Economic Assimilation of Foreign-Born Workers in the United States: An Overlapping Rotating Panel Analysis

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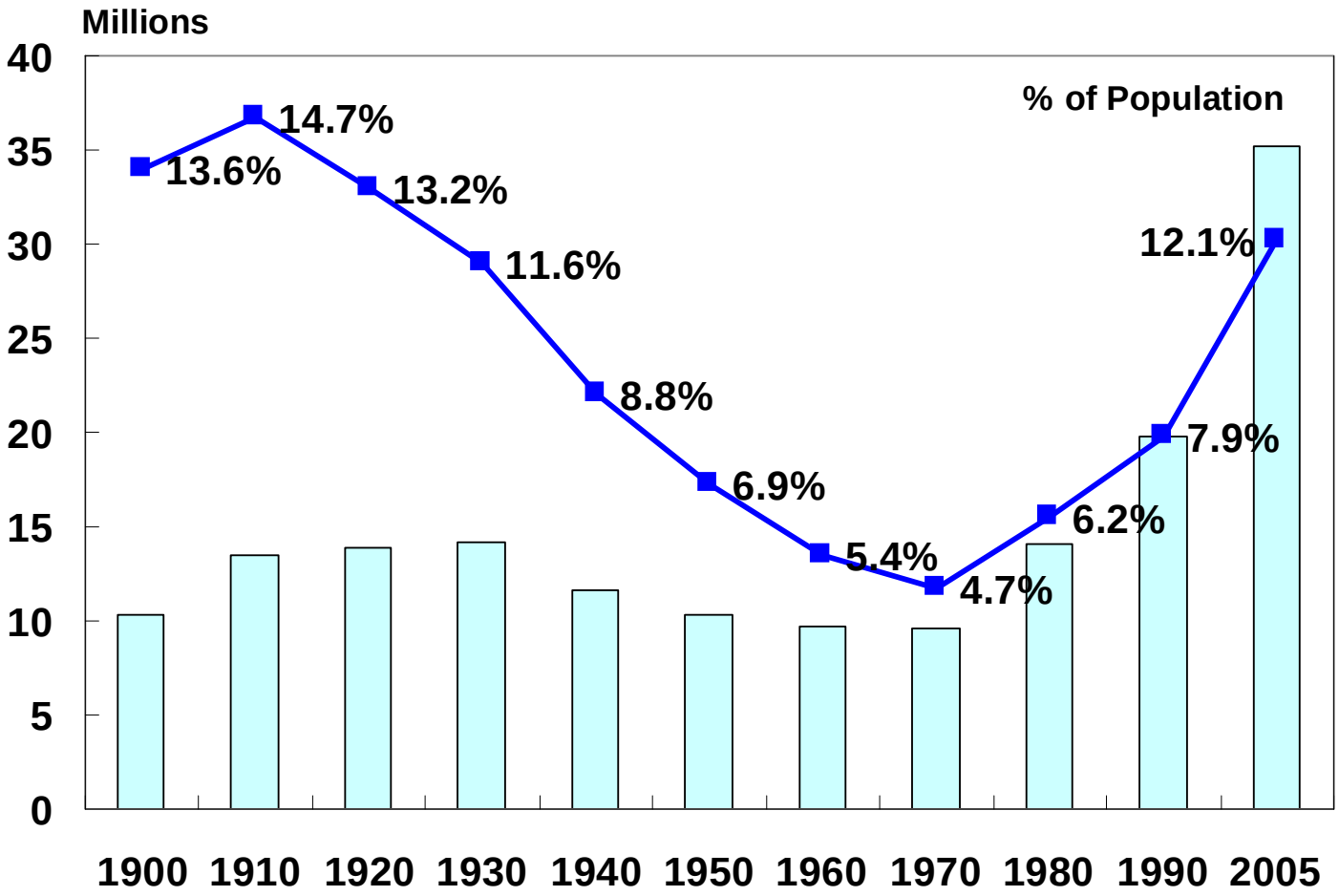
Foreign-Born Population in the United States



Source: Center for Immigration Studies (CIS)

Decennial Censuses for 1900-1990 and CIS Analysis of March 2005 CPS.

Main Question

Do the wages of foreign-born workers

approach those of native-born workers

as foreign-born workers stay longer in the United States?

Empirical Specification

Cohort Heterogeneity (CH) Model using Repeated Cross Section

- A Native-Born Worker:

$$\log wage_{it} = \alpha_{nat} age_{it} + \beta_{nat} edu_i + \gamma_{nat,t} + \varepsilon_{it}$$

- A Foreign-Born Worker:

$$\begin{aligned} \log wage_{it} \quad = \quad & (\alpha_{nat} + \alpha)\, age_{it} + \delta years\text{-}since\text{-}migration_{it} \\ & + (\beta_{nat} + \beta)\, edu_i + \gamma_{imm,t} \\ & + \mu_c + \lambda country\text{-}of\text{-}origin_i + \varepsilon_{it} \end{aligned}$$

Empirical Specification

Individual Heterogeneity (IH) Model using Longitudinal Data

- A Native-Born Worker:

$$\log wage_{it} = \alpha_{nat} age_{it} + \beta_{nat} edu_i + \gamma_{nat,t} + \mu_i + \varepsilon_{it}$$

- A Foreign-Born Worker:

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Measure of Economic Assimilation

- Foreign-Native Gap in Wage Growth (Borjas, 1995)

$$EA\left(age, ysm\right) = \left.\frac{d}{dt}\log wage_{imm}\right|_{(age,ysm)} - \left.\frac{d}{dt}\log wage_{nat}\right|_{(age)}$$

Measure of Economic Assimilation

- Foreign-Native Gap in Wage Growth (Borjas, 1995)

$$EA\left(age, ysm\right) = \left.\frac{d}{dt}\log wage_{imm}\right|_{(age,ysm)} - \left.\frac{d}{dt}\log wage_{nat}\right|_{(age)}$$

- $EA\left(age, ysm\right) = \alpha + \delta$ under some identification conditions

Do Foreign-Born Workers Assimilate?

	Control for Entry Year Heterogeneity	Control for Individual Heterogeneity
1960-1990	$\alpha + \delta > 0$ (Cross-Section Studies)	
1994-2004		

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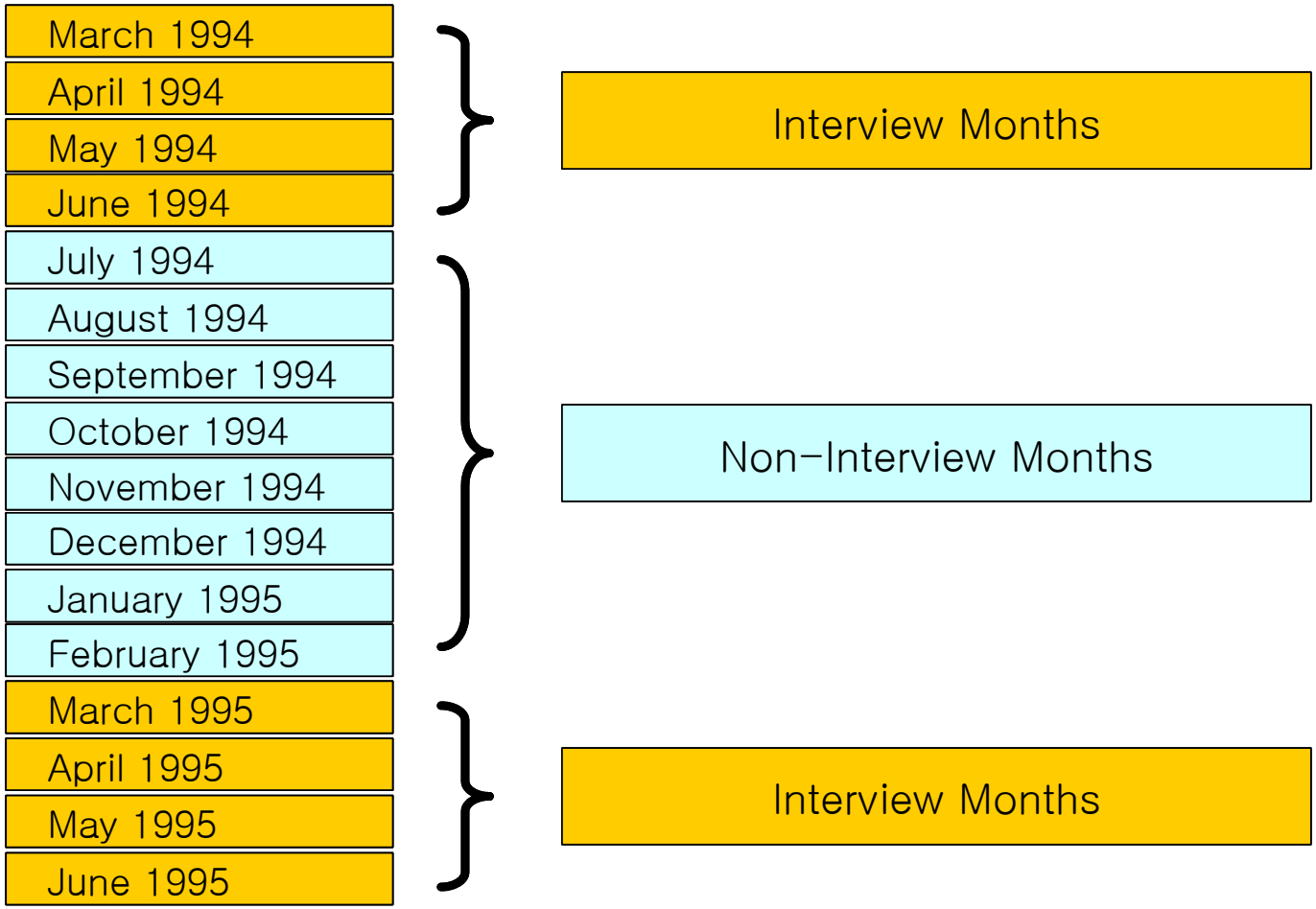
	Control for Entry Year Heterogeneity	Control for Individual Heterogeneity
1960-1990	$\alpha + \delta > 0$ (Cross-Section Studies)	
1994-2004	$\alpha + \delta > 0$ (This Paper)	$\alpha + \delta < 0$ (This Paper)

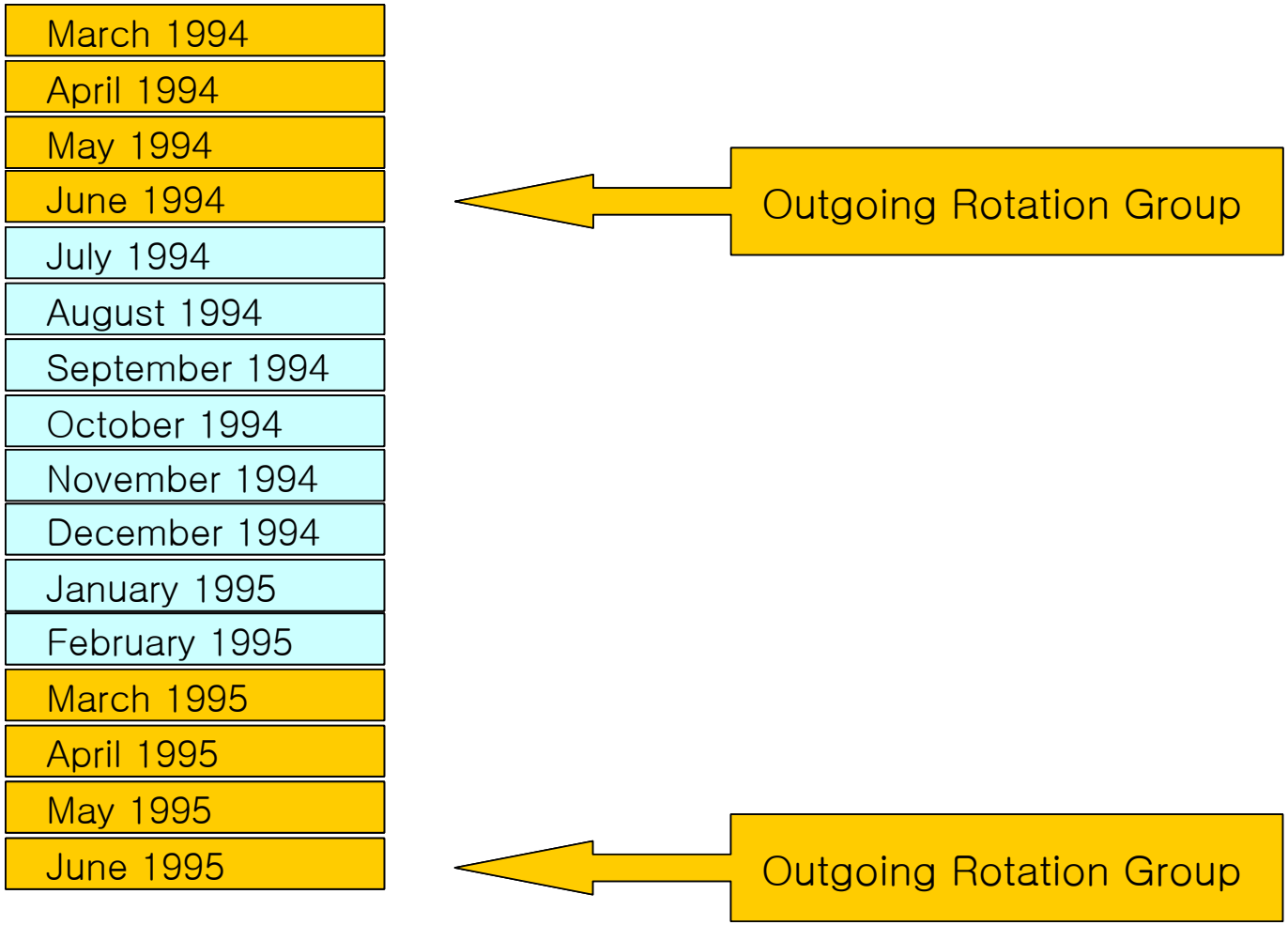
Road Map

1. Measure of Economic Assimilation
2. Data Structure: Current Population Survey (CPS)
3. Summary Statistics
4. Correcting for Sample Attrition & Outmigration
5. Evidence on Wage Convergence

Current Population Survey



CPS Merged Outgoing Rotation Group



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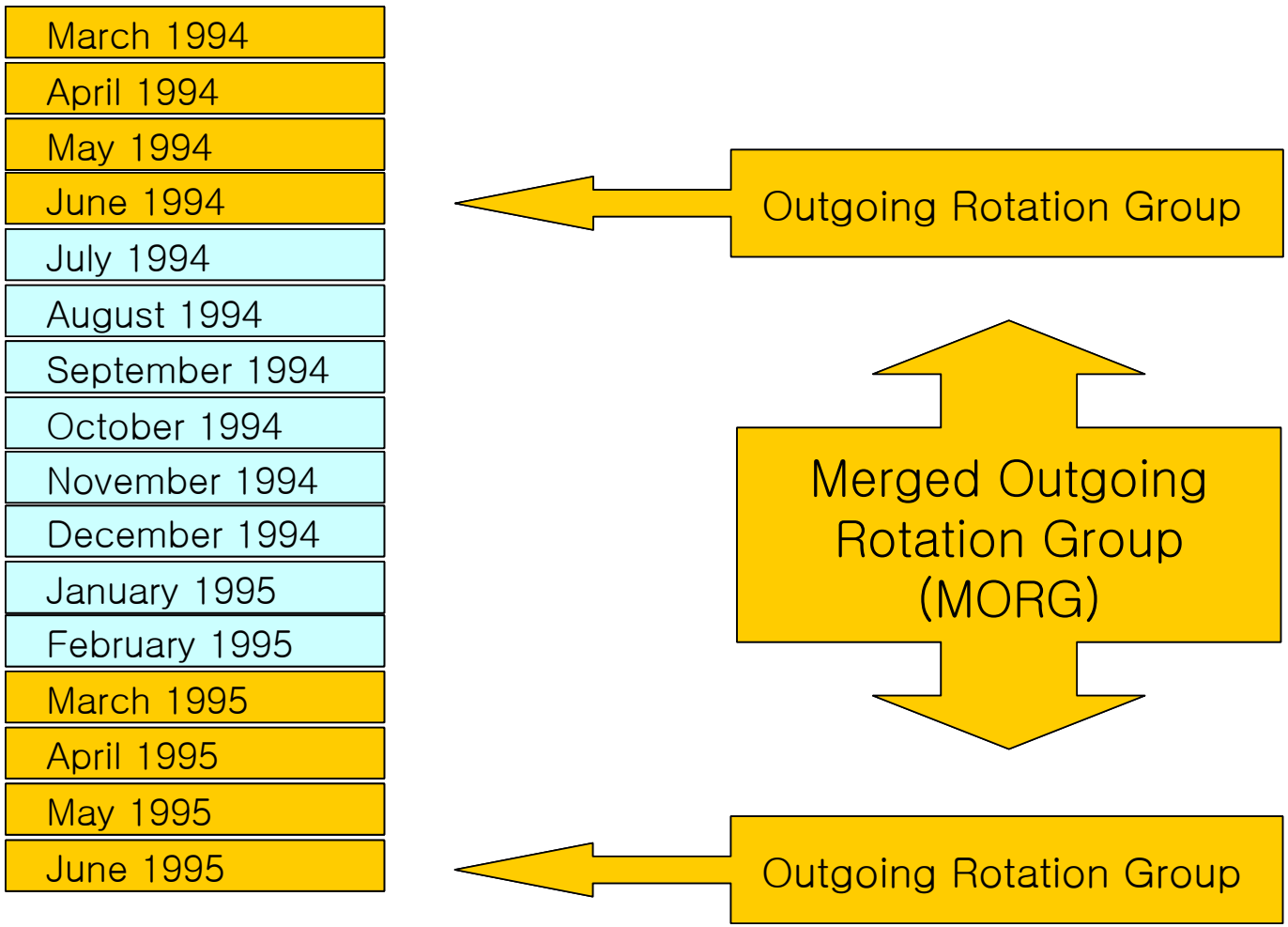
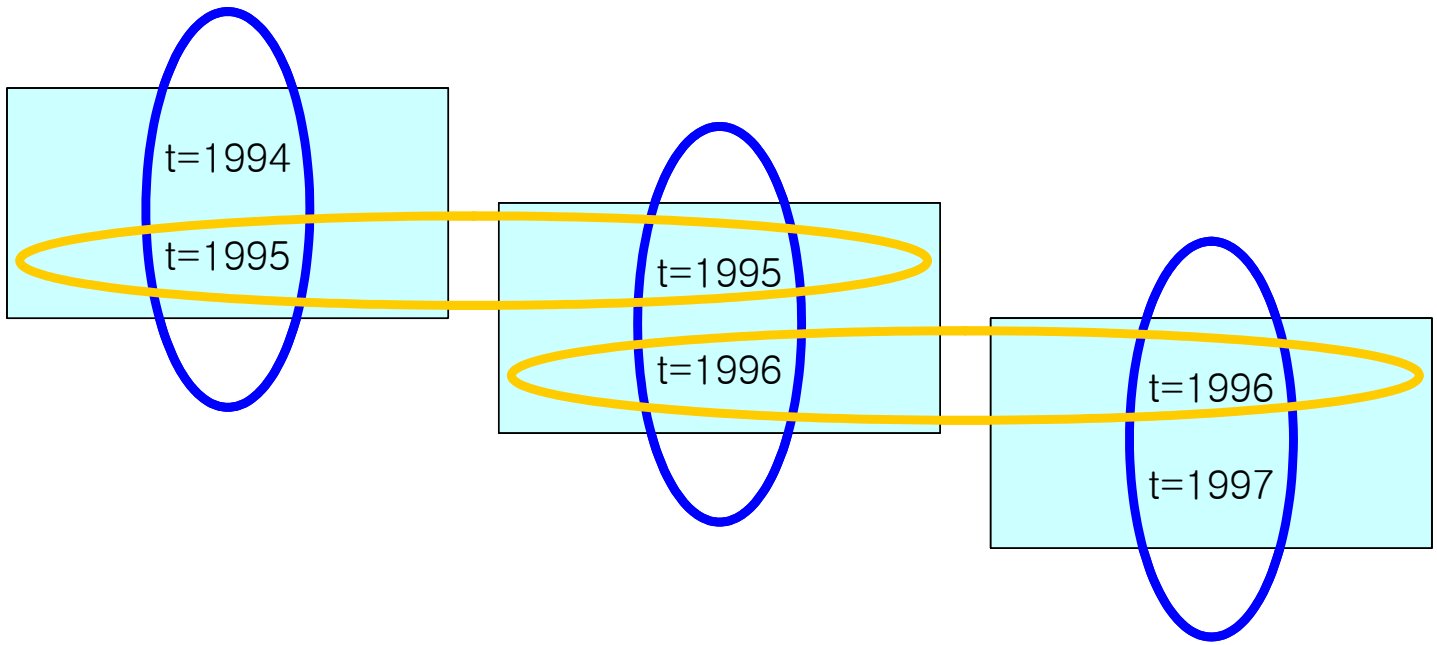


Matched Current Population Survey

- Longitudinal Feature
- Cross-Sectional Feature



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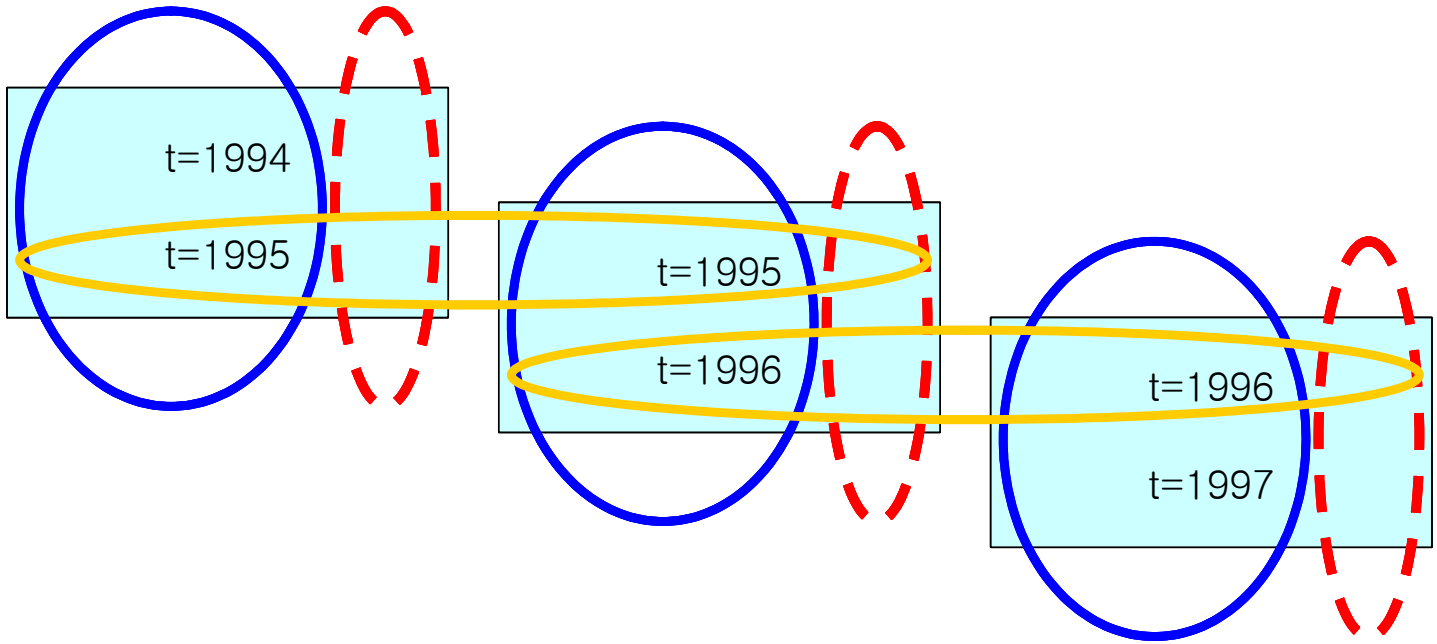

Table 1. Summary Statistics (Persons with Reported Wages)
Native-Born and Foreign-Born Men of age 18-64 (Mean & SD)

	Cross-Section Sample		Matched Sample	
	Native-Born	Foreign-Born	Native-Born	Foreign-Born
Age	41.4	39.4		
	(12.3)	(11.7)		
Hours	43.6	42.3		
	(10.9)	(9.8)		
Marital	64%	68%		
Latin		53%		
Europe		16%		
Asia		25%		
Others		6%		
N	578519	82630		

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	Cross-Section Sample		Matched Sample	
	Native-Born	Foreign-Born	Native-Born	Foreign-Born
Age	41.4	39.4	42.8	40.8
	(12.3)	(11.7)	(11.4)	(11.3)
Hours	43.6	42.3	44.2	42.9
	(10.9)	(9.8)	(10.9)	(10.3)
Marital	64%	68%	70%	74%
Latin		53%		51%
Europe		16%		18%
Asia		25%		26%
Others		6%		5%
N	578519	82630	167981	20718

Table 1. Summary Statistics: Education (Persons with Reported Wages)

	Cross-Section Sample		Matched Sample	
	Native-Born	Foreign-Born	Native-Born	Foreign-Born
Educ	13.7	11.9		
	(2.4)	(4.3)		
Latin				
Europe				
Asia				
Others				
N	578519	82630		

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	Cross-Section Sample		Matched Sample	
	Native-Born	Foreign-Born	Native-Born	Foreign-Born
Educ	13.7	11.9		
	(2.4)	(4.3)		
Latin		9.9		
		(4.3)		
Europe		13.8		
		(3.3)		
Asia		14.2		
		(3.4)		
Others		13.6		
		(3.6)		
N	578519	82630		

Table 1. Summary Statistics: Education (Persons with Reported Wages)

	Cross-Section Sample		Matched Sample	
	Native-Born	Foreign-Born	Native-Born	Foreign-Born
Educ	13.7	11.9	13.7	11.9
	(2.4)	(4.3)	(2.5)	(4.4)
Latin		9.9		9.9
		(4.3)		(4.2)
Europe		13.8		13.7
		(3.3)		(3.4)
Asia		14.2		14.3
		(3.4)		(3.4)
Others		13.6		13.5
		(3.6)		(3.7)
N	578519	82630	167981	20718

Table 1. Summary Statistics: Wage (Persons with Reported Wages)

	Cross-Section Sample		Matched Sample	
	Native-Born	Foreign-Born	Native-Born	Foreign-Born
Wage	16.2	12.8		
	(15.2)	(13.1)		
Latin				
Europe				
Asia				
Others				
N	355948	53095		

Table 1. Summary Statistics: Wage (Persons with Reported Wages)

	Cross-Section Sample		Matched Sample	
	Native-Born	Foreign-Born	Native-Born	Foreign-Born
Wage	16.2	12.8		
	(15.2)	(13.1)		
Latin		9.4		
		(6.8)		
Europe		19.6		
		(19.8)		
Asia		17.0		
		(16.9)		
Others		13.9		
		(13.8)		
N	355948	53095		

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	Cross-Section Sample		Matched Sample	
	Native-Born	Foreign-Born	Native-Born	Foreign-Born
Wage	16.2	12.8	16.6	13.5
	(15.2)	(13.1)	(15.4)	(14.4)
Latin		9.4		9.8
		(6.8)		(7.2)
Europe		19.6		20.4
		(19.8)		(21.3)
Asia		17.0		17.8
		(16.9)		(18.3)
Others		13.9		14.7
		(13.8)		(15.2)
N	355948	53095	100499	12903

Correcting for Sample Attrition & Outmigration

Road Map

1. Sample Attrition when there is No Outmigration

   Heckman (1974, 1976)

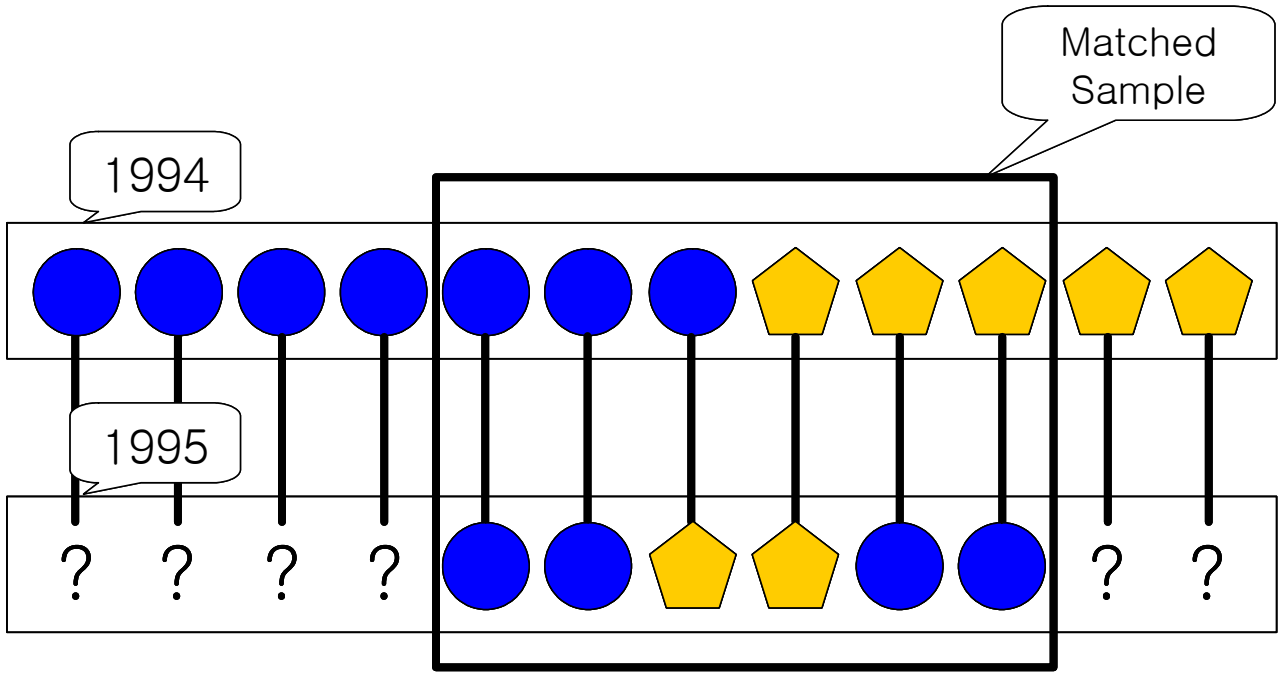
   Hirano, Imbens, Ridder, and Rubin (2001) and Bhattacharya (2006)

2. Sample Attrition in the presence of Outmigration

   Kim (2008)

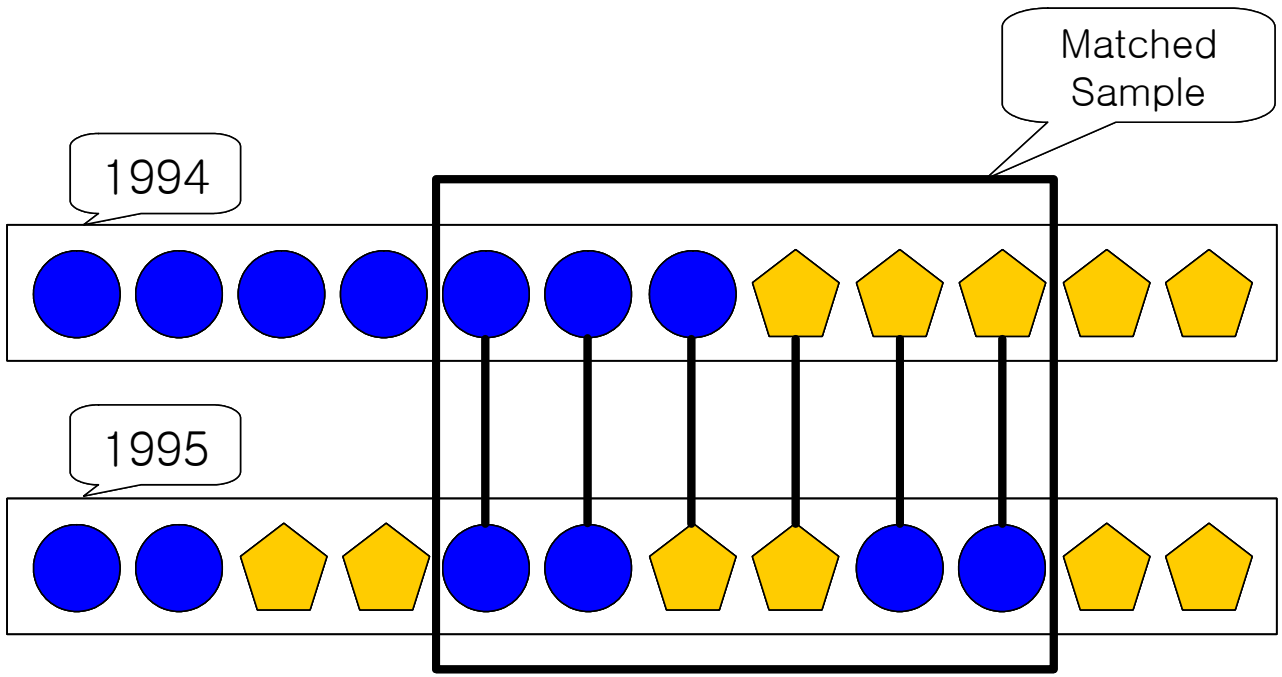
Attrition Causes Problems

In general, the distribution of cross-sections
is different from the distribution of a matched sample.



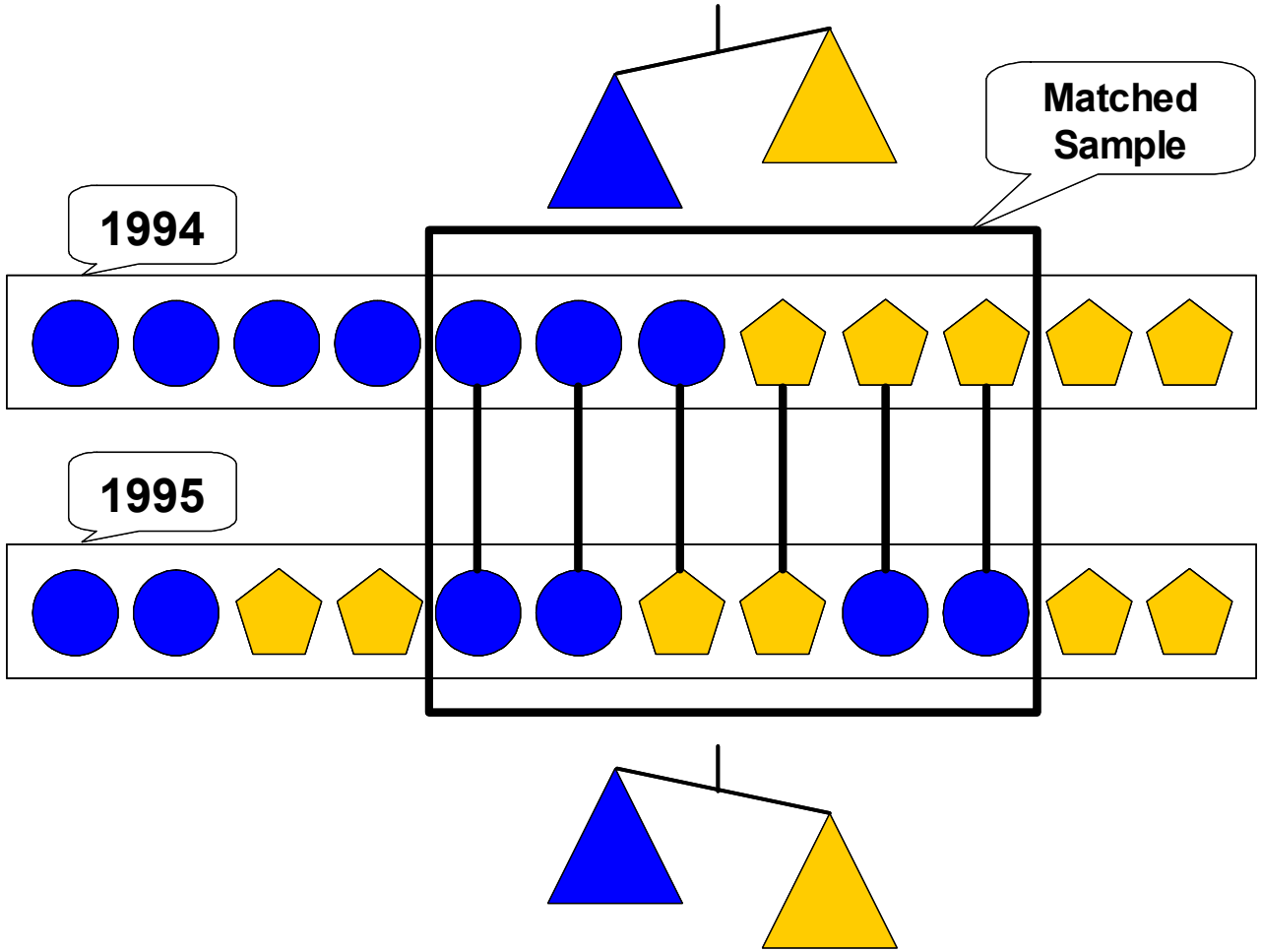
Availability of 2nd Period Cross-Section

In general, the distribution of a 2nd period cross-section
is different from the distribution of a 2nd period matched sample.



Sample Attrition when there is No Outmigration

Hirano, Imbens, Ridder, and Rubin (2001) and Bhattacharya (2006)



Sample Attrition in the presence of Outmigration

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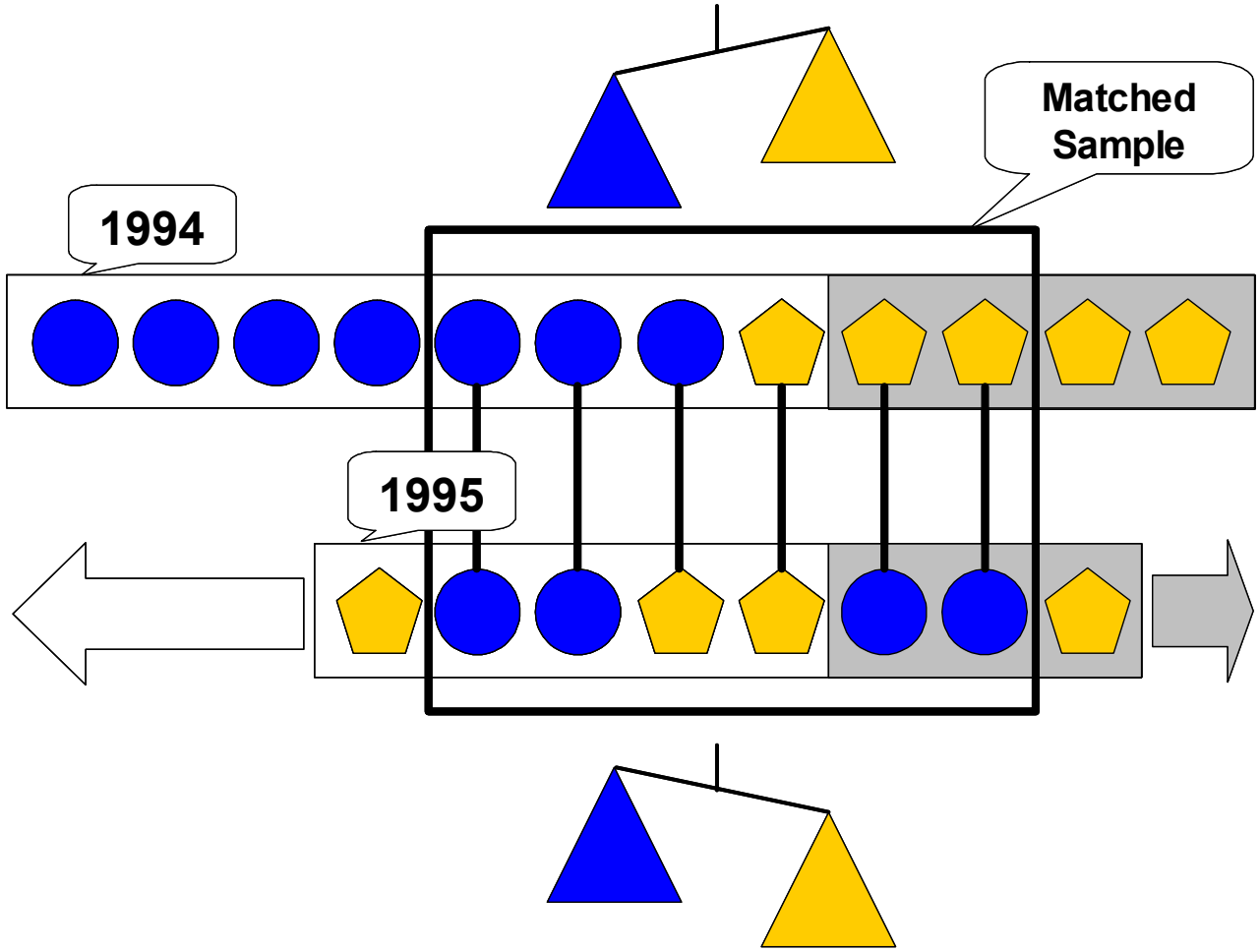

Estimation Strategy

1. Estimate $\Pr\left(D_P = 1 | z_2\right)$,

   where z is a vector of variables of known transition probability, such as age, education, country of origin, and year of entry.

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   where u includes endogenous and exogenous variables such as wage, labor market status, age, education, marital status, country of origin, and years since migration.

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   where u includes endogenous and exogenous variables such as wage, labor market status, age, education, marital status, country of origin, and years since migration.

3. Estimate θ_0 by

$$E\left[m\left(y_1, y_2, x_1, x_2, \theta_0\right) \cdot C\left(u_1, u_2\right) | x_1, x_2, D_S = 1\right] = 0,$$

   for all x_1, x_2, where $C\left(u_1, u_2\right) = \dfrac{\Pr\left(D_S = 1\right)}{\Pr\left(D_S = 1 \middle| u_1, u_2\right)}$.

Estimates: Individual vs. Cohort Heterogeneity

Table 4. Economic Assimilation Estimates in %: Reported Wages Only
(Att-Out-Adjusted Estimates with Quadratic Specifications)

	Individual Heterogeneity	Cohort Heterogeneity
age=24, ysm=4	–1.17**	
	(0.55)	
age=32, ysm=12	–0.75**	
	(0.35)	
age=40, ysm=20	–0.33	
	(0.32)	
age=48, ysm=28	0.08	
	(0.48)	

Estimates: Individual vs. Cohort Heterogeneity

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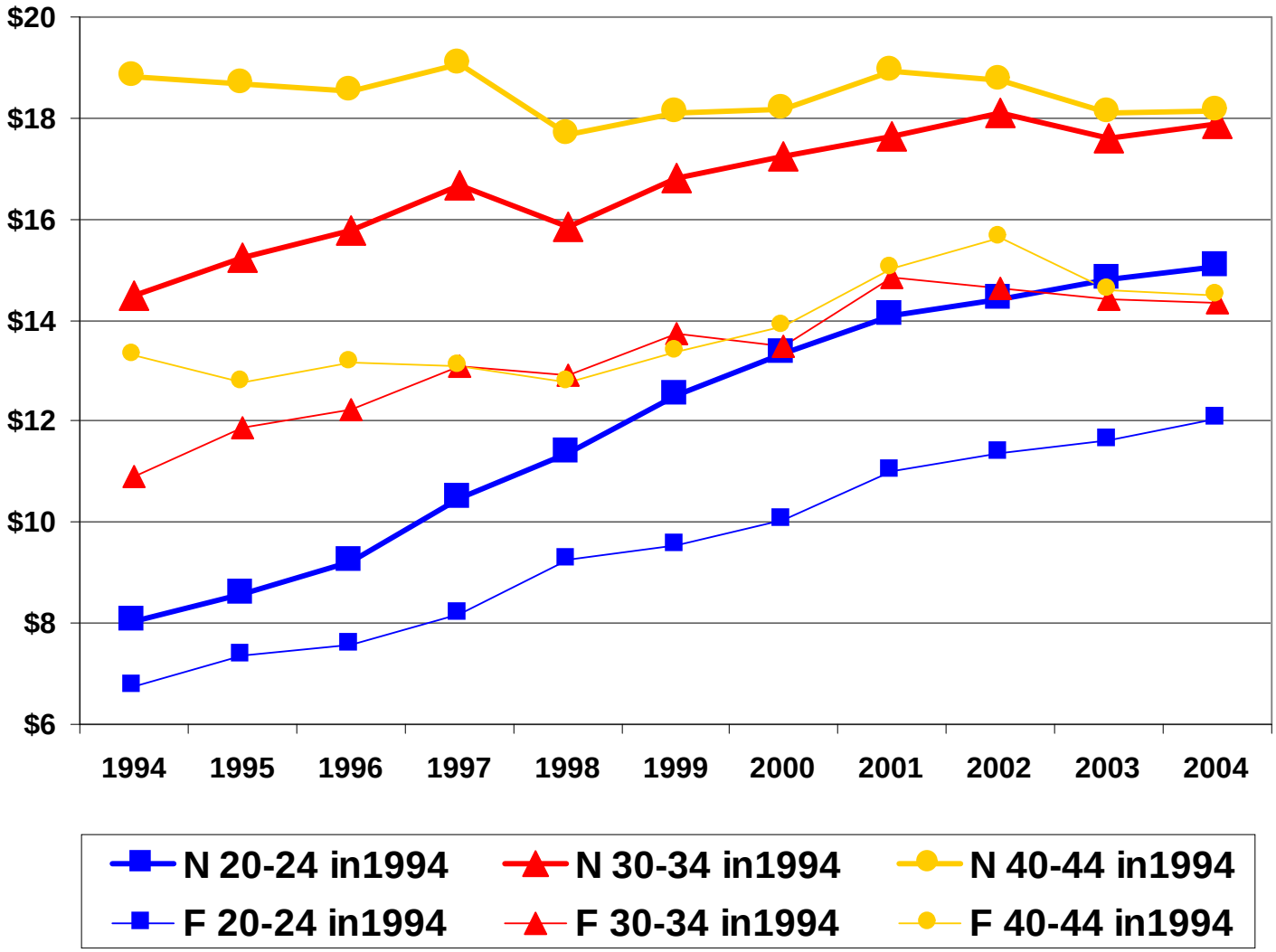
(Att-Out-Adjusted Estimates with Quadratic Specifications)

	Individual Heterogeneity	Cohort Heterogeneity
age=24, ysm=4	–1.17**	0.93**
	(0.55)	(0.36)
age=32, ysm=12	–0.75**	0.74***
	(0.35)	(0.24)
age=40, ysm=20	–0.33	0.56***
	(0.32)	(0.21)
age=48, ysm=28	0.08	0.37
	(0.48)	(0.30)

Mean Wages: Natives vs. Immigrants



Natives & Immigrants who arrived 1980-1991 (CPS)

Cohort vs. Individual Heterogeneity (1)

- Assume that the true model is given by

$$\begin{aligned} y_{it} &= \alpha age_{it} + \delta ysm_{it} + \beta edu_i + \mu_i + \varepsilon_{it} \\ &= \alpha age_{it} + \delta (t - c) + \beta edu_i + \mu_i + \varepsilon_{it}, \end{aligned}$$

  for an individual i in an arrival year cohort c.

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for an individual i in an arrival year cohort c.

- Repeated Cross-Section Analyses:

$$\begin{aligned} E[y_{it}|c, t, age_{it}, edu_i] &= \alpha age_{it} + \delta (t - c) + \beta edu_i \\ &\quad + E[\mu_i|c, t, age_{it}, edu_i], \\ E[y_{jt'}|c, t', age_{jt'}, edu_j] &= \alpha age_{jt'} + \delta (t' - c) + \beta edu_j \\ &\quad + E\left[\mu_j|c, t', age_{jt'}, edu_j\right], \end{aligned}$$

where $t' = t + 1$ & i and j are in the same cohort c.

$\alpha + \delta$ is identified when $E[\mu_i|c, t, age_{it}, edu_i] = \mu_c$ w.p.1.

Cohort vs. Individual Heterogeneity (2)

- If ability and age at migration are correlated,

$$\begin{aligned} E\left[\mu_i | c, t, age_{it}, edu_i\right] &= E\left[\mu_i | c, age_{it} - (t-c)\right] \\ &= \mu_c + \eta_a \left(age_{it} - (t-c)\right). \end{aligned}$$

  the cohort heterogeneity assumption made in most repeated cross-section studies leads to biased estimates.

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- Longitudinal Analyses:

$$\alpha + \delta = E\left[y_{it'} - y_{it} | c, t', t, age_{it'}, age_{it}, edu_i\right].$$

Wage Convergence? Central and South Americans

Table 5. Economic Assimilation in %: Reported Wages Only

Individual Hetero.	Att-Out-Adjusted		Not Adjusted	
	linear	quadratic	linear	quadratic
age=24, ysm=4	0.10	–1.41**		
	(0.37)	(0.64)		
age=32, ysm=12		–0.76*		
		(0.41)		
age=40, ysm=20		–0.11		
		(0.41)		
age=48, ysm=28		0.55		
		(0.64)		
Native (N=89117) & C.S.American (N=6438)				

Wage Convergence? Central and South Americans

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Individual Hetero.	Att-Out-Adjusted		Not Adjusted	
	linear	quadratic	linear	quadratic
age=24, ysm=4	0.10	–1.41**	0.12	–1.33**
	(0.37)	(0.64)	(0.37)	(0.63)
age=32, ysm=12		–0.76*		–0.82**
		(0.41)		(0.41)
age=40, ysm=20		–0.11		–0.31
		(0.41)		(0.41)
age=48, ysm=28		0.55		0.20
		(0.64)		(0.63)
Native (N=89117) & C.S.American (N=6438)				

Wage Convergence? "Europeans"

Table 5. Economic Assimilation in %: Reported Wages Only

Individual Hetero.	Att-Out-Adjusted		Not Adjusted	
	linear	quadratic	linear	quadratic
age=24, ysm=4	–1.18	–0.96	–1.09	–1.16
	(0.86)	(1.74)	(0.84)	(1.77)
age=32, ysm=12		–0.85		–0.95
		(1.20)		(1.23)
age=40, ysm=20		–0.73		–0.74
		(0.86)		(0.87)
age=48, ysm=28		–0.62		–0.54
		(0.94)		(0.91)
Native (N=89117) & European (N=1689)				

Wage Convergence? Asians

Table 5. Economic Assimilation in %: Reported Wages Only

Individual Hetero.	Att-Out-Adjusted		Not Adjusted	
	linear	quadratic	linear	quadratic
age=24, ysm=4	–0.51	–0.84	–0.36	–1.12
	(0.64)	(1.37)	(0.62)	(1.30)
age=32, ysm=12		–0.52		–0.60
		(0.82)		(0.79)
age=40, ysm=20		–0.19		–0.08
		(0.76)		(0.75)
age=48, ysm=28		0.13		0.45
		(1.27)		(1.24)
Native (N=89117) & Asian (N=2657)				

Concluding Remarks

- Use an Overlapping Rotating Panel Data Set

  Control for Fixed Unobserved Heterogeneity

  Correct for Sample Attrition & Outmigration

- Empirical Findings:

  Little Evidence of Economic Assimilation

  Repeated Cross-Section Estimates are Biased

- Future Research Agenda

  Economic Assimilation for the Entire Wage Distribution

  Correct for Bias in Repeated Cross-Section Analyses

Scarcity of Available Longitudinal Data

- Panel Data Studies

  National Longitudinal Survey of Male Immigrants (N=98): Chiswick, 1980

  Longitudinal Survey of Scientists and Engineers: Borjas, 1989

  Permanent Residents from the Immigration and Naturalization Service for fiscal year 1971: Jasso and Rosenzweig, 1988

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- Cross-Section Linked to Time Series Studies

  Health and Retirement Study linked to Social Security Earnings: Hu, 1999

  CPS or Survey of Income and Program Participation linked to Social Security Earnings: Lubotsky, 2000, 2001

Determinants of Sample Attrition and Outmigration

- Sample Attrition

  Age, Education, and Marital Status

  Years Since Migration, Citizenship Status, and Birth Country

  Labor Market Participation Status and Wage at time 1

  Labor Market Participation Status and Wage at time 2

- Outmigration

  Age and Education

  Arrival Year and Birth Country

Results from Previous Literature

- Borjas (1999): the relative wage growth of immigrants is

  0.60-0.76% points higher per year during the first 10 years

  0.38-0.50% points higher per year during the first 20 years.

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- Duleep and Regets (1997): matched CPS without adjustment

  0.3% points per year faster per year

  at median age and years since migration (1987-1988)

- Lubotsky (2000): time series linked to cross-section data

  0.50-0.65% points faster per year

  during the first twenty years since migration (1951-1997)