British, American, and British-American Social Mobility: Intergenerational Occupational Change Among Migrants and Non-Migrants in the Late 19th Century

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RESEARCH QUESTIONS

In previous work (Long & Ferrie 2011; Long & Ferrie 2007) we examine trends in intergenerational social mobility in the U.S. and Britain in the nineteenth century.

Key finding: mobility in U.S. in 19th century significantly greater than in Britain, unlike the present.

Along with theoretical results (Piketty 1995, Benabou and Ok 2001, Benabou and Tirole 2006) helps explain durability of “myth” of exceptional American mobility.

RESEARCH QUESTIONS

The present study adds to our comparison of men in Britain and the U.S. the most (geographically) mobile group: trans-Atlantic migrants from Britain to the U.S.. We want to know

- How much intergenerational mobility did this group experience?
- How did their mobility experience compare with that of non-migrants in both countries?
- What can be said about the selectivity of the migrants?

BACKGROUND

The “quality” of immigrants is usually assessed by examining how they do relative to the native-born

But this cannot distinguish between change in overall home-country quality and change in the selectivity of immigration

Focuses exclusively on immigrants’ experience after arrival in the destination

BACKGROUND

A complementary literature focuses on the “brain drain”: selective immigration’s impact on home-country characteristics

Focuses exclusively on migrants’ experience before departure in the home country and the non-migrants’ experience in the home country before and after migrants depart

BACKGROUND

Few studies examine the (1) migrants before departure from home and after arrival at destination and (2) non-migrants before and after the migrants depart (Abramtizky et al. 2010; Wegge 2002)

A different perspective on “selectivity”

But data on both “movers” & “stayers” is seldom available

OUR APPROACH

Here, we use 2 cohorts of British movers and stayers (1861-1880 & 1881-1900), observing (1) migrants before & after departure and (2) non-migrants before & after the migrants left

We account for selection explicitly

We provide the first measurement of inter-generational mobility for one of the largest groups of migrants to the U.S.

THE CONTEXT

Migration was completely unrestricted at this time (before the Quota System of the 1920s)

Driven not by desperation (c.f. Irish Famine migrants) but by "normal" forces (e.g. relative wages)

The British were a large fraction of the migrant stream (close to 40% in some years), but their share moved opposite the total volume of migration

THE CONTEXT

The Britain each cohort left behind was a decade or more ahead of the U.S. in its industrialization

More opportunity in the U.S. for those squeezed out by changes (consolidation in farming, displacement of craft workers by factories and machines)

THE DATA

Previously, we created samples of males linked across censuses from 1861-1881 & 1881-1901 in Britain, and males linked from 1860-1880 & 1880-1900 in the U.S.

Linkage based on (i) name, (ii) year of birth, (iii) parish & county (Britain) or state (U.S.) of birth.

Individuals were 30-39 years old in the terminal year and were observed with their fathers in the initial year.

Fathers' & sons' occupations observed at same life-cycle point .

THE DATA

For comparable data on migrants from Britain to the U.S., we generated 2 new samples

British-born males age 30-39 in the 1880 U.S. Census of Population linked back to the 1861 British Census

British-born males age 30-39 in the 1900 U.S. Census of Population linked back to the 1881 British Census

THE DATA

Main challenge: Lack of specific birthplace info for migrants in U.S. censuses

Requirements/Checks (1880 $\rightarrow$ 1861):

- Unique record (name, age birthplace) in 1880 U.S. census and 1861 Br census
- Not present in British 1881 census
- Not present in U.S. 1860 census index
- If they were present in the 1870 U.S. census index, they were not also present in the 1871 British census index, and if they were present in the 1871 British census index, they were not also present in the 1870 U.S. census index.
- Oldest U.S.-born child in 1880 was born after 1860
- Youngest Britain-born child in 1880 was born before 1862

Abel Dellbridge, b. 1844-45, miner, born in England

1880 U.S. Census of Population, Nevada City, California

[7-296.]

Received August 18,80

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Supervisor's Dist. No. 2
Enumeration Dist. No. 60

Note A.—The Census Year begins June 1, 1879, and ends May 31, 1880.
Note B.—All persons will be included in the Enumeration who were living on the 1st day of June, 1880. No others will. Children BORN SINCE June 1, 1880, will be OMITTED. Members of Families who have DIED SINCE June 1, 1880, will be INCLUDED.
Note C.—Questions Nos. 13, 14, 22 and 23 are not to be asked in respect to persons under 10 years of age.

SCHEDULE 1.—Inhabitants in Nevada City, in the County of Nevada, State of California, enumerated by me on the fourth day of June, 1880.

W J Organ, Enumerator.

Line	Dwelling	Family	Name	Color	Sex	Age	Relationship	Married	Occupation	Place of Birth	Father's Birthplace	Mother's Birthplace
1	46	51	Dellbridge Abel	W	M	35		/	Miner	England	England	England
2			—— Elizabeth J	W	F	35	wife	/	Keep house	England	England	England
3			—— Wm N R.	W	M	14	Son		at School	Maryland	Eng	Eng
4			—— Ellen J	W	F	11	daughter		at School	Tennessee	Eng	Eng
5			—— Emily E	W	F	7	daughter		at school	Pennsylvania	Eng	Eng
6			—— John	W	M	3	Son			Michigan	Eng	Eng
7	47	52	Raymond James S	W	M	47			Carpenter	Connecticut	New York	Conn
8	48	53	Oliver Domingo	W	M	46		/	Miner	California	Portugal	Cal
9			—— Mary B	W	F	36	wife	/	dress maker	Chile	Chile	Chile
10			—— Anfelow	W	M	17	son		workin butcher shop	California	Cal	Chili
11			—— Louis	W	M	15	son		workin Brewery	California	Cal	Chili
12			—— Rosa	W	F	5	daughter			California	Cal	Chili
13	48	54	Gabb[illegible]								Eng	Eng
14											Mass	Mass
15			—— Lilly	W	F	3	daughter			California	Ohio	Mass
16			—— William	W	M	39	Brother		Engineer (steam)	Ohio	Eng	Eng
17	49	55	Seaman William	W	M	41		/	Manufacturer Carriages	Ohio	Prussia	Baden
18			—— Mearia	W	F	43	wife	/	Keeping house	Indiana	Penn	Penn

Abel Dellbridge, b. 1844-45, father: miner, born in Liskeard, Cornwall, England

The undermentioned Houses are situate within the Boundaries of the

Parish [or Township] of St Ive. | City or Municipal Borough of | Municipal Ward of | Parliamentary Borough of | Town of | Hamlet or Tything, &c., of | Ecclesiastical District of St Ive

No. of Schedule	Road, Street, &c., and No. or Name of House	HOUSES Inhabited	HOUSES Uninhabited (U.), or Building (B.)	Name and Surname of each Person	Relation to Head of Family	Condition	Age of Males	Age of Females	Rank, Profession, or Occupation	Where Born	Whether Blind, or Deaf-and-Dumb
122				Elizabeth Berk	Boarder	Un		36	Worker of c. Lead mine	Cornwall Mawnan	
123	Moor Down	1		Joseph Hocken	Head	Mar	30		Lead Miner	Do Lanlivery	
				Ann Do	Wife	Mar		28		Do St Ive	
				John Do	Son		10		Scholar	Do Do	
				Richard Do	Son		8		Scholar	Do Do	
				Mary J Do	Dau			5	Scholar	Do Do	
				Joseph Do	Son		2			Do Do	
				George Rowe	Boarder		31		Lead Miner	Do Gunheris	
124	Moor Down	1		John Dellbridge	Head	Mar	43		Lead miner	Cornwall Cubert	
				Jane Do	Wife	Mar		42		Do Charlestown	
				Elizabeth J Do	Dau	Un		17	Worker of Mine	Do Liskeard	
				Abel H Do	Son		16		Lead Miner	Do Liskeard	
				John Do	Son		14		Lead Miner	Do St Ive	
				Mary Do	Dau			11		Do St Ive	
				James Do	Son		10		Worker at Mine	Do Do	
				George Do	Son		7		Scholar	Do Do	
				William H Do	Son		5		Do	Do Do	
				Richard Do	Son		2			Do Do	
				Ellen Do	Dau		8 Mo			Do Do	
125		1		Stephen Crabb	Head	Mar	43		Lead Miner	Do St Ive	
				Mary Do	Wife	Mar		50		Do St Bamford	
				William Do	Son		16		Lead Miner	Do St Ive	
				John C Do	Son		14		Lead Miner	Do Do	
				Elizabeth J Do	Dau			10	Scholar	Do Do	
	Total of Houses...	3									

1861 Census of England, St. Ive, Cornwall

THE DATA

U.S. samples: 4,138 (1860-1880) &
3,919 (1880-1900)

British samples: 2,039 (1861-1881) &
4,071 (1881-1901)

Migrant samples: 1,176* (1861-1880) &
1,144 (1881-1900)

Four occupation categories: White Collar, Farmer, Skilled & Semiskilled, and Unskilled

* 2,174 linked; remainder awaiting occupational transcription

MEASURING INTERGENERATIONAL MOBILITY

The conventional approach:

$$\ln Y_i^{\text{Son}} = \beta \ln Y_i^{\text{Father}} + \varepsilon_i$$

where β = "intergenerational income elasticity"

But we've only got occupations, and they're difficult to order unambiguously

MEASURING INTERGENERATIONAL MOBILITY

	Britain 1861-1881				
Son's Occup.	White Collar	Farmer	Skilled & Semi-Skilled	Un-Skilled	Row Sum
A. Raw Frequencies (Column Percent)					
WC	117	18	153	54	342
	(41.9)	(11.6)	(15.8)	(8.5)	
F	3	67	4	10	84
	(1.1)	(43.2)	(0.4)	(1.6)	
SS	115	46	641	288	1,090
	(41.2)	(29.7)	(66.4)	(45.1)	
U	44	24	168	287	523
	(15.8)	(15.5)	(17.4)	(44.9)	
Col. Sum	279	155	966	639	2,039

MEASURING INTERGENERATIONAL MOBILITY

$$P = \begin{bmatrix} 3 & 1 \\ 2 & 2 \end{bmatrix} \qquad Q = \begin{bmatrix} 2 & 1 \\ 6 & 1 \end{bmatrix}$$

$$Q' = \begin{bmatrix} 2 & 2 \\ 3 & 1 \end{bmatrix}$$

$M_P = 3/8 \quad M_Q = 7/10$

$M_P = 3/8 \quad M_{Q'} = 5/8$

MEASURING INTERGENERATIONAL MOBILITY

$$P = \begin{bmatrix} 3 & 1 \\ 2 & 2 \end{bmatrix} \quad Q = \begin{bmatrix} 2 & 1 \\ 6 & 1 \end{bmatrix}$$

Cross-Product Ratios: (3 x 2) / (2 x 1) = 3 for P

(2 x 1) / (6 x 1) = 1/3 for Q

MEASURING INTERGENERATIONAL MOBILITY

$$Q = \begin{bmatrix} 2 & 1 \\ 6 & 1 \end{bmatrix} \qquad Q' = \begin{bmatrix} 2 & 2 \\ 3 & 1 \end{bmatrix}$$

Cross-Product Ratio for Q = ratio for Q' = 1/3

MEASURING INTERGENERATIONAL MOBILITY

For tables > 2 × 2, use the "Altham statistic," which uses all of the cross-product ratios:

$$d(P,Q) = \left[\sum_{i=1}^{r} \sum_{j=1}^{s} \sum_{l=1}^{r} \sum_{m=1}^{s} \left| ln\left(\frac{p_{ij}p_{lm}q_{im}q_{lj}}{p_{im}p_{lj}q_{ij}q_{lm}} \right) \right|^2 \right]^{1/2}$$

Measures distance between mobility in P and mobility in Q

MEASURING INTERGENERATIONAL MOBILITY

The Plan:

- For each country/year (e.g. U.S. 1860-80) group occupations into 4 categories (white collar, skilled, farmer, laborer)
- Measure fraction off main diagonal with actual marginal frequencies (M)
- Measure fraction off main diagonal with the marginal frequencies from the other table in the comparison (M')

MEASURING INTERGENERATIONAL MOBILITY

- Calculate the Altham statistic $d(P,J)$ comparing that 4 × 4 table to independence, a matrix J of ones:

higher $d(P,J) \Rightarrow$ farther from independence
$\Rightarrow$ less intergenerational mobility

- For country/year pairs (e.g. U.S. 1860-80 & Britain 1861-81) calculate the Altham statistic $d(P,Q)$ to compare the difference in mobility

Migrants were more mobile at both the top (White Collar) and the bottom (Unskilled)

Father's Occupation

Son's Occup.	Britain 1861-1881 White Collar	Farmer	Skilled & Semi-Skilled	Un-Skilled	Row Sum	Britain 1861-U.S. 1880 White Collar	Farmer	Skilled & Semi-Skilled	Un-Skilled	Row Sum
A. Raw Frequencies (Column Percent)										
WC	117 (41.9)	18 (11.6)	153 (15.8)	54 (8.5)	342	35 (24.0)	12 (13.2)	113 (16.5)	42 (16.5)	202
F	3 (1.1)	67 (43.2)	4 (0.4)	10 (1.6)	84	15 (10.3)	22 (24.2)	64 (9.3)	49 (19.3)	150
SS	115 (41.2)	46 (29.7)	641 (66.4)	288 (45.1)	1,090	78 (53.4)	41 (45.1)	439 (64.1)	123 (48.4)	681
U	44 (15.8)	24 (15.5)	168 (17.4)	287 (44.9)	523	18 (12.3)	16 (17.6)	69 (10.1)	40 (15.7)	143
Col. Sum	279	155	966	639	2,039	146	91	685	254	1,176

Non-migrants ("stayers")

Migrants ("movers")

MOBILITY MEASURES

Comparison and Terminal Year	M (1)	M′ (2)	d(P,J) (3)	G^2 (4)	d(Q,J) (5)	G^2 (6)	d(P,Q) (7)	G^2 (8)	d^i(P,Q) (9)	G^2 (10)
1. Britain 1861-1881 (P)	45.5	41.4	29.2	567.64***						
vs.							23.8	139.66***	7.2	7.71
Migrants 1861-1880 (Q)	54.4	67.5			7.8	45.88***				
2. U.S. 1860-1880 (P)	51.3	50.1	12.7	592.23***						
vs.							7.5	24.63***	3.0	3.95
Migrants 1861-1880 (Q)	54.4	57.4			7.8	45.88***				
3. Britain 1881-1901 (P)	43.9	45.3	23.5	710.97***						
vs.							11.5	34.35***	5.8	7.68
Migrants 1881-1900 (Q)	51.1	48.4			13.7	111.27***				
4. U.S. 1880-1900 (P)	53.8	50.0	15.1	854.43***						
vs.							6.4	10.60	5.5	9.20
Migrants 1881-1900 (Q)	51.1	54.8			13.7	111.27***				

Note: M is total mobility (percent off the main diagonal), M′ is total mobility using the marginal frequencies from the other table, G^2 is the likelihood ratio χ^2 statistic with significance levels *** < 0.01 ** < 0.05 * < 0.10. Degrees of freedom: 9 for columns (4), (6), and (8); 5 for column (10).

Table **3**. Summary Measures of Intergenerational Mobility.

VISUALIZING MOBILITY DIFFERENCES

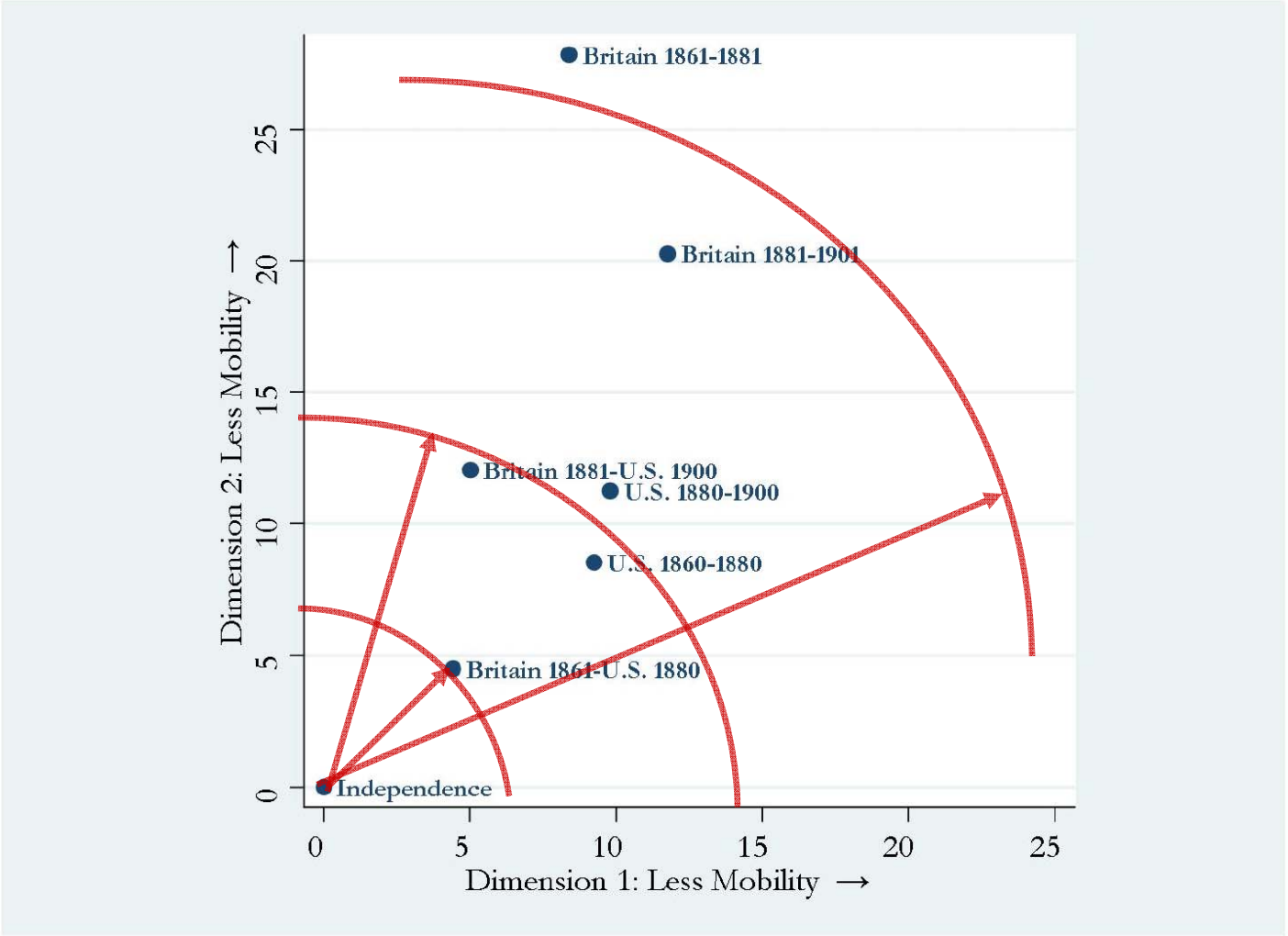

Figure 3. Intergenerational Occupational Mobility in the U.S., Britain, and in British-to-U.S. Migrants (Multidimensional Scaling Scores)

STRUCTURAL MODEL: SWITCHING ORDERED PROBIT

We've been *descriptive* up to now, so to move to *causation*, we need to consider selectivity:

$$y_{1i} = \beta_1' X_{1i} + \varepsilon_{1i} \quad \text{if } M_i = 1 \tag{1}$$

$$y_{0i} = \beta_0' X_{0i} + \varepsilon_{0i} \quad \text{if } M_i = 0 \tag{2}$$

$$M_i = \begin{cases} 1 & \text{if } \gamma_1' Z_i + \gamma_2 (y_{1i} - y_{0i}) + u_i \geq 0 \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

Where y is occupational class, now ordered:

White Collar > Farmer > Skilled & Semiskilled > Unskilled

and M = 1 if migrant, 0 if non-migrant

SWITCHING ORDERED PROBIT

Selection and Treatment Effect parameters:

$$s_1 = \mathrm{E}\left(y_1^* \mid M=1\right) - \mathrm{E}\left(y_1^* \mid M=0\right) = \tilde{X}_1\hat{\beta}_1 - \tilde{X}_0\hat{\beta}_1$$
$$s_0 = \mathrm{E}\left(y_0^* \mid M=0\right) - \mathrm{E}\left(y_0^* \mid M=1\right) = \tilde{X}_0\hat{\beta}_0 - \tilde{X}_1\hat{\beta}_0 \qquad (4)$$

$$\tau_1 = \mathrm{E}\left(y_1^* - y_0^* \mid M=1\right) = \tilde{X}_1\hat{\beta}_1 - \tilde{X}_1\hat{\beta}_0 \qquad (5)$$

$$\tau_0 = \mathrm{E}\left(y_1^* - y_0^* \mid M=0\right) = \tilde{X}_0\hat{\beta}_1 - \tilde{X}_0\hat{\beta}_0 \qquad (6)$$

SWITCHING ORDERED PROBIT

1881	Ordered Probit Switching Regression				Structural Probit (Move)			
	Movers		Stayers					
Characteristic	β	*t*-stat.	β	*t*-stat.	β	S.E.	[90% C.I.	
Father's Class: 1. WC	0.56	4.39***	0.97	13.35***				
Father's Class: 2. F	0.48	2.30**	0.88	10.02***				
Father's Class: 3. SS	0.25	2.40**	0.37	6.35***				
Age	0.13	0.93	0.10	1.47	0.16	0.15	[-0.10	0.41]
Age^2	0.00	0.85	0.00	1.44	-0.01	0.01	[-0.01	0.00]
Father's Age	0.00	0.23	0.01	3.60***	0.00	0.01	[-0.01	0.01]
Father in Agric.	-0.06	0.33	-0.43	6.19***				
One Servant in HH	0.34	2.40**	0.34	4.07***	0.11	0.17	[-0.17	0.40]
2+ Servants in HH	0.42	2.48**	0.55	4.96***	0.02	0.23	[-0.35	0.40]
Age Discrepancy	-0.02	0.30	-0.06	2.80***	0.16	0.06	[0.06	0.26]
Eldest Child	-0.06	0.74	-0.04	0.91	-0.12	0.09	[-0.28	0.04]
Oldest Brother in HH					-0.07	0.06	[-0.17	0.02]
Children in HH					0.04	0.01	[0.02	0.06]
Mother Employed					-0.19	0.07	[-0.31	-0.07]
Parish ≠ Birth Parish					-0.04	0.04	[-0.10	0.03]
$y_M - y_S$					-0.90	0.37	[-1.51	-0.29]
Constant	-0.22	0.21	-0.37	0.74	-2.18	1.08	[-3.95	-0.39]

Note: Observations: 5,025. Omitted categories are "Father's Class: 4. U," "No Servants in HH," "<2 Servants in HH," "Not Eldest Child," "Not Oldest Brother in HH," "Mother Not Employed," and "Parish=Birth Parish." Structural Probit SEs and CIs calculated by bootstrapping via data resampling with 500 repetitions.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table **4**. Ordered Probit Switching Regression (FIML).

SWITCHING ORDERED PROBIT

Parameter	Estimate	S.E.	[90% C.I.]	
(1) $\hat{y}_M$, Movers	1.093	0.127	[0.883	1.302]
(2) $\hat{y}_M$, Stayers	1.028	0.138	[0.801	1.254]
(3) $\hat{y}_S$, Movers	1.128	0.153	[0.876	1.380]
(4) $\hat{y}_S$, Stayers	1.002	0.130	[0.787	1.216]
(5) s_M, Selection of migrants=(1)-(2)	0.065	0.027	[0.021	0.109]
(6) s_S, Selection of stayers=(4)-(3)	-0.127	0.029	[-0.174	-0.080]
(7) τ_M, Treatment Effect: Treated=(1)-(3)	-0.036	0.196	[-0.359	0.288]
(8) τ_S, Treatment Effect: Not Treated=(2)-(4)	0.026	0.186	[-0.281	0.333]
Average Treatment Effect	0.013	0.188	[-0.297	0.322]

Note: SEs and CIs are calculated by bootstrapping via data resampling with 500 repetitions.

Table **5**. Selection and Treatment Parameters Based On Ordered Probit Switching Regression.

CONCLUSIONS

Earliest migrants more mobile than both British non-migrants and U.S. native-born

Later migrants still more mobile than British non-migrants (though gap is smaller) and just as mobile as U.S. native-born

Strong positive selection among migrants

Puzzling result: migration was less likely among those anticipating more improvement

CONCLUSIONS

Extensions:

1.use country-specific and time-specific occupation incomes instead of categories

2.estimate selectivity for first cohort

3.examine other outcomes (land ownership) and types of movers (tied vs. independent)

THE CONTEXT

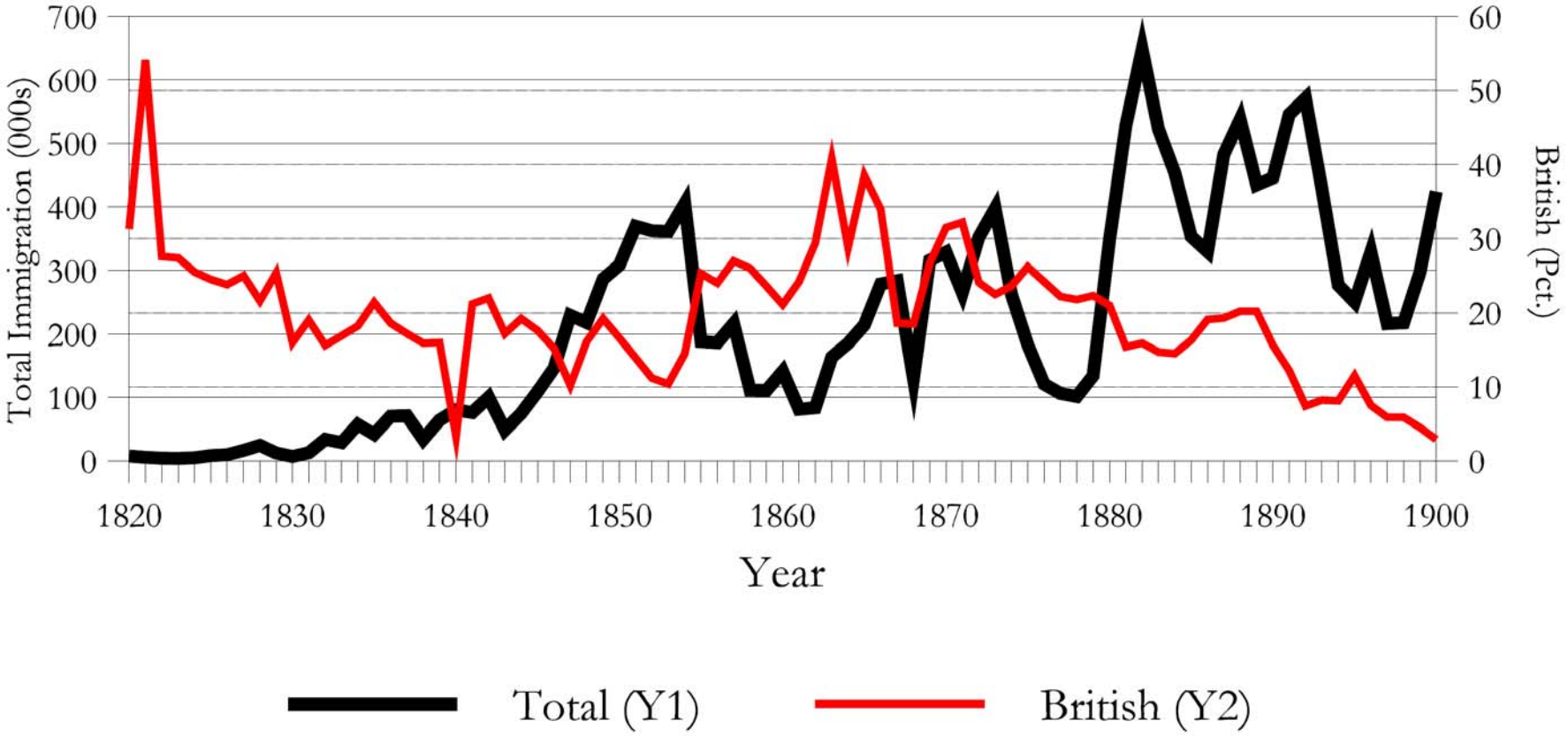

Figure 1. Total (000s) & British (Pct.) Immigration into the U.S., 1820-1900. Source: *Historical Statistics of the U.S. (Millennial Edition)*, Series Ad106-120.

THE CONTEXT

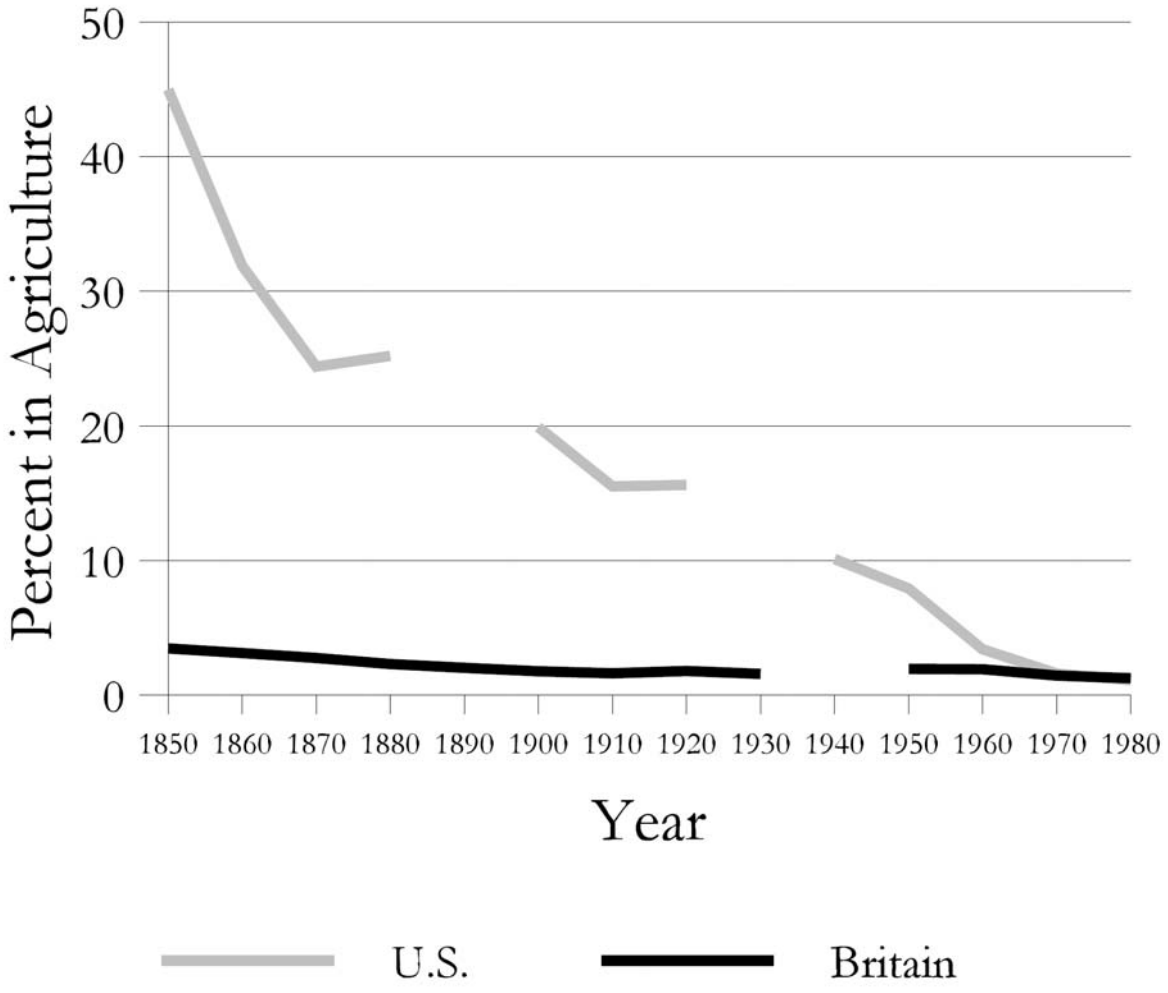

Figure 2. Population Employed in Agriculture in the U.S. and Britain, 1850-1980.

True whether we look at actual or standardized marginal distributions

Father's Occupation

Son's Occup.	Britain 1861-1881 White Collar	Farmer	Skilled & Semi-Skilled	Un-Skilled	Row Sum	Britain 1861-U.S. 1880 White Collar	Farmer	Skilled & Semi-Skilled	Un-Skilled	Row Sum
B. Standardized Frequencies (Column Percent)										
WC	55	6	27	12	100	35	17	27	22	100
	(55.3)	(5.6)	(27.0)	(12.1)		(34.5)	(16.7)	(26.8)	(22.0)	
F	6	83	3	9	100	17	36	18	30	100
	(5.7)	(82.7)	(2.8)	(9.0)		(17.1)	(35.5)	(17.6)	(29.7)	
SS	22	6	46	26	100	25	19	34	21	100
	(22.0)	(5.8)	(45.9)	(26.2)		(25.4)	(18.9)	(34.4)	(21.3)	
U	17	6	24	53	100	23	29	21	27	100
	(17.0)	(6.1)	(24.2)	(52.7)		(22.9)	(28.8)	(21.2)	(27.1)	
Col. Sum	100	100	100	100	400	100	100	100	100	400