Spatial Variation in Higher Education Financing and the Supply of College Graduates

John Kennan
University of Wisconsin-Madison and NBER

December 2018

Too Good to be True?

Effects of National Tuition Reductions				
	California resident levels			
	Population at Age 36		Tax	Tuition
	College Grad	High School	(present values)	
California	6.9%	-1.8%	725	-128
Florida	22.9%	-10.9%	230	-208
Illinois	34.1%	-18.3%	299	-441
Massachusetts	8.6%	-9.4%	-64	-237
Michigan	50.4%	-22.7%	119	-472
New York	27.3%	-18.9%	297	-935
Pennsylvania	71.5%	-26.8%	178	-405
Texas	3.2%	2.2%	354	-37
Wisconsin	30.5%	-13.9%	99	-189
U.S.	**25.4%**	**-13.5%**	**6701**	**-6666**

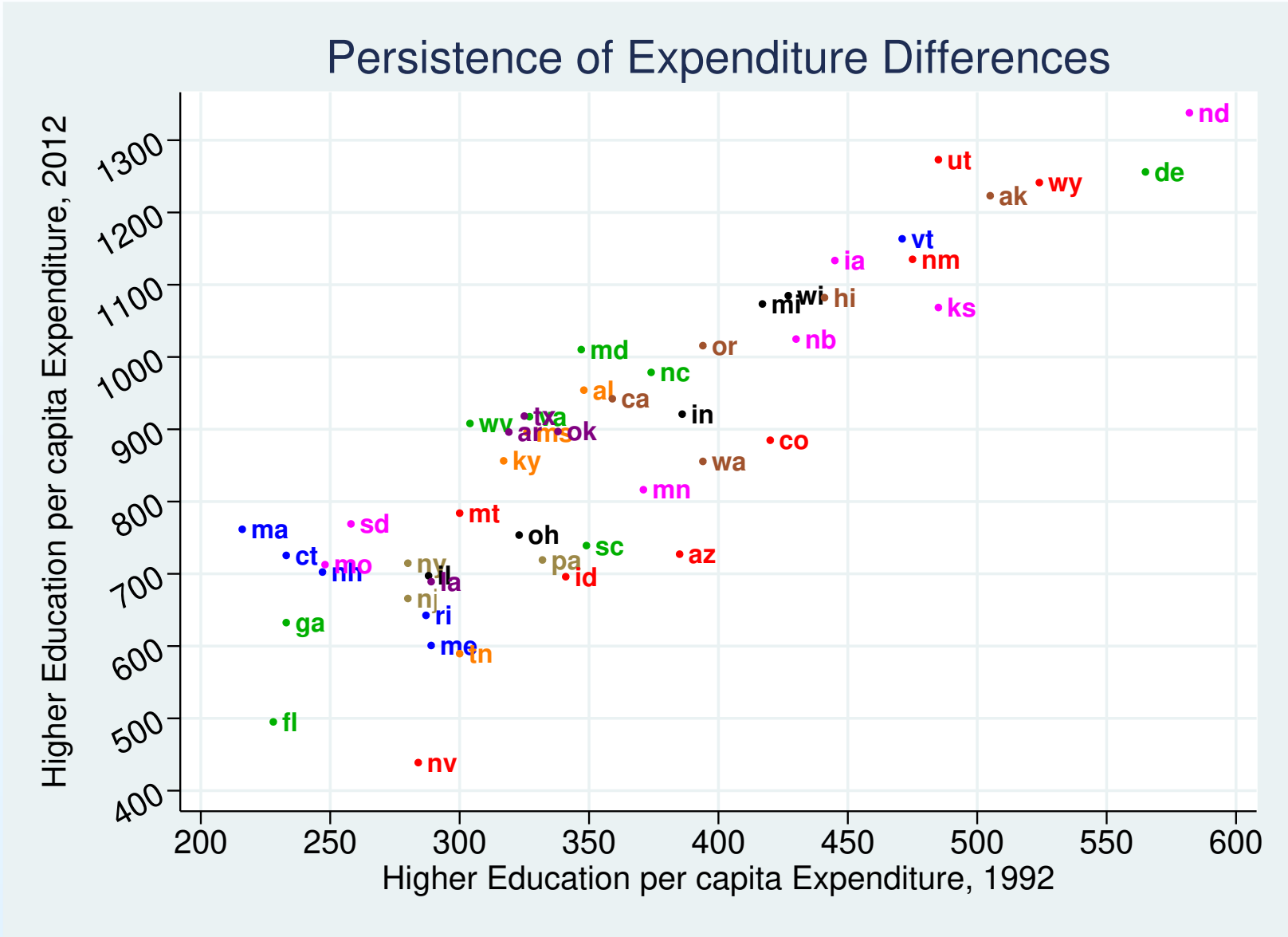
Motivation

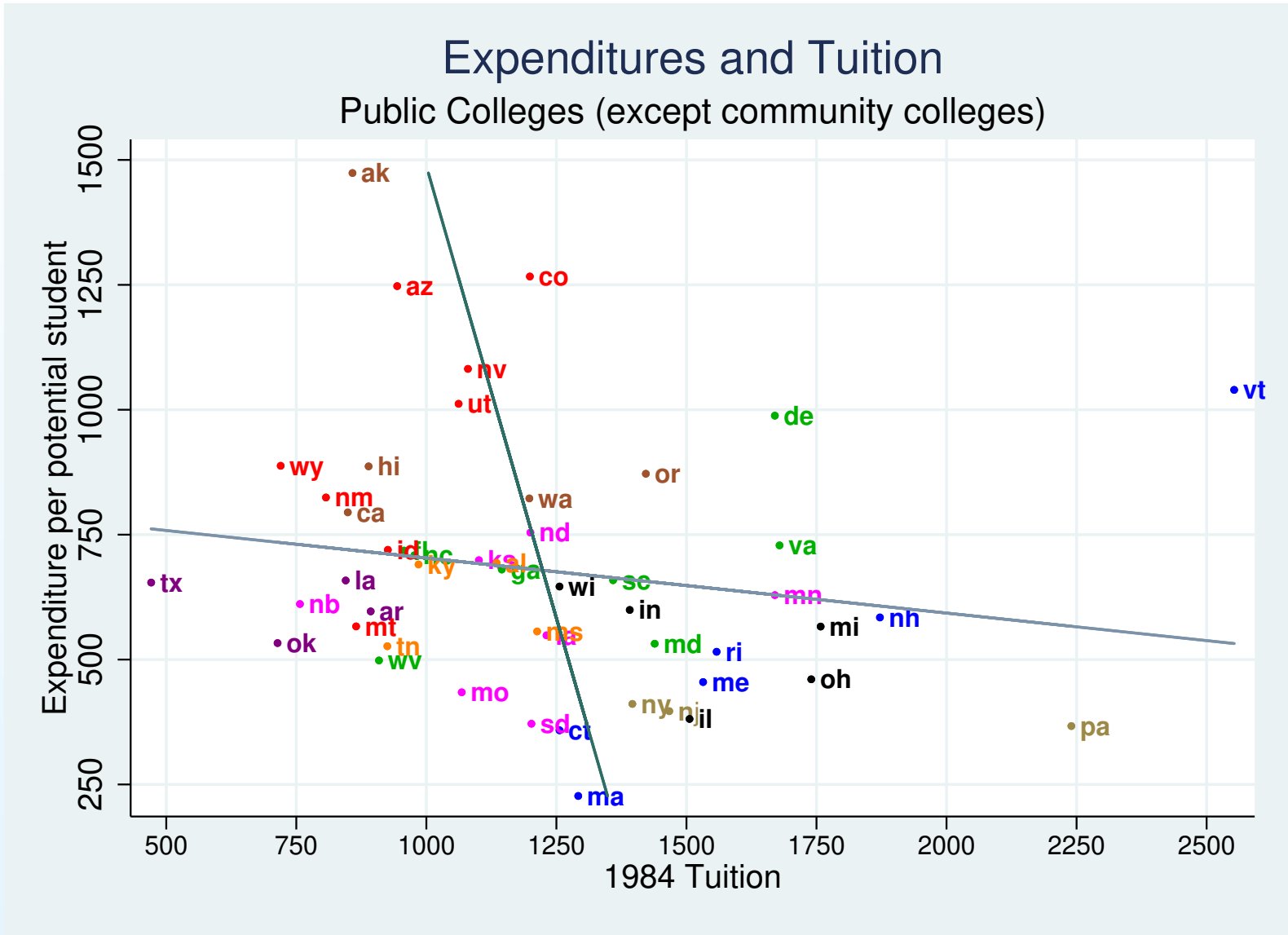
To what extent is human capital sorted over geographical locations?
How is this affected by local subsidies?
In the U.S., States spend a lot of money on higher education
When a State spends more money, does it get more human capital?
(or does the additional human capital just move to high-wage States?)

Aims:

- Analyze sequences of migration decisions, to maximize net income (Kennan-Walker)
- Include choice of whether and where to go to college
    - and which college type
    - and where to work

Higher Education Expenditures




Expenditures and Tuition
Public Colleges (except community colleges)
Expenditure per potential student
1984 Tuition
250
500
750
1000
1250
1500
500
750
1000
1250
1500
1750
2000
2250
2500
ak
az
co
nv
ut
vt
de
wy
hi
or
nm
ca
wa
nd
va
id
hc
ky
ga
sc
tx
la
wi
mn
nb
ar
in
nh
mt
mi
ok
tn
md
ri
wv
me
oh
mo
ny
nj
il
sd
ct
pa
ma

A Life-Cycle Model of Expected Income Maximization

w_{ij} individual i's earnings in location j – local price of individual's skill bundle
Wage in current location is known
Wages in other locations can be learned only by moving there
In each period, choose

1. whether to move [interstate]
2. whether to enroll in one of 4 types of colleges

Schooling outcomes are uncertain:

- Each enrollment choice associated with a probability of moving up to the next level

Colleges and Schooling Levels

4 College Types:

1. Lower-Tier Public (community colleges)
2. Upper-Tier Public (State universities and colleges)
3. Lower-Tier Private (Baccalaureate except Liberal Arts; Business; 2-year)
4. Upper-Tier Private (Other Private)

3 Schooling Levels:

1. High School plus (12 or 13 years completed)
2. Some College (14 or 15 years completed)
3. College Graduate (at least 16 years completed)

Choice Probabilities: basic model

$$V(x,\zeta) = \max_{j,\xi} \left(v(x,j,\xi) + \zeta_{j,\xi} \right)$$

x: state vector (schooling, home location, current and previous location, age, ability)
ζ: payoff shock ((preferences or switching costs, Type I Extreme Value))

Continuation value

$$v(x,j,\xi) = u(x,j,\xi) + \beta \sum_{x'} p(x'|x,j,\xi)\bar{v}(x')$$

Expected continuation value

$$\begin{aligned} \bar{v}(x) &= E_\zeta V(x,\zeta) \\ \exp\left(\bar{v}(x) - \bar{\gamma}\right) &= \sum_{k=1}^{J} \sum_{s=1}^{N_\xi} \exp\left(v(x,k,s)\right) \end{aligned}$$

$\bar{\gamma}$: the Euler constant

Choice Probabilities

$$\rho(x,j,\xi) = \exp\left(v(x,j,\xi) - \left(\bar{v}(x) - \bar{\gamma}\right)\right)$$

$\rho(x,j,\xi)$: probability of choosing location j, and enrollment ξ, when the state is x

State Variables and Flow Payoffs

$$\tilde{u}_h(x, j, \xi) = u_h(x, j, \xi) + \zeta_{j,\xi}$$

$u_h(x, j, \xi)$: payoffs associated with observable states

$$u_h(x, j, \xi) = \alpha_0(e) + \alpha_1 w(g, e, b, \ell^0, \omega, \xi) + \alpha_2 Y(\ell^0) + \alpha^H \chi(\ell^0 = h) - C_h(x, \xi) - \Delta(x, j)$$

ω : location match component of wages
α^H : attachment to home location
$C_h(x, \xi)$: College costs
$\Delta(x, j)$: Moving costs

Wages

$$w_{ij} = \mu_j\left(e_i\right) + \upsilon_{ij}\left(e_i\right) + G(e_i, b_i, g_i) + \varepsilon_{ij}(e_i) + \eta_i$$

w_{ij} : Wage of individual i in location j at age g_i
e_i : Current schooling Level
$\mu_j\left(e_i\right)$: Mean wages (for each schooling level) in location j (known)
$\upsilon_{ij}\left(e_i\right)$: location match effect (permanent)
G : age-earnings profile, depending on ability b_i
η_i : (random) individual effect, fixed across locations (known to the individual)
drawn from a symmetric 3-point distribution (zero mean, one parameter)
$\varepsilon_i\left(e_i\right)$ **:** transient effect, mixture of normals, iid over time

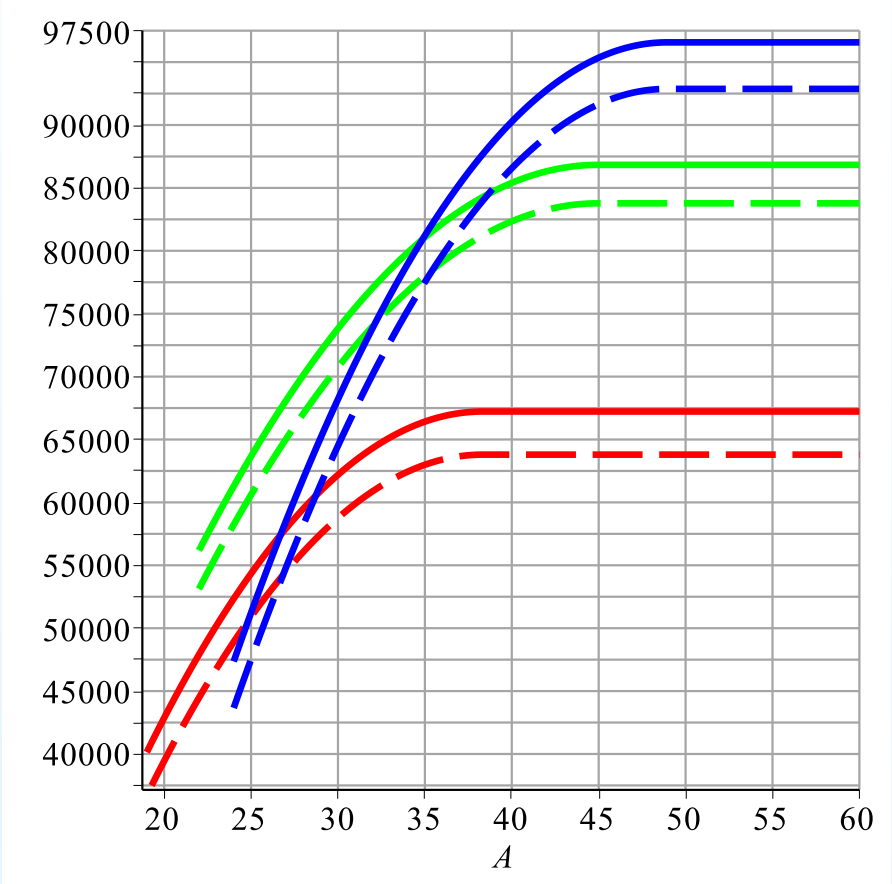
Migration decisions depend only on μ and υ

Age-Earnings Profiles

$$G(e,b,g) = \begin{cases} \theta_e b + y_e^* - c_e (g - g_e^*)^2 & g \leq g_e^* \\ \theta_e b + y_e^* & g \geq g_e^* \end{cases}$$

Quadratic, then constant; Level depends on ability b (binary)

y_e^* Peak wage for education level e; Age at the peak: g_e^*



Low Ability (dashed line), High Ability (solid line)

High School, Some College, College

College Costs

$$
\begin{aligned}
C(x,\xi) \quad = \quad & \delta_0(\xi) + \delta_1(\xi)\tau(\ell,\xi) + \delta_2(\xi)E(\ell,\xi) + \delta_3 b + \delta_4 b\chi(\xi \in \Xi) + \delta_5 d_m + \delta_6 d_f \\
& + \delta_7 y + \delta_8(g - g_0) + \left(\delta_9(\xi) + \delta_{10} b + \delta_{11} d_m + \delta_{12} d_f + \delta_{13} y\right) s(\ell,\xi) \\
& + (\delta_{14} + \delta_{15} b)\chi(e = 1) + \delta_{16}\chi(\xi = \xi_{-1})
\end{aligned}
$$

$$
\tau(\ell,\xi) \quad = \quad \chi(\ell = h)\tau_r(\ell,\xi) + \chi(\ell \neq h)\tau_n(\ell,\xi)
$$

$\delta_0(\xi)$	Disutility of schooling, $\xi \in \{1,2,3,4\}$
$\tau_r(\ell,\xi), \tau_n(\ell,\xi)$	resident, nonresident **T**uition fees, college type ξ, location ℓ
$E(\ell,\xi)$	College **E**xpenditures on instruction, etc
b	A**b**ility (**b**inary, a**b**ove or **b**elow sample median AFQT)
$\chi_{\xi\in\Xi}$	indicator, upper-tier colleges
d_m, d_f	E**d**ucation of **m**other and **f**ather (college indicator variables)
y	Famil**y** income (high or low)
g	A**g**e
$s(\ell,\xi)$	Financial aid (**s**cholarships)
δ_{16}	Enrollment persistence

Moving Costs

Cost of moving to location $j \neq \ell^0$ in state x

$$\Delta\left(x, j \neq \ell^0\right) = \gamma_0\left(e\right) + \gamma_1 D\left(\ell^0, j\right) - \gamma_2 \chi\left(j \in \mathbb{A}\left(\ell^0\right)\right) - \gamma_3 \chi\left(j = \ell^1\right) + \gamma_4 g - \gamma_5 n_j$$

γ_0 base cost (disutility) of moving, for someone at schooling level e
$D\left(\ell^0, j\right)$ distance from ℓ^0 to j
γ_2 cheaper to move to an adjacent location
$\mathbb{A}\left(\ell^0\right)$ the set of locations adjacent to ℓ^0 (States that share a border)
γ_3 cheaper to move to a previous location
γ_4 moving cost rises with age
γ_5 cheaper to move to a large location (n_j is the population in location j)

Data

NLSY79, $1979 - 93$, white non-Hispanic males (X-section sample)
Drop observations with zero earnings and positive hours or weeks worked
continuous histories, starting at labor force entry age
Wage measured as total wage and salary income, plus farm and business income
adjusted for cost of living differences across States
Binary ability measure: AFQT score above or below the sample median
High School Plus: 12 or 13 years of schooling
707 men, 6,764 person-years; interstate migration **2.3%** per year (age>25)
Some College: 14 or 15 years of schooling, less than a four-year degree
212 men, 1,890 person-years, (**5.6%** per year)
College Graduates: at least a Bachelors degree
362 men, 4,241 person-years, 267 interstate moves (**7.4%** per year)

Wages: Wage model estimated separately, $1979 - 2013$ data

State Means
1980 and 1990 PUMS, earnings of white men (HS aged 19-20, SC 21-22, CG 23-34)
Median regression with (1) age and (50) State dummies
μ_j is the predicted wage from this regression

Tuition, Expenditures and Financial Aid

Tuition: enrollment-weighted averages of "sticker prices" (IPEDS, 1980,1984)
Expenditures: total spending on instruction etc over all colleges of each type, by State
Financial Aid: expenditures on scholarships per potential student in the State
Potential Students: number of high school graduates aged 22-36 in each State in 1990

Ability and Schooling

Ability, Parents' Education and Schooling				
Neither Parent went to College				
	High School	Some College	College	Total
Low Ability	375 **84.8%**	33 7.5%	34 7.7%	442 **62.3%**
High Ability	128 47.8%	56 20.9%	84 31.3%	268 37.7%
Total	503 70.8%	89 12.5%	118 16.6%	710
Both Parents went to College				
	High School	Some College	College	Total
Low Ability	41 51.9%	19 24.1%	19 24.1%	79 29.7%
High Ability	24 12.8%	44 23.5%	119 **63.6%**	187 **70.3%**
Total	65 24.4%	63 23.7%	138 51.9%	266

High Ability: Above sample median AFQT score (63%)

Estimation

Choose parameter vector θ to maximize likelihood

$$\Lambda(\theta) = \sum_{i=1}^{N} \log L_i(\theta)$$

Likelihood of an individual history

$$L_i(\theta) = \frac{1}{n_\eta (n_\upsilon)^{N_i}} \sum_{\omega^i \in \Omega(N_i)} \left(\prod_{t=1}^{T_i} q(e_{it}, \xi_{it}) \psi_{it}\left(\omega^i, \theta\right) \lambda_{it}\left(\omega^i, \theta\right) \right)$$

$q(e_{it}, \xi_{it})$ likelihood of observed college transitions
$\psi_{it}\left(\omega^i, \theta\right)$ likelihood of observed wage
$\lambda_{it}\left(\omega^i, \theta\right)$ likelihood of observed location and enrollment choices

Parameter Estimates

Table 1: **Estimated College Transition Probabilities**

			Low AFQT		High AFQT	
	Initial Grade		12-13	14-15	12-13	14-15
	e		0	1	0	1
	Next Grade		14-15	16	14-15	16
		ξ				
Public	Lower-Tier	1	22.7%	16.5%	33.6%	10.7%
Public	Upper-Tier	2	50.7%	32.4%	57.8%	33.0%
Private	Lower-Tier	3	55.2%	22.5%	57.1%	36.2%
Private	Upper-Tier	4	42.8%	28.9%	56.2%	34.8%
			Standard Errors			
Public	Lower-Tier	1	3.3%	6.2%	3.9%	6.0%
Public	Upper-Tier	2	4.3%	4.6%	3.0%	3.0%
Private	Lower-Tier	3	6.3%	10.0%	4.7%	8.7%
Private	Upper-Tier	4	4.0%	6.6%	3.3%	3.8%

Parameter Estimates

	$\hat{\theta}$	$\hat{\sigma}_\theta$
A. Consumption value of education		
Some College	-0.26	0.05
College Grad	-0.01	0.17
B. Flow Utility		
Income	0.10	0.01
Climate	0.010	0.004
Home Premium	0.16	0.01
C. Moving Cost		
High School	4.61	0.25
Some College	4.09	0.27
College Grad	4.12	0.28
Distance	0.31	0.06
Adjacent Location	0.89	0.08
Previous Location	2.31	0.11
Age effect	0.08	0.01
Population	0.86	0.06
Enroll/migr shocks	0.50	0.03

	$\hat{\theta}$	$\hat{\sigma}_\theta$
D. College Cost		
Disutility: Pub lo	1.11	0.27
Disutility: Pub hi	-0.08	0.38
Disutility: Pvt lo	1.80	0.45
Disutility: Pvt hi	0.93	0.40
Ability effect	0.28	0.16
Ability × upper	0.31	0.07
Mother's ed	-0.07	0.03
Father's ed	0.13	0.03
Family Inc	0.07	0.03
Age effect	0.28	0.16
Ability × aid	41.93	7.30
Mother-ed × aid	41.63	6.95
Father-ed × aid	3.55	7.19
Family inc × aid	-7.32	7.10
extra, hi tier	0.87	0.26
hi ability, hi tier	-0.48	0.17
enroll change	1.42	0.10

	$\hat{\theta}$	$\hat{\sigma}_\theta$
E. Policy Variables		
Tuition: lo pub	1.14	0.37
Tuition: hi pub	2.15	0.19
Tuition: lo pvt	-1.60	0.56
Tuition: hi pvt	-0.09	0.22
Expend: lo pub	17.70	2.12
Expend: hi pub	-0.66	0.76
Expend: lo pvt	-11.46	29.69
Expend: hi pvt	7.16	2.90
Fin Aid: Pub lo	17.76	37.03
Fin Aid: Pub hi	-21.24	9.87
Fin Aid: Pvt lo	119.04	128.45
Fin Aid: Pvt hi	-32.02	23.14
Ability × aid	41.93	7.30
Mother-ed × aid	41.63	6.95
Father-ed × aid	3.55	7.19
Family inc × aid	-7.32	7.10

Empirical Results

- strong response to differences in tuition (for public colleges)
- strong response to higher education expenditures for community colleges
- no evidence that expenditures affect outcomes for other colleges

Effects of Changes in Tuition and Expenditure

Use 1970 Census to tabulate education levels of parents of NLSY79 cohorts

The model has 800 value functions
classified by home location, whether each parent went to college, ability, family income (binary)
Count the numbers of each type:

- Find households with children aged $5 - 13$ in 1970 Census
- Tabulate college attendance, family income, of the parents of these children.

Tabulate choice probabilities (college and location) for each value function
Population is a weighted average of the types

Policy Effects:
Iterate the state transition matrix implied by the policy variables used in estimation
then do the same thing for the new values of the policy variables (e.g. tuition)
and compare the population distributions

Tuition and Tax Revenue
PV of lifetime tuition and tax payments, assuming proportional taxes

Effects of Tuition Reductions

20% reduction (one State at a time)

	Population at Age 36						Revenue (PV)			
	Current Location			Home Location			Taxes		Tuition	
	Grad	SC	HS	Grad	SC	HS	△%	$	△%	$
California	3.6%	-1.0%	-3.6%	3.5%	-1.2%	-3.9%	0.19%	56.3	-12.3%	-149.2
Florida	5.9%	0.4%	-4.1%	6.9%	0.1%	-4.9%	0.27%	16.2	-10.0%	-44.8
Illinois	9.4%	1.0%	-6.1%	10.8%	0.9%	-6.5%	0.15%	26.7	-6.9%	-71.9
Massachusetts	3.2%	0.1%	-3.2%	3.4%	0.1%	-3.4%	-0.12%	-14.6	-8.8%	-45.6
Michigan	12.7%	1.7%	-6.6%	14.3%	1.6%	-6.9%	-0.08%	-13.6	-4.3%	-45.0
New York	7.6%	0.2%	-5.8%	8.1%	0.0%	-6.2%	0.05%	17.6	-8.7%	-165.4
Pennsylvania	13.4%	3.5%	-6.1%	17.9%	3.8%	-6.4%	-0.17%	-33.4	2.0%	19.9
Texas	4.2%	0.4%	-2.8%	4.4%	0.2%	-3.0%	0.33%	48.6	-13.3%	-80.5
Wisconsin	9.6%	1.1%	-5.1%	10.6%	1.0%	-5.4%	-0.13%	-11.3	-6.9%	-34.7

Effects of Expenditure Increases (Community Colleges)

Increase expenditure (per student) by 20% of national average level
one State at a time

	Population at Age 36							
	Current Location			Home Location			Revenue (PV)	
	Grad	SC	HS	Grad	SC	HS	Taxes	Tuition
CA	1.45%	1.88%	-3.13%	1.54%	2.00%	-3.46%	-41.4	10.8
FL	1.71%	1.97%	-2.28%	2.30%	2.27%	-2.80%	-6.1	15.3
IL	0.74%	0.98%	-0.89%	0.90%	1.07%	-0.96%	-7.5	13.8
MA	0.28%	0.66%	-0.49%	0.30%	0.71%	-0.53%	-3.0	1.2
MI	0.89%	1.23%	-0.87%	1.04%	1.32%	-0.91%	-9.8	14.5
NY	0.21%	1.40%	-0.70%	0.25%	1.49%	-0.74%	-22.9	51.9
PA	0.67%	0.94%	-0.53%	0.92%	1.02%	-0.55%	-7.4	14.1
TX	0.44%	0.66%	-0.61%	0.54%	0.73%	-0.67%	-2.3	4.9
WI	0.48%	0.78%	-0.51%	0.57%	0.85%	-0.54%	-4.3	4.1

Low National Tuition Levels with GE adjustments

Effects of National Tuition Reductions (California resident levels)						
	Population at Age 36					
	Current Location		Home Location		Tax	Tuition
	Grad	HS	Grad	HS	(present values)	
California	6.9%	-1.8%	2.9%	-0.1%	725	-128
Florida	22.9%	-10.9%	15.7%	-9.5%	230	-208
Illinois	34.1%	-18.3%	36.5%	-18.7%	299	-441
Massachusetts	8.6%	-9.4%	11.1%	-9.1%	-64	-237
Michigan	50.4%	-22.7%	55.8%	-23.2%	119	-472
New York	27.3%	-18.9%	27.9%	-19.1%	297	-935
Pennsylvania	71.5%	-26.8%	89.0%	-27.5%	178	-405
Texas	3.2%	2.2%	-2.5%	3.9%	354	-37
Wisconsin	30.5%	-13.9%	32.2%	-14.0%	99	-189
U.S.	**25.4%**	**-13.5%**	**25.4%**	**-13.5%**	**6701**	**-6666**

Fortin (2006): 10% change in relative supply (CG/HS) changes college premium by 2%
Here relative supply increases by 45%,
so assume the college premium falls by 9% (cg -4.5%, hs $+4.5\%$)
Multiplying tax rate in each State by 1.015 is enough to achieve revenue-neutrality
(e.g. tax rate increases from 10% to 10.15%)

Conclusion

Education subsidies and tuition differences might affect

- whether people go to college
- which type of college
- where (home State or elsewhere)

Empirical results

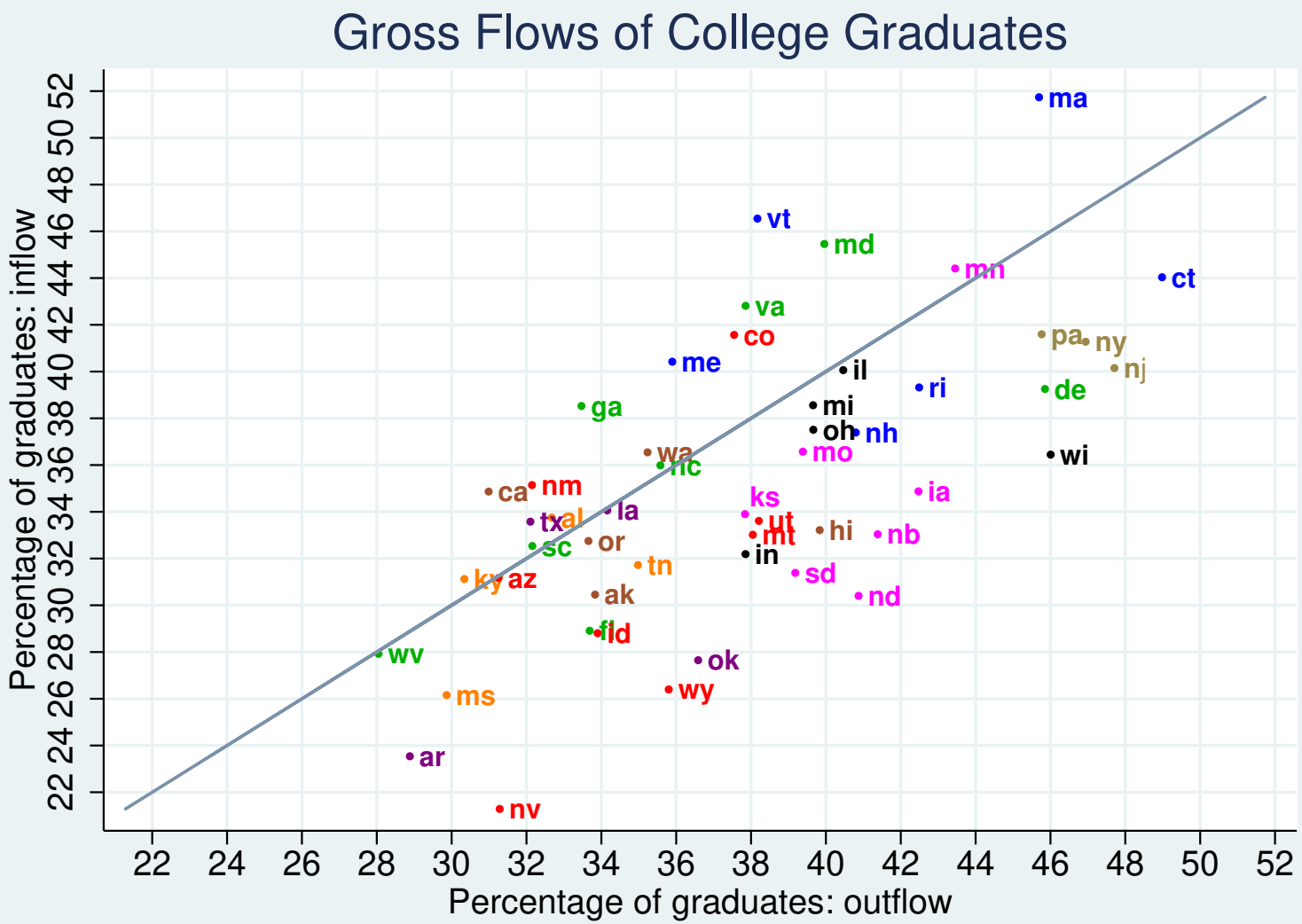
- a strong response to differences in tuition (for public colleges)
- some evidence of a response to higher education subsidies
- response is particularly strong for community colleges

Migration “leakage” is minimal

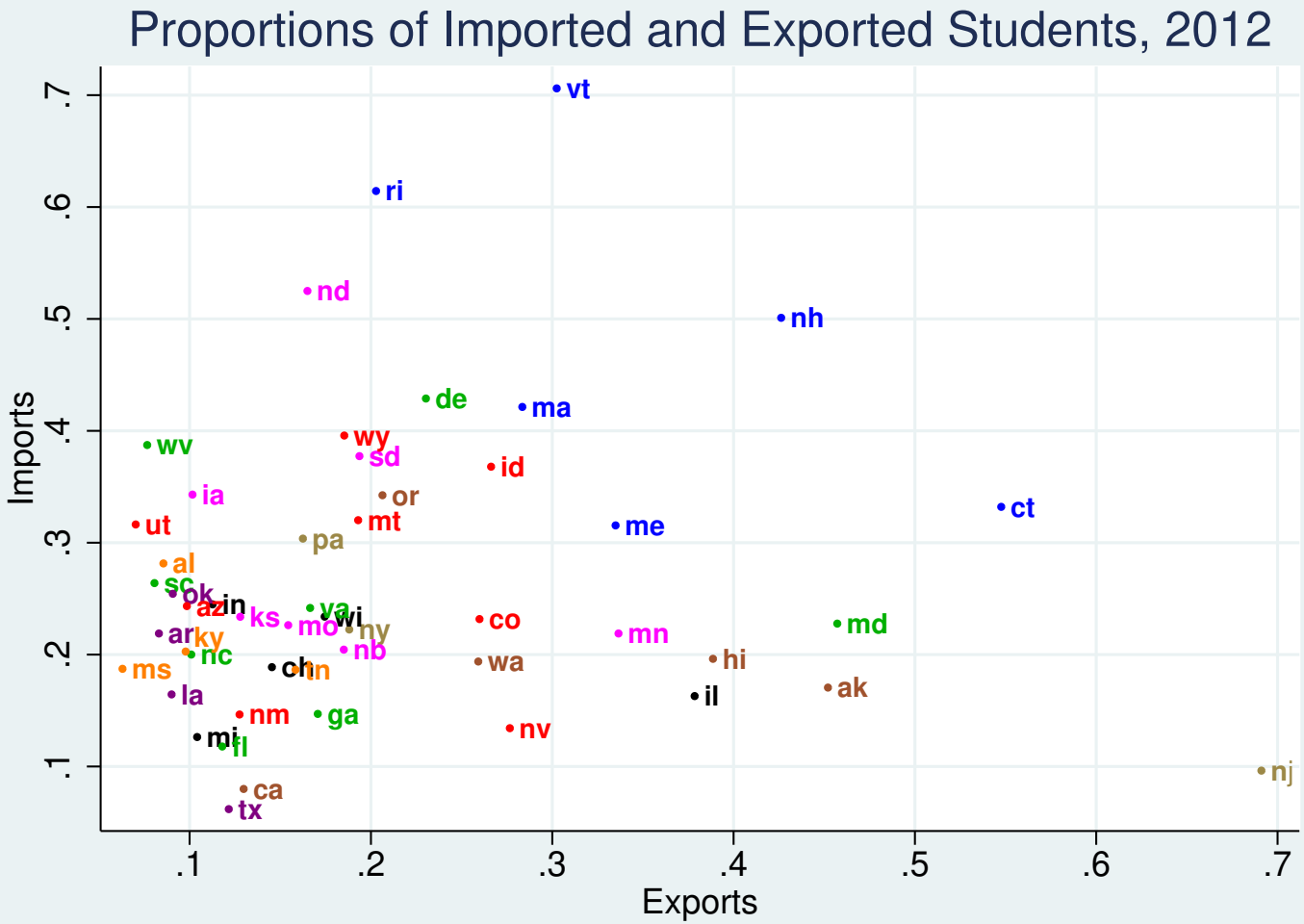
National Tuition at California Resident Levels

- huge increase in college attainment
- revenue-neutral if tax rate increased from 10% to 10.1%

Gross Flows


Gross Flows of College Graduates
Percentage of graduates: inflow
22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52
Percentage of graduates: outflow
22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52
ma
vt
md
mn
ct
va
co
pa
ny
nj
me
il
ri
de
ga
mi
oh
nh
wa
mo
wi
nc
ca
nm
ia
ks
la
al
tx
ut
hi
nb
or
mt
sc
in
tn
sd
ky
az
nd
ak
fl
id
wv
ok
ms
wy
ar
nv

Imports a


Proportions of Imported and Exported Students, 2012
Imports
Exports
.1
.2
.3
.4
.5
.6
.7
vt
ri
nd
nh
de
ma
wv
wy
sd
id
ia
or
ct
ut
mt
me
pa
al
sc
ok
az
in
va
wi
ks
mo
ny
co
mn
md
ar
ky
nc
nb
wa
hi
ms
ch
tn
ak
la
il
nm
ga
nv
mi
fl
nj
ca
tx

Wage Differentials

	Mean	Min	Max
Earnings (State medians, $1983)			
High School (age 20)	7,856	5,824	10,196
Some College (age 22)	9,966	7,451	11,809
College Graduate (age 24)	13,984	9,345	16,174

Parents' College Attendance (1970 Census, large States)

Largest States	Neither	Father only	Mother only	Both	Population
California	57.3%	17.7%	8.0%	17.1%	9.1%
New York	63.4%	15.8%	6.1%	14.6%	8.7%
Pennsylvania	73.3%	13.3%	4.2%	9.2%	6.1%
Ohio	71.9%	12.8%	4.8%	10.5%	5.8%
Texas	68.1%	13.6%	5.2%	13.1%	5.8%
Illinois	65.8%	14.1%	6.1%	14.0%	5.5%
Michigan	69.7%	13.4%	5.6%	11.3%	4.8%
New Jersey	62.9%	17.3%	5.6%	14.2%	3.2%
Massachusetts	63.4%	15.7%	6.7%	14.1%	3.1%
Indiana	73.9%	11.9%	4.7%	9.5%	2.9%
Wisconsin	69.8%	12.3%	6.3%	11.6%	2.7%
U.S.	66.9%	13.9%	6.1%	13.0%	100.0%

Parents' College Attendance (1970 Census, highs and lows)

	Neither	Father only	Mother only	Both	Pop
Utah	50.8%	23.5%	6.4%	19.3%	0.7%
California	57.3%	17.7%	8.0%	17.1%	9.1%
Washington	58.9%	16.9%	7.5%	16.8%	1.8%
Idaho	59.6%	14.2%	8.9%	17.2%	0.4%
Montana	60.4%	13.6%	10.5%	15.5%	0.5%
Wyoming	60.6%	11.0%	12.5%	15.9%	0.2%
Nevada	60.6%	16.2%	9.3%	13.9%	0.2%
Colorado	61.4%	14.0%	7.3%	17.2%	1.1%
U.S.	66.9%	13.9%	6.1%	13.0%	100.0%
South Carolina	73.4%	9.5%	5.3%	11.8%	1.0%
Indiana	73.9%	11.9%	4.7%	9.5%	2.9%
Tennessee	74.4%	10.1%	4.5%	11.0%	1.8%
Arkansas	76.1%	10.5%	4.3%	9.1%	0.8%
West Virginia	78.9%	9.6%	4.2%	7.3%	1.1%
Kentucky	79.4%	9.2%	4.0%	7.4%	1.8%

East

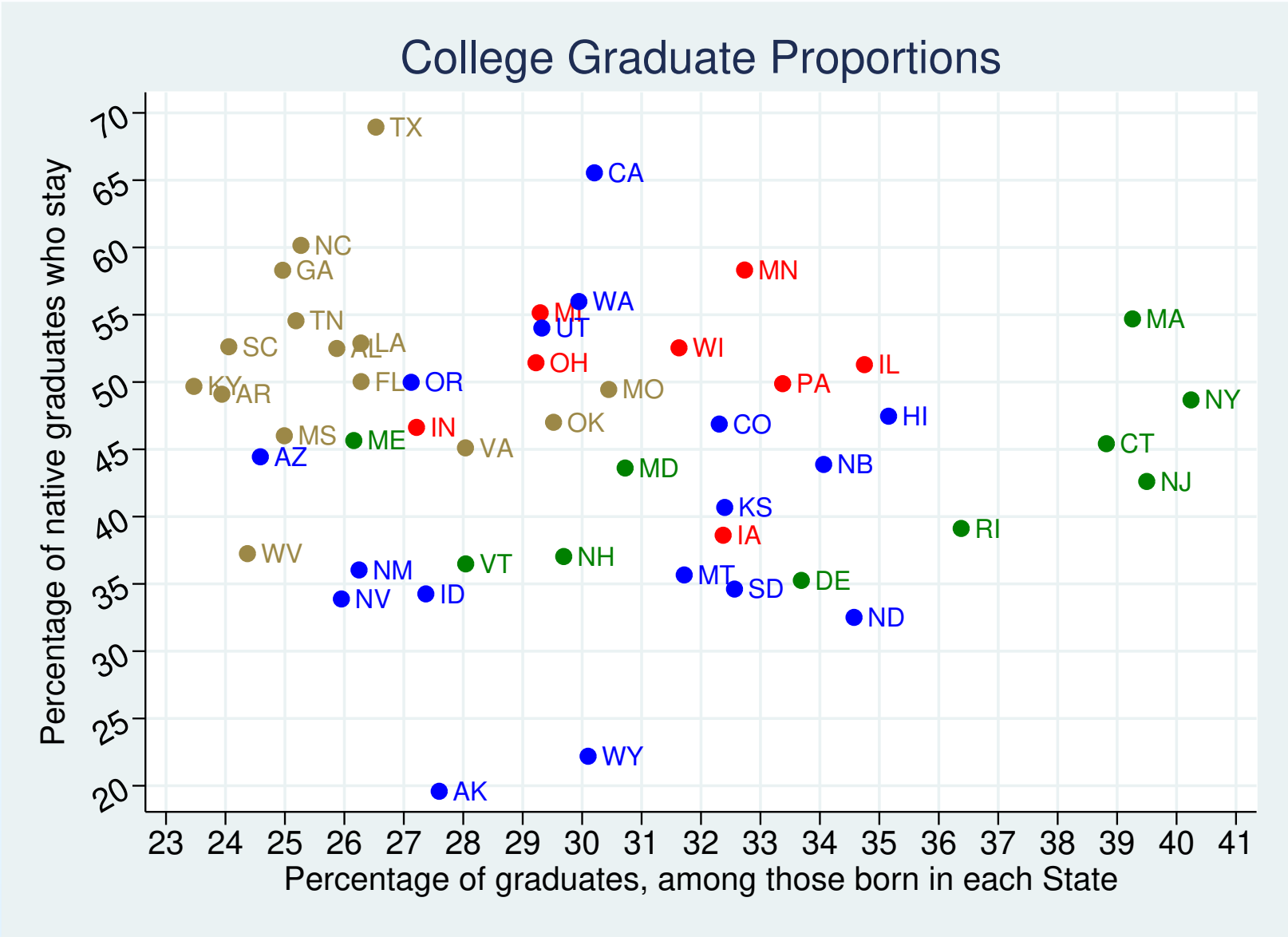
College Graduates: East			
	Private	Public	Total
Out of State	25 43.1%	16 28.1%	41 35.7%
In State	33 56.9%	41 71.9%	74 64.3%
Total	58 50.4%	57 49.6%	115

College Graduates: Not East			
	Private	Public	Total
Out of State	19 30.6%	30 13.2%	49 17.0%
In State	43 69.4%	197 86.8%	240 83.0%
Total	62 21.5%	227 78.5%	289

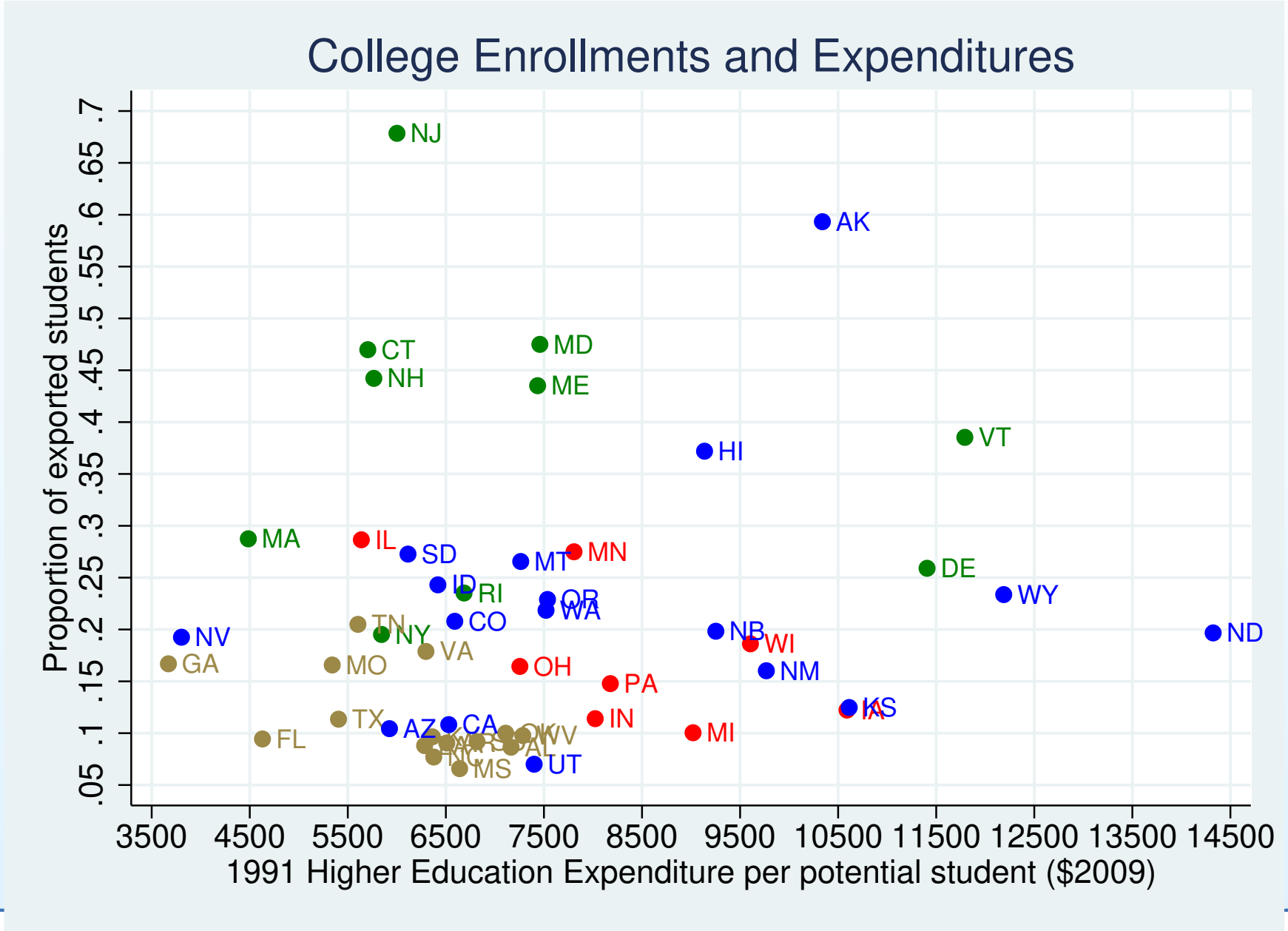
Michigan Colleges

	Students	State Support	Tuition	
2009 data		per student	resident	nonresident
Michigan State University	46,510	$7,644	$10,880	$27,343
University of Michigan-Ann Arbor	41,028	$7,930	$11,659	$34,937
Wayne State University	31,024	$7,102	$8,643	$18,412
	118,562	$7,601		
Regional Universities (12)	292,575	$3,584	$8,616	$18,366
Community Colleges (28)	230,587	$1,138		

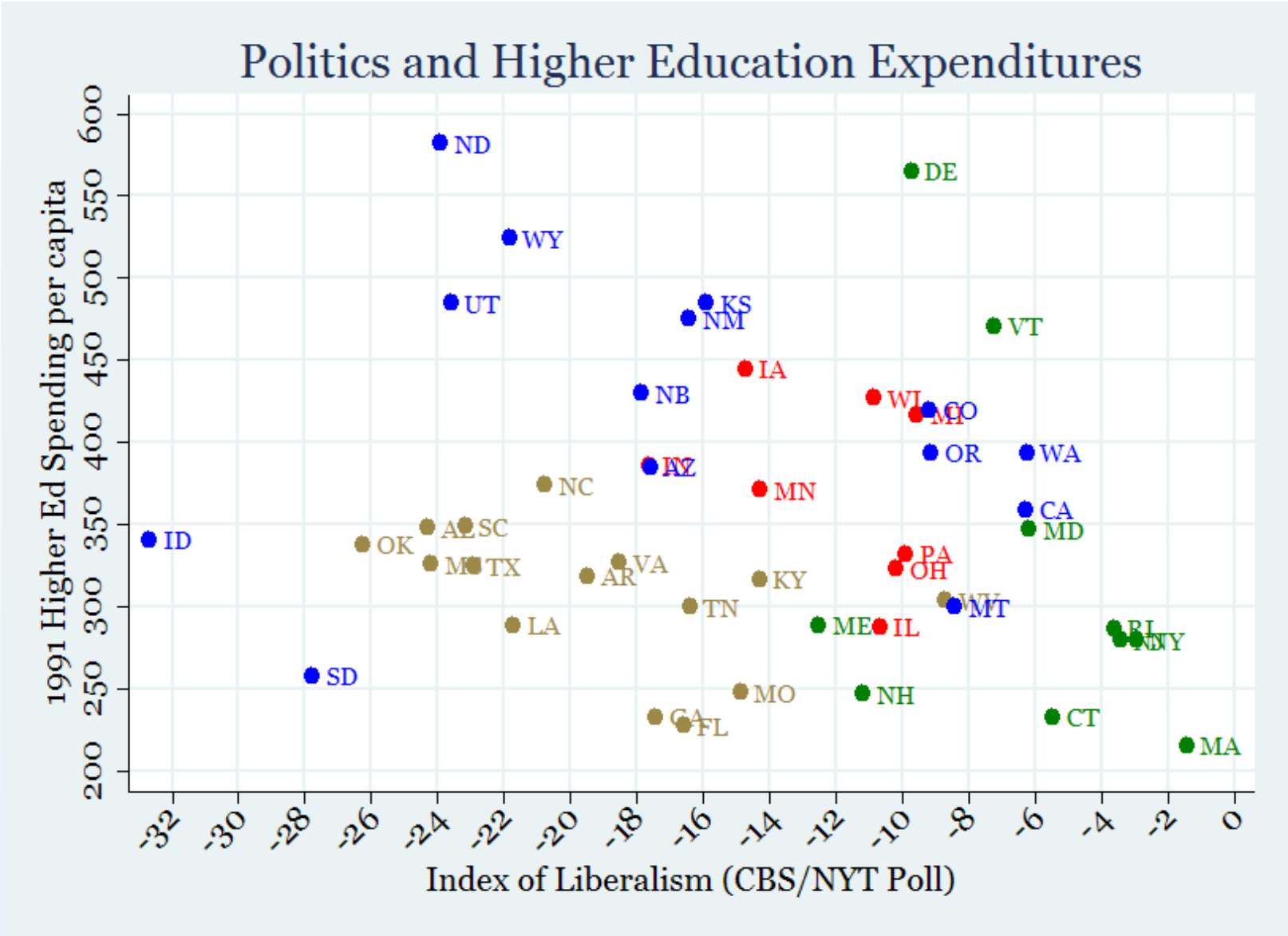
Migration


College Graduate Proportions
Percentage of native graduates who stay
70
65
60
55
50
45
40
35
30
25
20
TX
CA
NC
GA
MN
WA
MI
TN
MA
UT
SC
LA
AL
WI
OH
IL
KY
FL
OR
PA
NY
AR
MO
HI
IN
OK
CO
MS
ME
CT
VA
AZ
MD
NB
NJ
KS
RI
IA
WV
NM
VT
NH
MT
DE
NV
ID
SD
ND
WY
AK
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
Percentage of graduates, among those born in each State

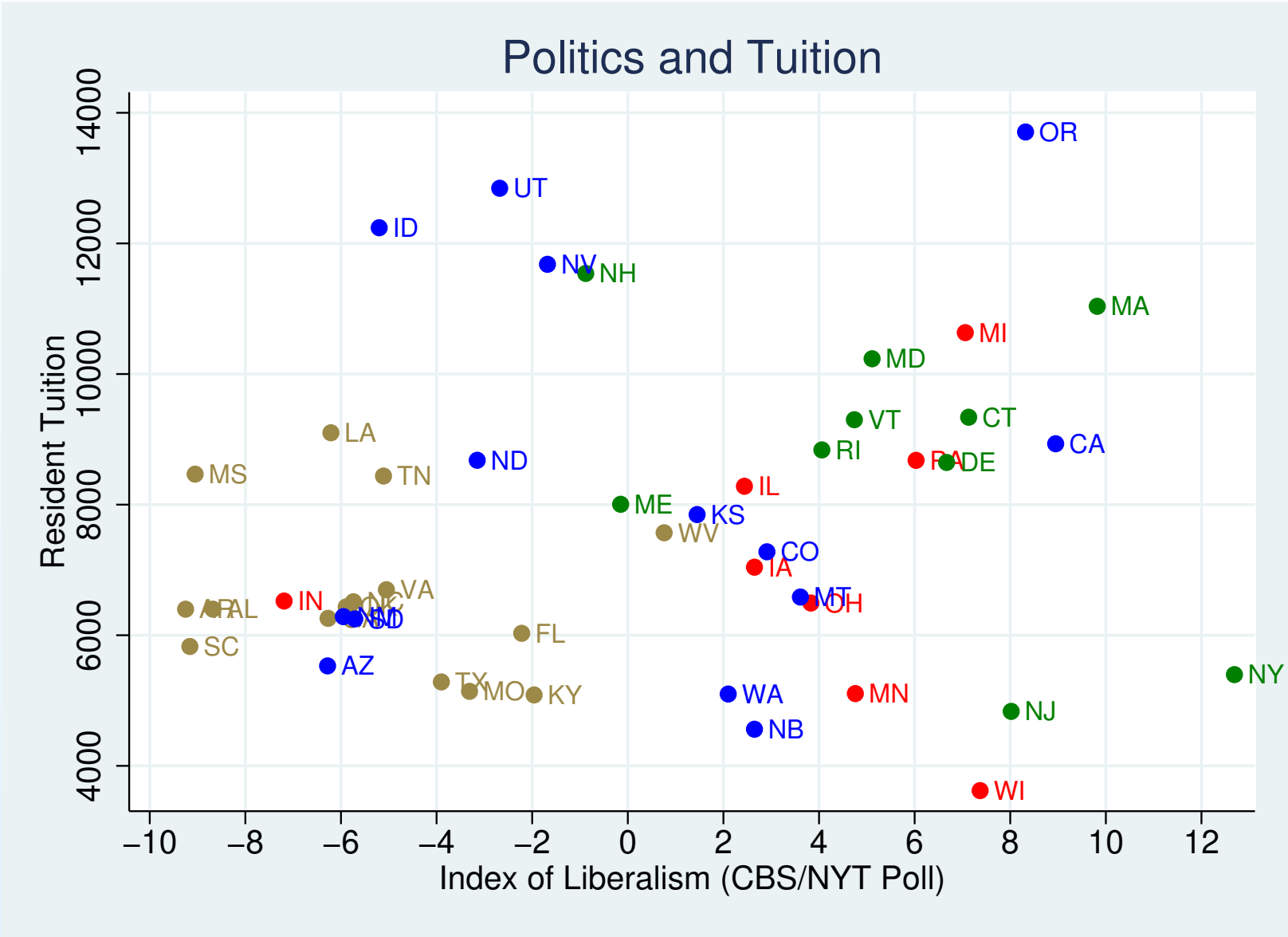
Exports and Expenditures



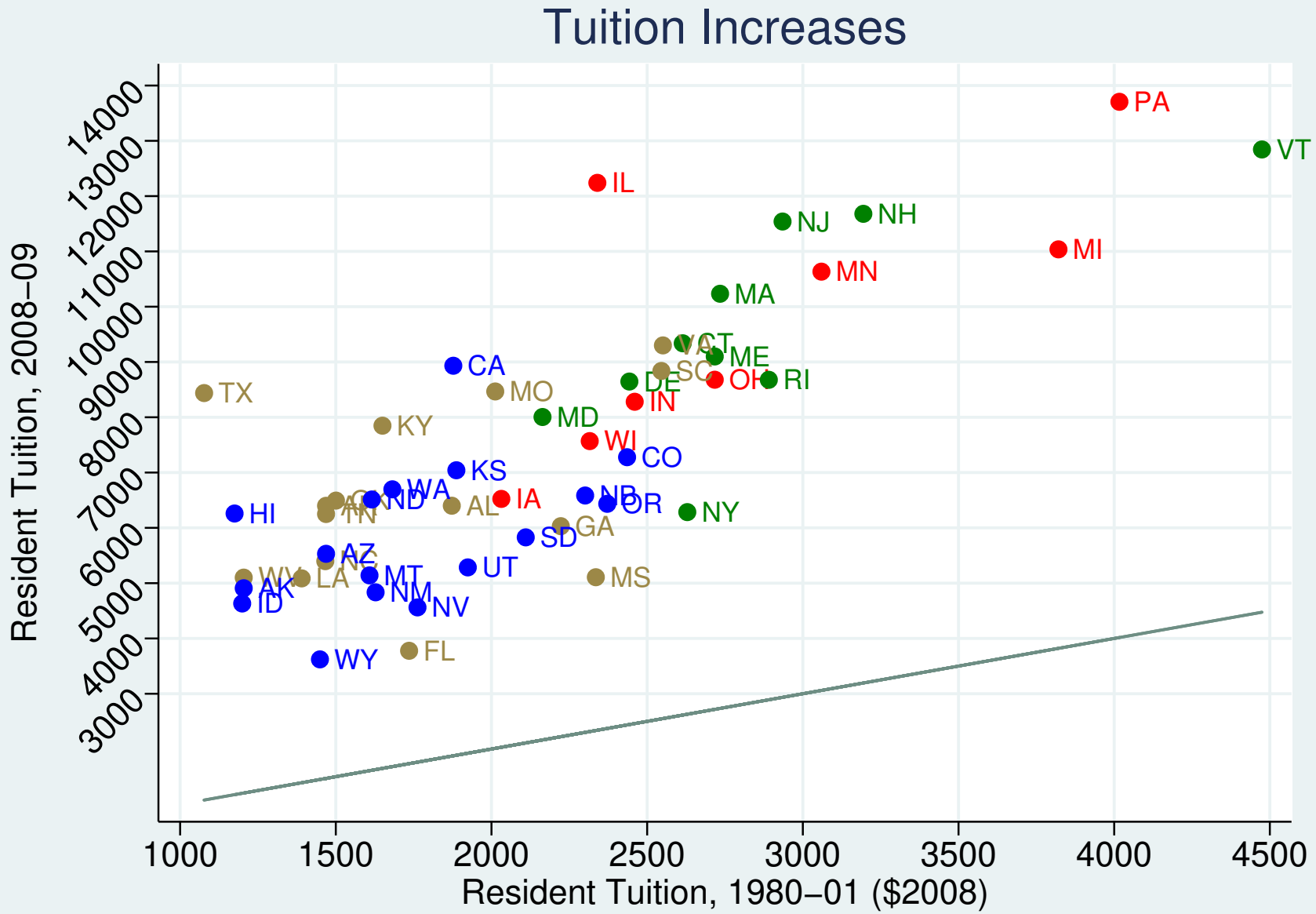
Politics and Expenditures



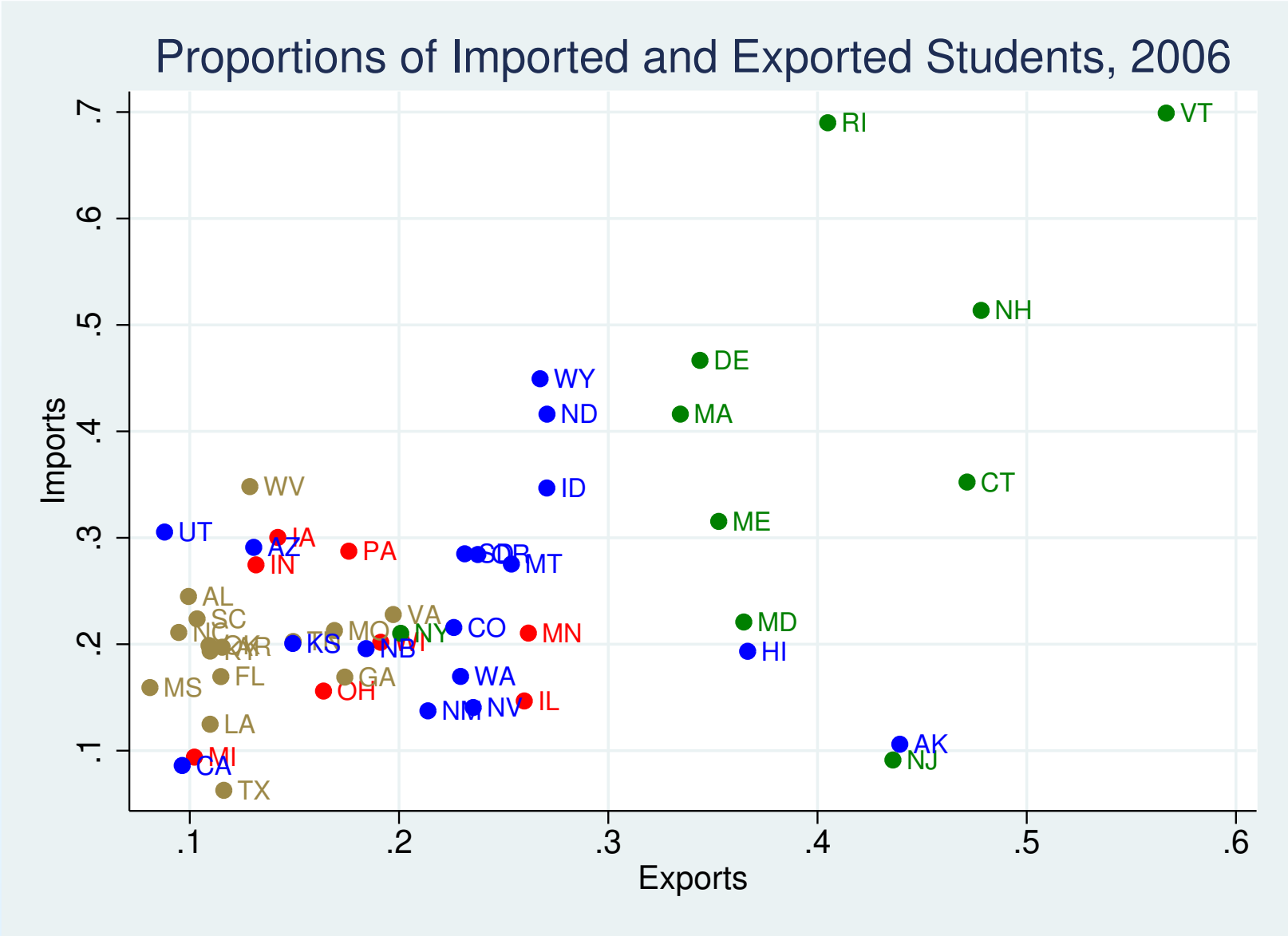
Politics and Tuition



Tuition Increases



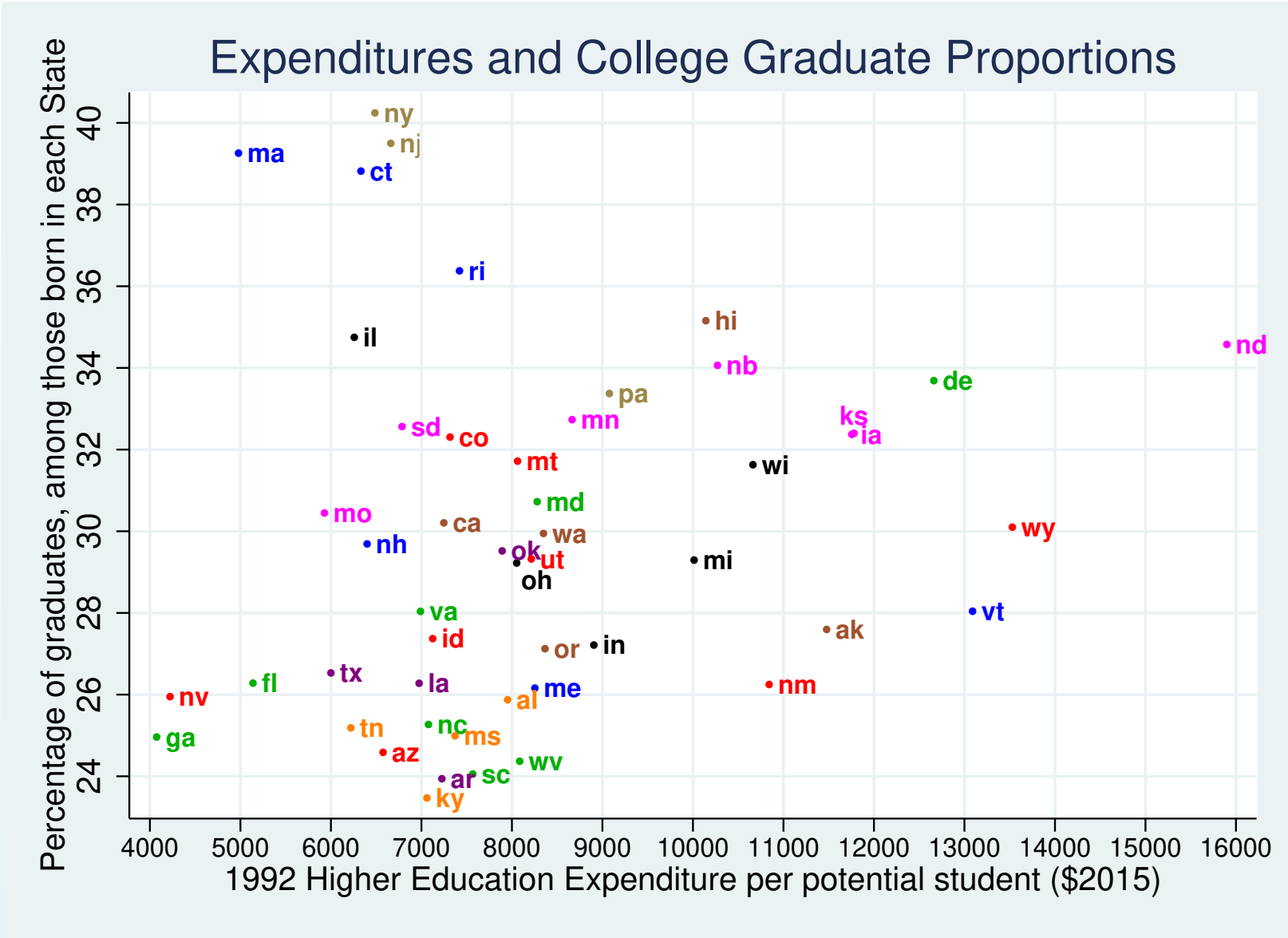
Imported and Exported College Students



Geographical Labor Supply Elasticities (High School)

Geographical Labor Supply Elasticities (College)

Higher Education Expenditures and Human Capital Distribution

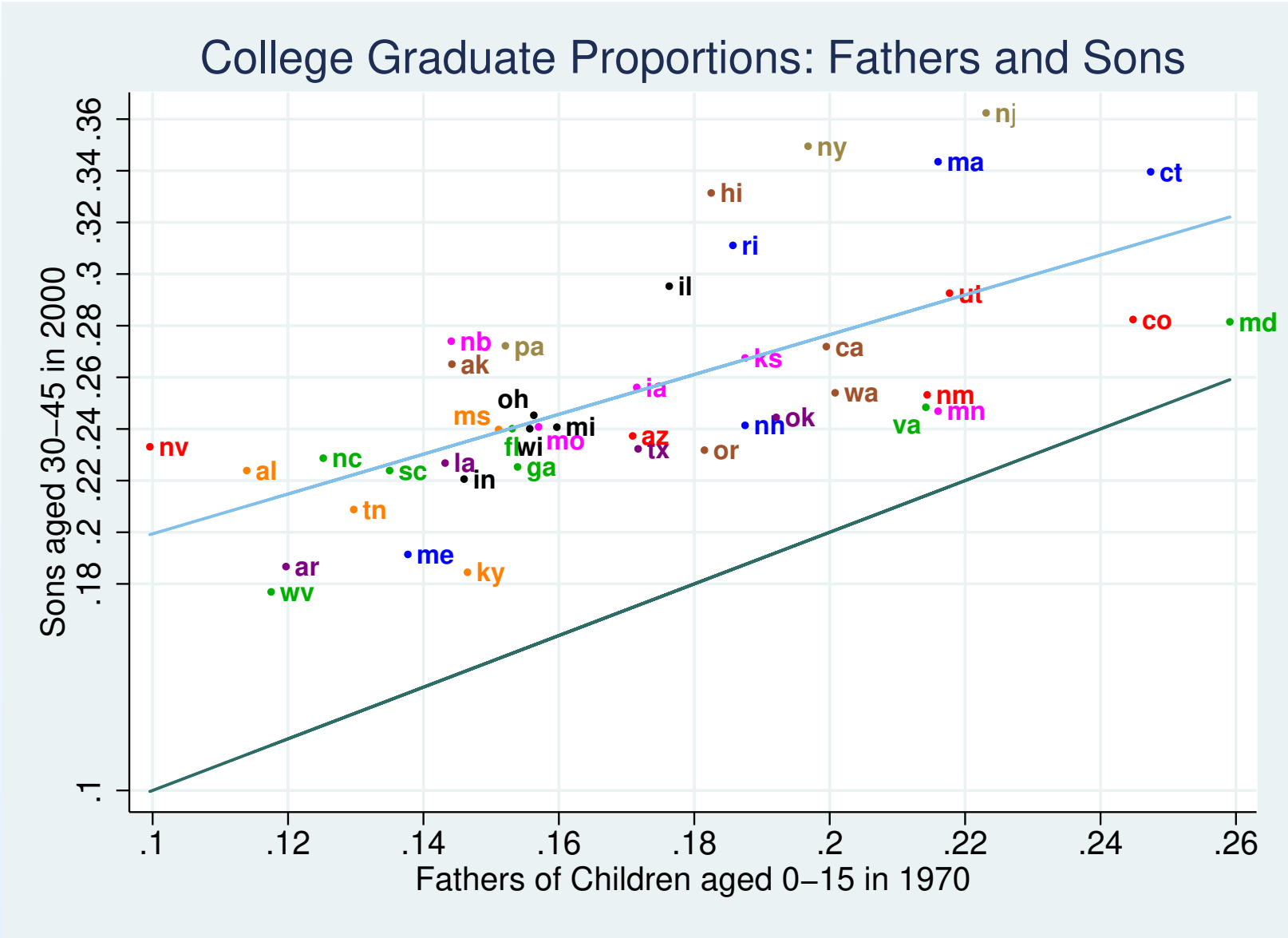


Public and Private Colleges

College Graduates			
	Private	Public	Total
Out of State	44 36.7%	46 16.2%	90 22.3%
In State	76 63.3%	238 83.8%	314 77.7%
Total	120 29.7%	284 70.3%	404

College Graduates: East			
	Private	Public	Total
Out of State	25 43.1%	16 28.1%	41 35.7%
In State	33 56.9%	41 71.9%	74 64.3%
Total	58 50.4%	57 49.6%	115

Intergenerational Relationships



Effects of Changes in Tuition and Expenditure

Policy Effects:

Iterate the state transition matrix implied by the policy variables used in estimation
then do the same thing for the new values of the policy variables (e.g. tuition)
and compare the population distributions

Effects of Policy Changes: Michigan								
	Population at Age 36						Revenue	
	Current Location			Home Location			Taxes	Tuition
Increase (20%)	Grad	SC	HS	Grad	SC	HS	$(PV)	
Tuition	-11.2%	-2.4%	6.2%	-12.9%	-2.4%	6.5%	25.2	2.1
Spending	0.03%	0.42%	-0.16%	0.02%	0.45%	-0.17%	-10.3	2.6
Decrease (20%)								
Tuition	12.7%	1.7%	-6.6%	14.3%	1.6%	-6.9%	-13.6	-45.0
Spending	0.11%	-1.36%	0.43%	0.12%	-1.47%	0.45%	9.2	-0.3

Effects of Tuition: Resident vs. Nonresident

Bound, Groen, Kezdi and Turner (2004)

Increases in the flow of new college graduates in a State have little effect on long-term stock

But this does not say much about policy effects:

If the flow increase mainly involved residents of the State, the long-term effect may be big

Test by changing resident and nonresident tuition levels separately

	Population at Age 36				Revenue (present values)			
	Resident		Nonresident		Resident		Nonresident	
	Graduates	Stayers	Graduates	Stayers	Taxes	Tuition	Taxes	Tuition
California	3.23%	81.9%	0.42%	54.3%	-6.5	-169.5	62.7	20.3
Florida	4.89%	83.7%	1.02%	52.3%	-7.9	-51.2	24.0	6.4
Illinois	3.64%	77.8%	0.16%	42.2%	-8.5	-83.0	35.2	11.0
Massachusetts	1.39%	72.1%	0.05%	36.6%	-30.9	-50.0	16.3	4.4
Michigan	12.16%	73.8%	0.53%	35.1%	-39.5	-59.3	25.9	14.3
New York	2.67%	75.7%	0.11%	38.9%	-52.3	-170.3	69.9	4.9
Pennsylvania	5.72%	73.3%	0.16%	35.1%	-54.0	9.1	20.6	10.8
Texas	1.13%	84.1%	0.13%	59.3%	7.2	-78.9	41.4	-1.6
Wisconsin	3.39%	74.1%	0.18%	34.2%	-27.3	-44.4	16.0	9.7

"Stayers": proportion of the national increase found in the State where tuition changed.