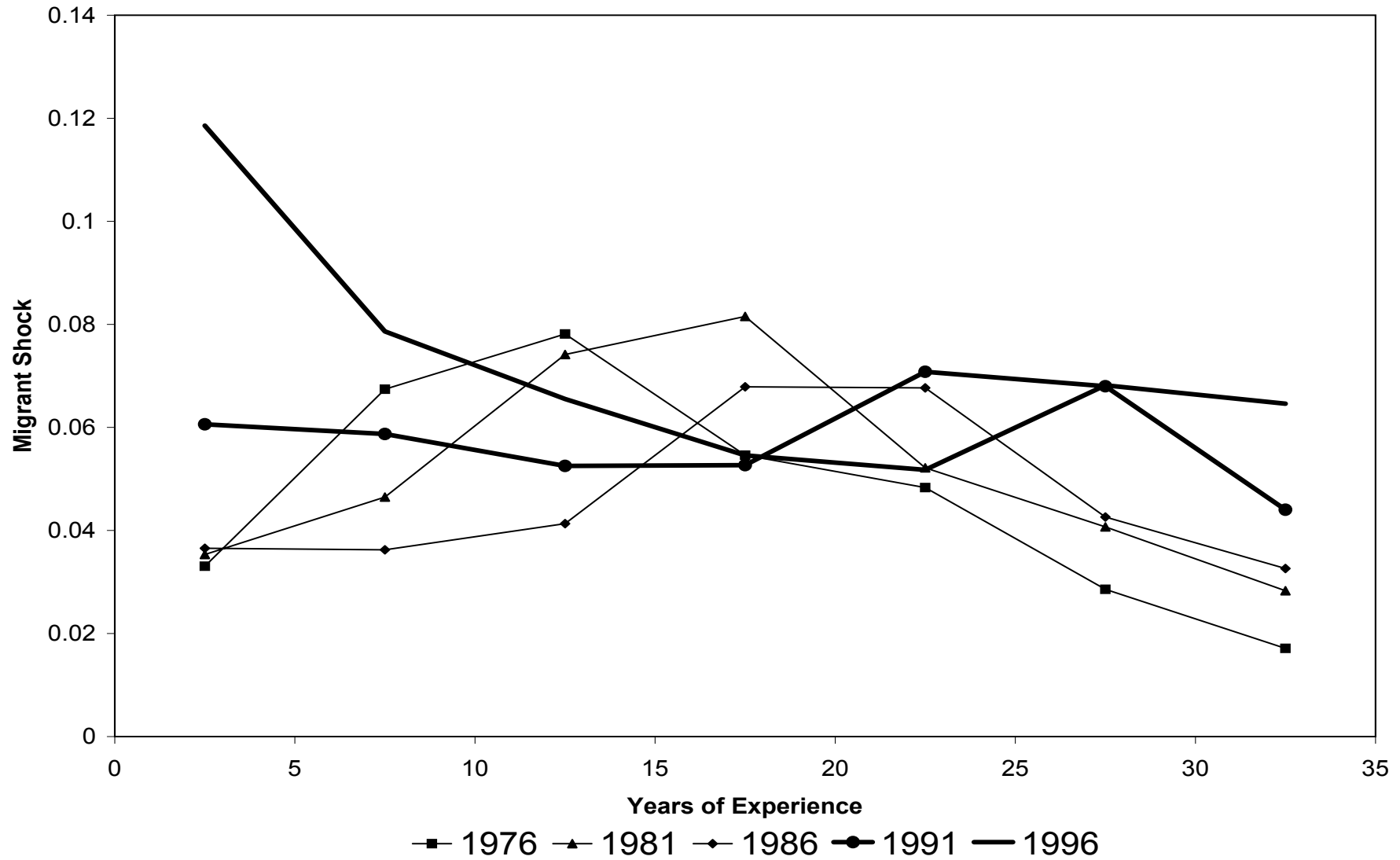## Without Apprenticeship Training
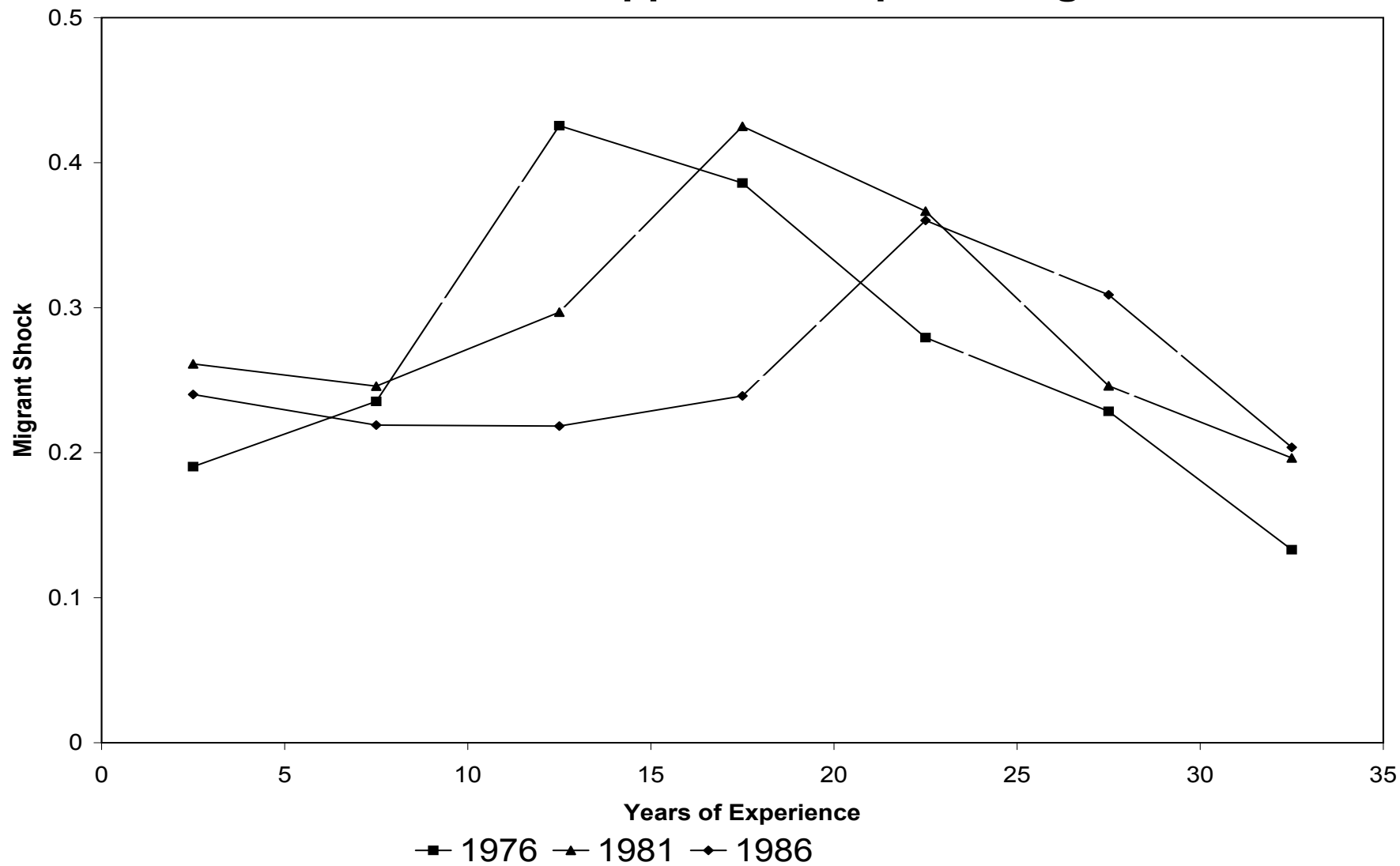
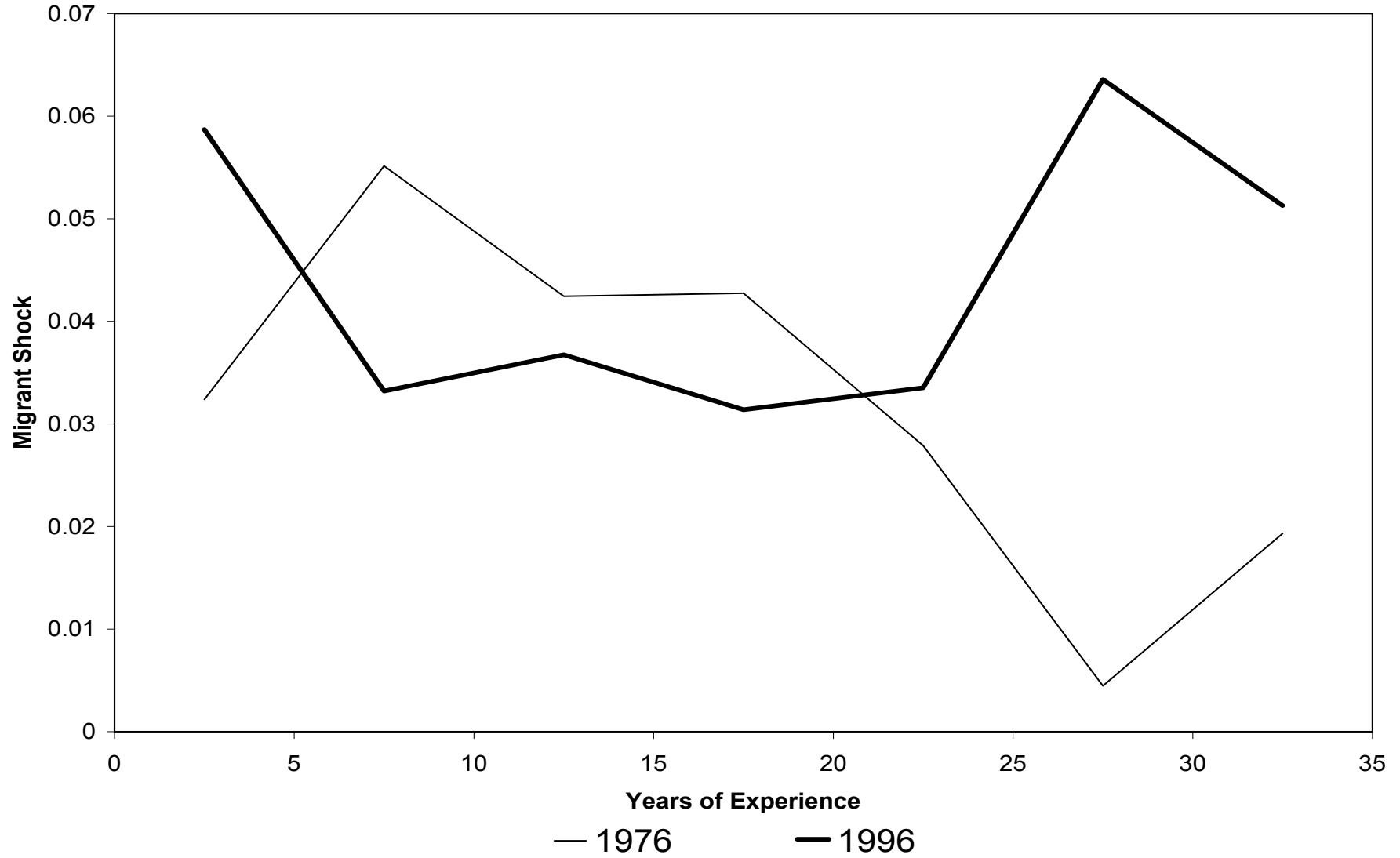# Immigrant Supply Shocks

Without Apprenticeship Training
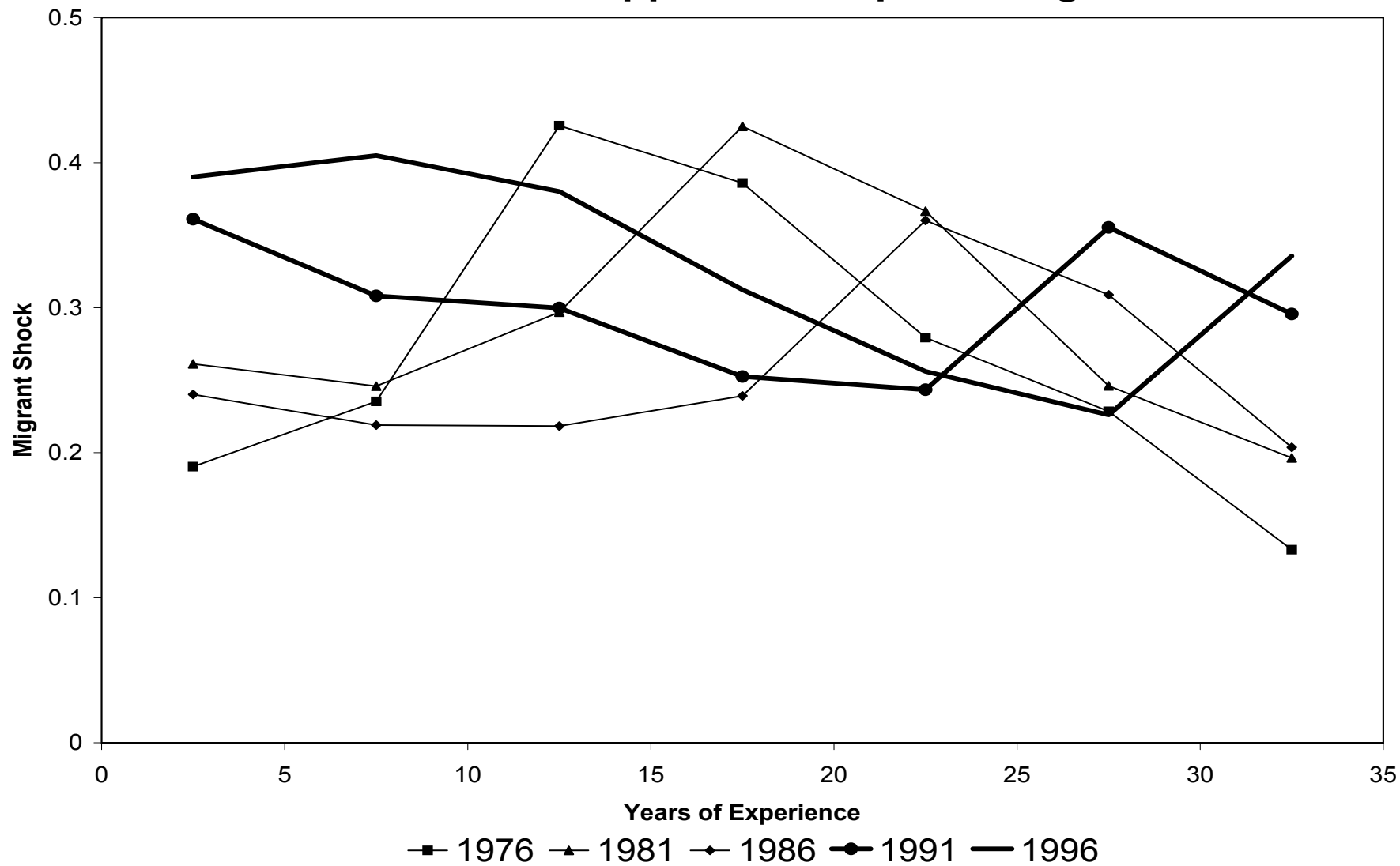
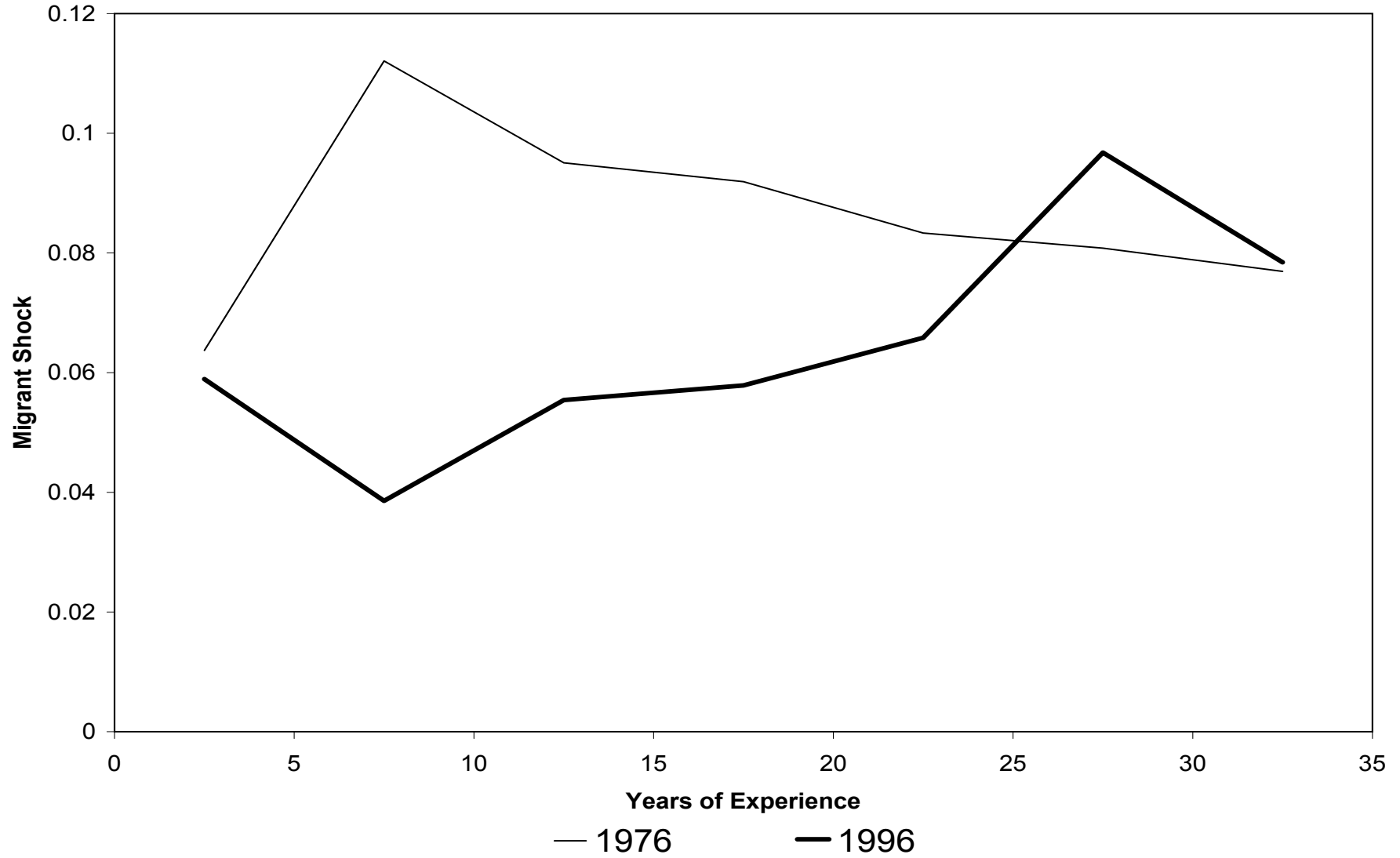# Immigrant Supply Shocks

With Apprenticeship Training

Immigrant Supply Shocks

Vocational College

Immigrant Supply Shocks

University

Earnings Profiles by Skill Group

Without Apprenticeship Training

With Apprenticeship Training

Vocational College

University
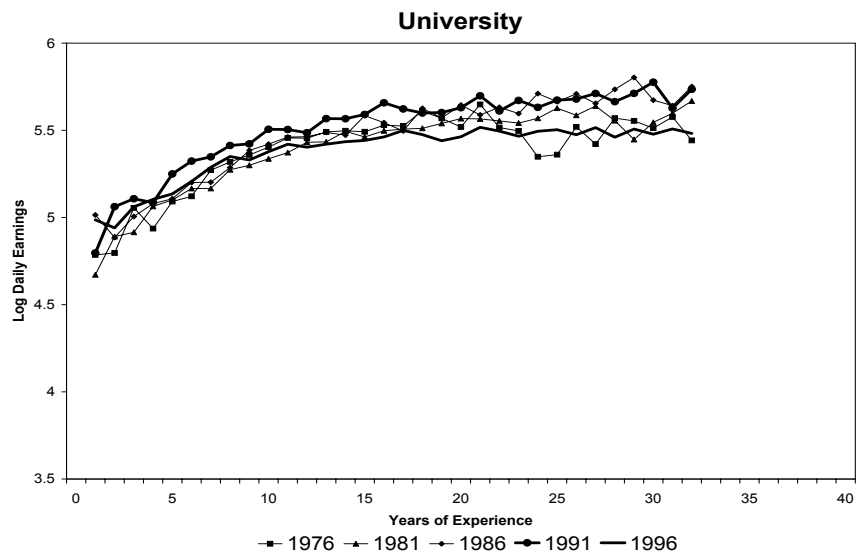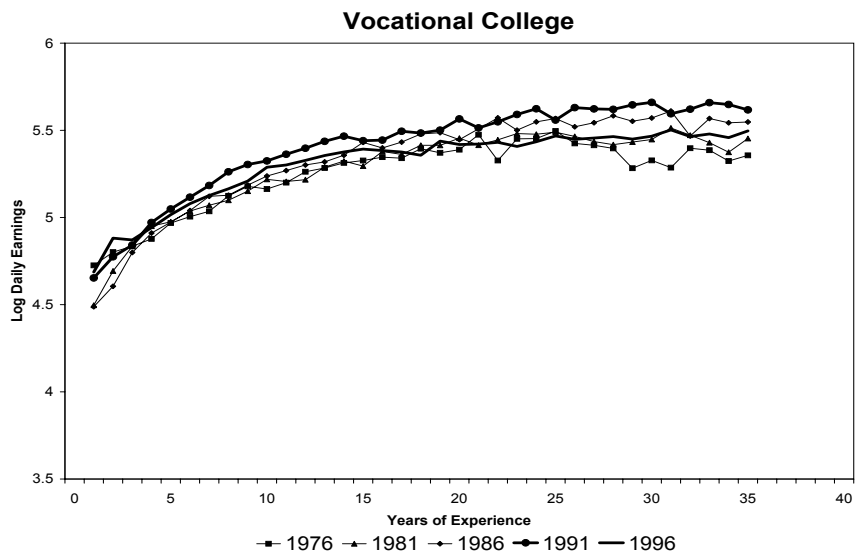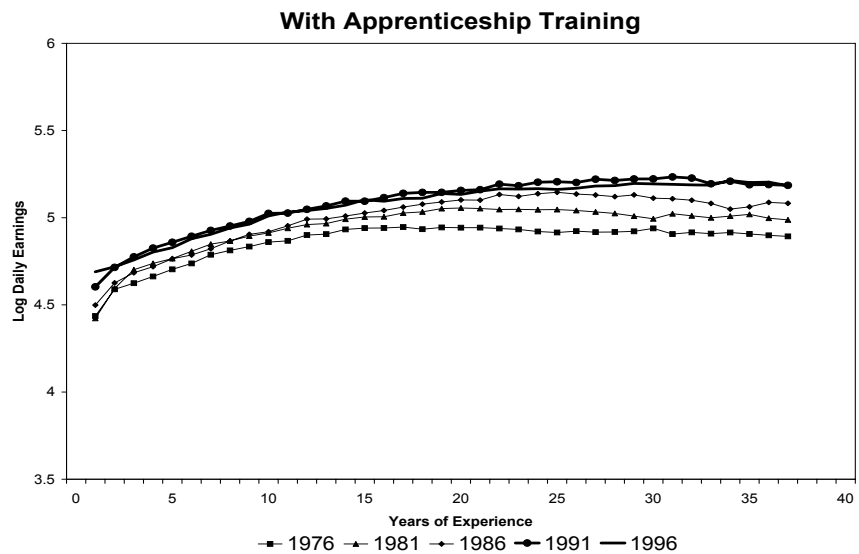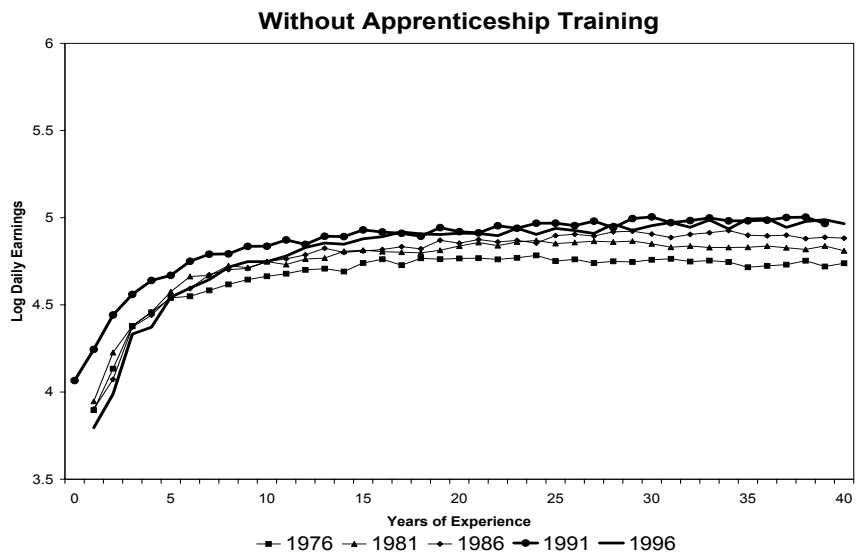
Wages and Immigrant Labor Supply
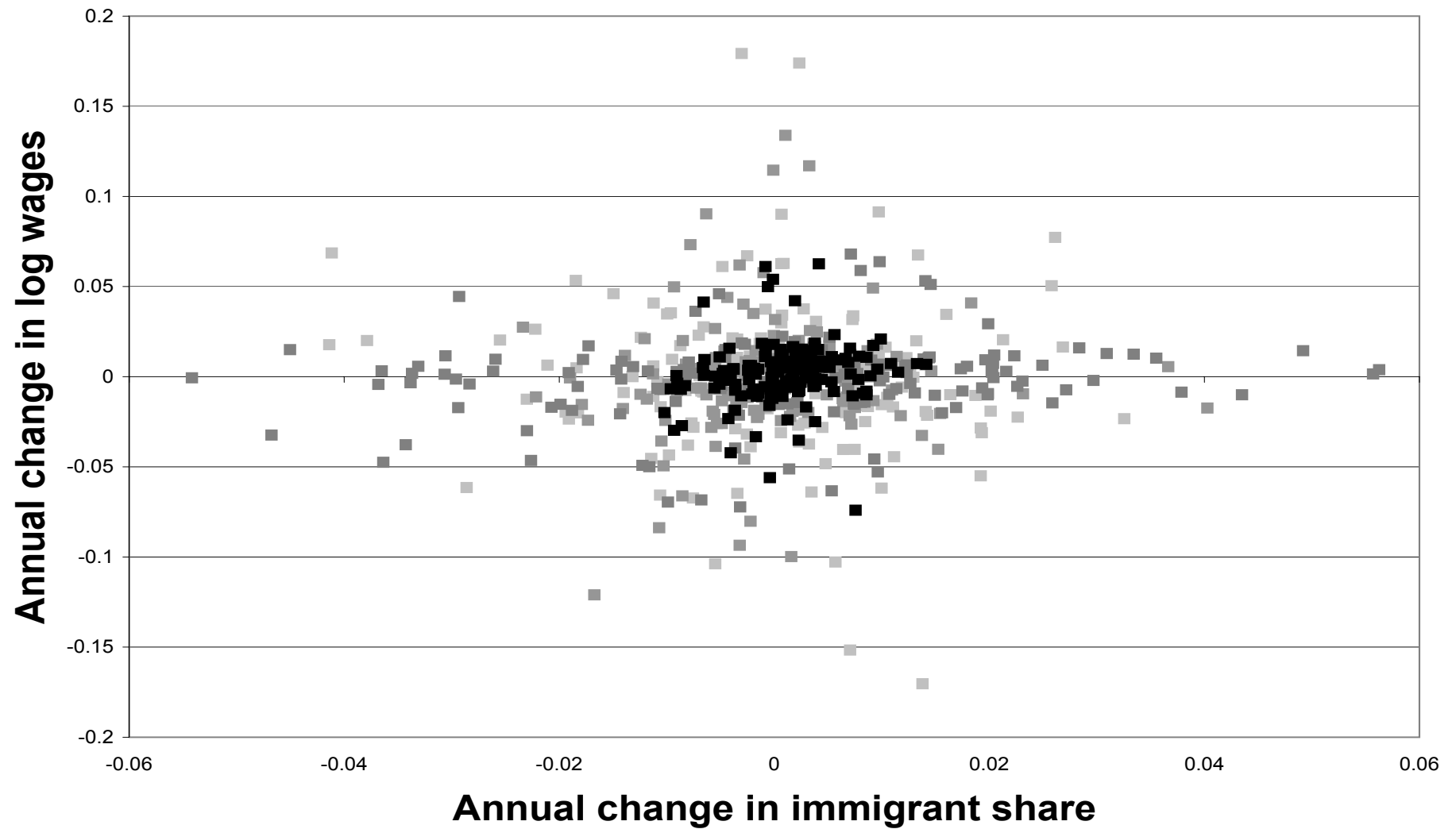
Notes: Wage change data have been adjusted to remove year effects.

Wages and Immigrant Labor Supply
Education-Experience Cells with Large Population
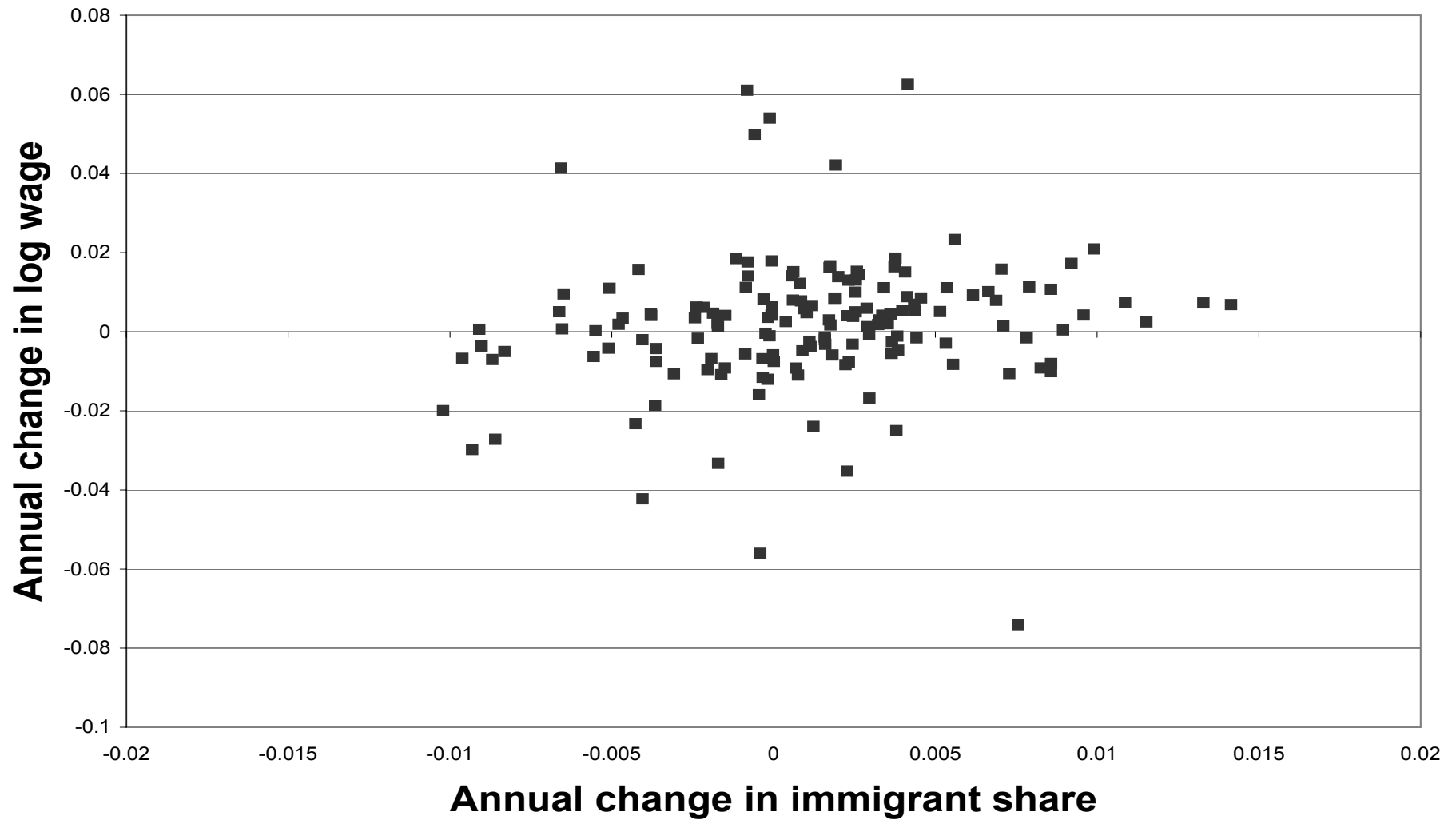
Unemployment Rates and Immigrant Labor Supply
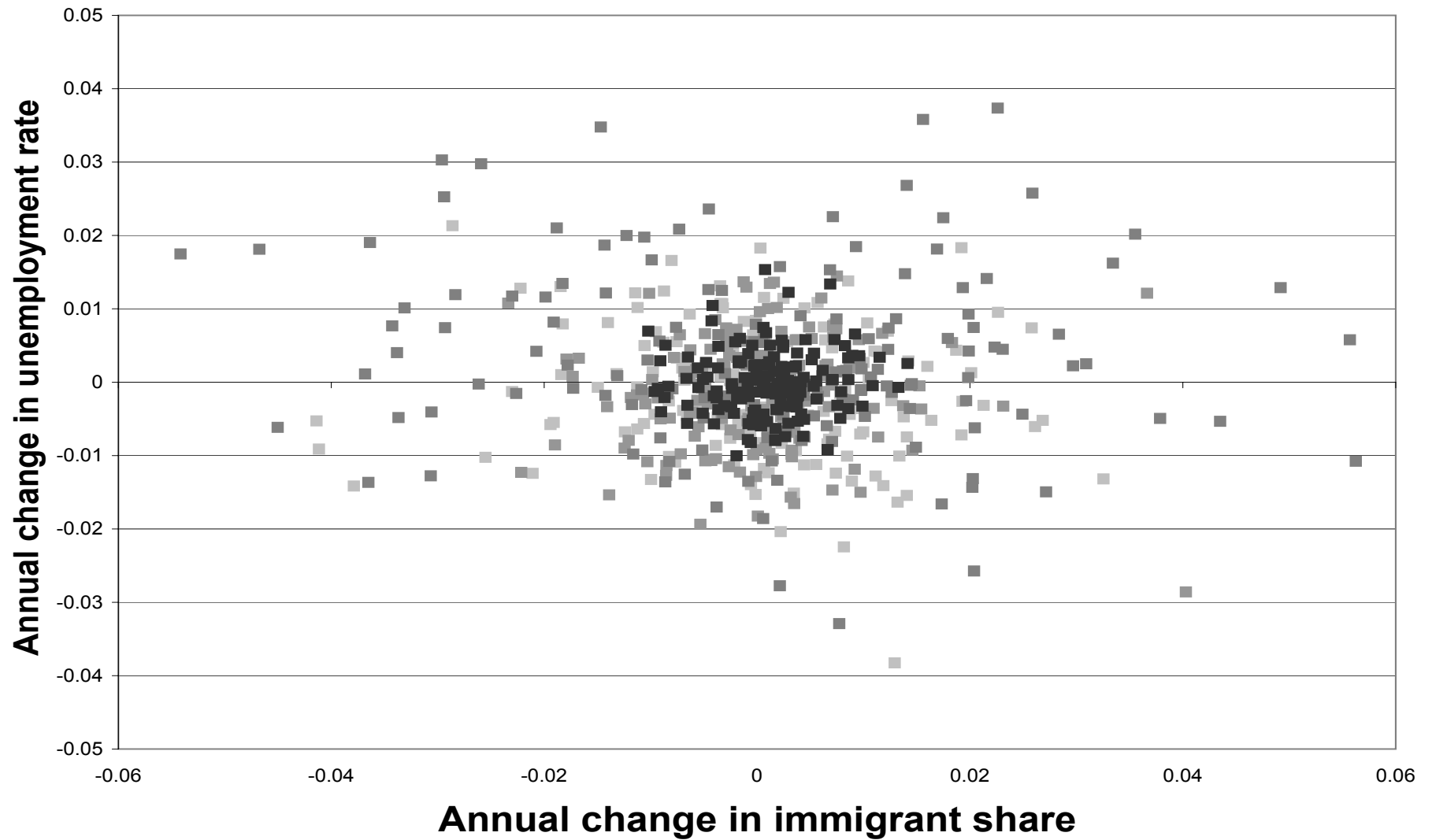
Notes: Unemployment change data have been adjusted to remove year effects.

Unemployment Rates and Immigrant Labor Supply Education-Experience Cells with Large Population
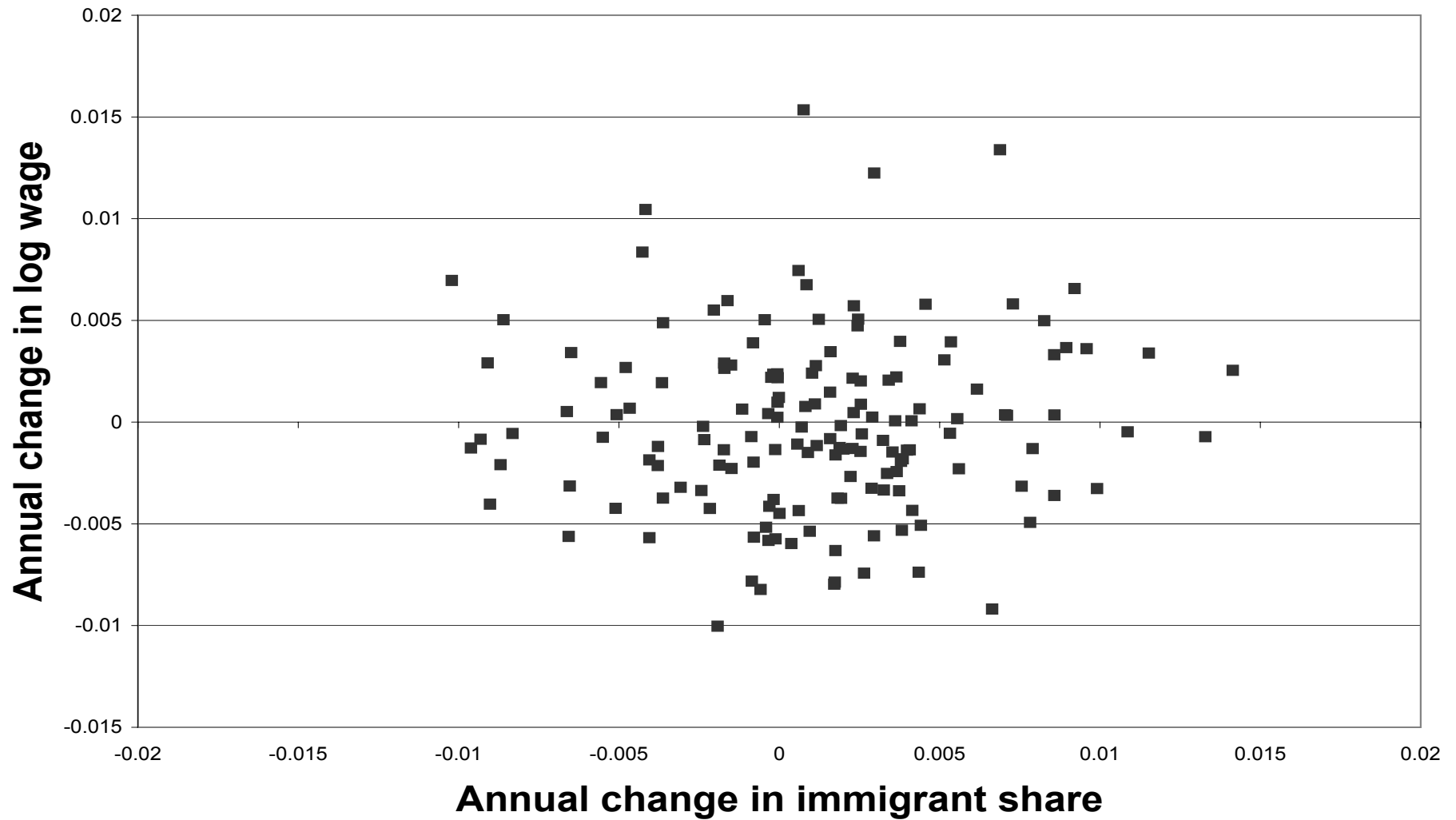
Estimation

Empirical Model:

$$y_{ijt} = \alpha p_{ijt} + s_i + x_j + \pi_t + (s_i \times x_j) + (s_i \times \pi_t) + (x_j \times \pi_t) + \varepsilon_{ijt}$$

y_{ijt} −   labor market outcome of <u>native</u> men who are in (i,j,t)-cell

<u>Fixed Effects:</u>

s_i −   education

x_i −   experience

π_i −   year

$(s_i \times x_j)$ ⇒   Impact of immigration on labor market outcomes identified by changes within education-experience cells over time

<u>OLS-Estimation:</u>   • weighted by sample size used to calculate y_{ijt}

            • clustered by $(s_i \times x_j)$-cells to adjust for serial correlation

Estimates of Immigrant Shock Adjustment Elasticities

	Dependent Variable		
Specification	Log earnings	Imputed log earnings	Unemploy- ment rate
Basic estimates	-.023 (.032)	-.105** (.036)	-.001 (.025)
Unweighted regression	.049 (.047)	-.135** (.050)	.018 (.019)
Employed workers as alternative weights	-.023 (.034)	-.107** (.041)	-.001 (.025)
Log native labor force as regressor	.040 (.047)	-.033 (.079)	-.073** (.026)

Notes: Standard errors are reported in parantheses and have been adjusted for clustering within skill-experience-cells. If not noted otherwise, regressions are weighted by size of the skill-experience-year cells . The regressions on wages have 664 observations, and the regression on umployment has 504 observations.

Estimates of Immigrant Shock Adjustment Elasticities
One-year experience groups

Specification	Log earnings	Imputed log earnings	Unemploy-ment rate
		Dependent Variable	
Basic estimates	-.044*** (.011)	-.104*** (.013)	.005 (.009)
Unweighted regression	-.006 (.021)	-.111*** (.030)	.039*** (.014)
Employed workers as alternative weights	-.043*** (.011)	-.106*** (.014)	.004 (.014)
Log native labor force as regressor	.034 (.188)	-.017 (.025)	-.042*** (.015)

Notes: Standard errors are reported in parantheses and have been adjusted for clustering within skill-experience-cells. If not noted otherwise, regressions are weighted by size of the skill-experience-year cells. The regressions on wages have 3312 observations, and the regression on umployment has 2592 observations.

Interpretation

$$p_{ijt} = \frac{M_{ijt}}{N_{ijt} + M_{ijt}} = \frac{m_{ijt}}{1 + m_{ijt}} \quad \text{with} \quad m_{ijt} = \frac{M_{ijt}}{N_{ijt}}$$

$\Rightarrow$ Wage Elasticity:

$$\frac{\partial \ln w_{ijt}}{\partial m_{ijt}} = \frac{\alpha}{\left(1 + m_{ijt}\right)^2}$$

Period 1975-1997

Δm : -.65 percent

$\frac{\partial \ln w_{ijt}}{\partial m_{ijt}}$: $-.105 * .987 = -.102$

$\Rightarrow$ A 10 percent negative supply shock from emigration raises natives' earnings by 1 percent

Basic Specification Estimates by Period

Period	Dependent Variable		
	Log earnings	Imputed log earnings	Unemploy- ment rate
1975-1979	-.184 (.166)	-.219 (.155)	—
1980-1984	-.028 (.067)	-.077 (.084)	-.148 (.100)
1985-1989	-.164*** (.050)	-.238*** (.052)	-.016 (.057)
1990-1997	.046 (.102)	-.084 (.091)	.139** (.061)
1975-1997	-.023 (.032)	-.105** (.036)	-.001 (.025)

(Significant) Period Elasticities

Period 1985-1989

$$\Delta m : \quad -.19 \text{ percent}$$

$$\frac{\partial \ln w_{ijt}}{\partial m_{ijt}} : \quad -.238 * .956 = -.237$$

A 10 percent negative supply shock from emigration raises natives' earnings by ~ 2.4 percent

Period 1990-1997

$$\Delta m : \quad 2.14 \text{ percent}$$

$$\frac{\partial \ln \mu_{ijt}}{\partial m_{ijt}} : \quad .139 * 1.043 = .145$$

A 10 percent positive supply shock from immigration raises natives' unemployment rate by ~ 1.5 percentage points

Basic Specification Estimates by Experience

	Years of Experience					
	Imputed Log Earnings			Unemployment Rate		
Period	1–10	11–25	26–35	1–10	11–25	26–35
1975-1979	-.349 (.737)	-.174*** (.021)	-.471*** (.092)	—	—	—
1980-1984	.150 (.152)	-.086 (.059)	-1.131*** (.279)	-.790*** (.040)	-.009 (.091)	.598** (.205)
1985-1989	-.102 (.228)	-.116 (.084)	.109 (.157)	-.269*** (.040)	-.109 (.055)	-.045 (.056)
1990-1997	1.224*** (.215)	-.015 (.152)	-.168*** (.029)	.272*** (.035)	.125 (.085)	.063*** (.011)
1975-1997	.165 (.206)	-.104*** (.024)	-.124*** (.017)	-.170* (.072)	-.047 (.031)	.097*** (.015)

Estimates by Education Group

	Imputed log earnings		Unemployment rate	
	Low Education	High Education	Low Education	High Education
1975-1979	-.213 (.199)	-.681 (.491)	—	—
1980-1984	-.087 (.271)	-.165 (.171)	-.174 (.142)	.296** (.122)
1985-1989	-.249*** (.071)	.043 (.374)	-.021 (.077)	.063 (.130)
1990-1997	-.065 (.119)	.283 (.268)	.115 (.077)	-.163 (.113)
1975-1997	-.076 (.051)	.009 (.141)	-.012 (.032)	.033 (.077)

Notes: Low edcuation   —   with and without apprenticeship training
          High education   —   vocational college and university

Estimates by Earnings Quantiles

Period	Quantile of imputed log earnings				
	10	25	50	75	90
1975-1979	-.266	-.177	-.215*	-.311**	-.031
	(.233)	(.162)	(.121)	(.131)	(.149)
1980-1984	-.040	.069	-.039	-.248	-.264
	(.146)	(.084)	(.102)	(.179)	(.272)
1985-1989	-.216	-.074	-.323***	-.333***	-.310***
	(.130)	(.070)	(.035)	(.108)	(.102)
1990-1997	-.102	-.002	-.127	-.109	-.250**
	(.173)	(.148)	(.123)	(.086)	(.096)
1975-1997	-.130***	-.065**	-.129**	-.172**	-.109
	(.036)	(.028)	(.047)	(.080)	(.080)

Alternative Skill Measures

	Quantiles of Wage Distribution	Employment Position Exp. −35 years	Exp. 11−35 years
1975-1979	.650*** (.210)	.109 (.324)	.345 (.206)
1980-1984	.597** (.295)	.143 (.549)	.124 (.571)
1985-1989	-.176 (.495)	.358 (.451)	.275 (.525)
1990-1997	.158 (.272)	-.149 (.202)	-.141 (.189)
1975-1997	.284 (.202)	.201 (.110)	.032 (.089)

Notes: Employment position distinguishes blue-collar workers, qualified blue-collar workers, and white-collar workers.

The Impact of Migrants on Migrants

		Dependent Variable	
Specification	Log earnings	Imputed log earnings	Unemploy- ment rate
Basic estimates	.052 (.050)	.021 (.060)	-.016 (.037)
Unweighted regression	.094 (.075)	.027 (.097)	.020 (.049)
Employed workers as alternative weights	.057 (.051)	.026 (.061)	-.016 (.038)
Log native labor force as regressor	.130** (.059)	.105 (.070)	-.067 (.047)

Conclusions

- weak evidence for adverse impact of migrant supply shock on labor market opportunities for natives

- largest significant effects $\Rightarrow$ A 10 percent increase of immigrant share in workforce generates
  - 2 percent decline in native wages
  - 1 percentage point increase of native unemployment rate (effect of large post-unification immigration shock?)

- along the skill-time dimension effects mostly insignificant

- stronger evidence for differential effects along the experience (or age) dimension

- no distinct distributional effects

$$\Rightarrow \text{Is the labor demand curve } \textit{really} \text{ downward sloping?}$$

Next Steps

Re-do the analysis using Microcensus data

- longer time series
  $\Rightarrow$ covers first wave of *guestworkers*

- identification of year of arrival
  $\Rightarrow$ estimation of effective years of experience

- distinction between population and workforce
  $\Rightarrow$ may solve endogeneity problem due to participation decisions

Problem with German Microcensus:

Earnings only recorded as categorized variable