CONFERENCE ON

EDUCATION
+
ECONOMIC DEVELOPMENT

Thursday, November 18, 2004
Friday, November 19, 2004

FEDERAL RESERVE BANK OF CLEVELAND

We know there are economic returns to public investment in education, but how can citizens and policymakers sort through the myriad ways to achieve the goals we seek? What are our policy and investment options, and how might we best prioritize them? What opportunities are available—aside from increased funding—and how can we realize greater public returns on the dollars we are already investing?

This two-day interactive conference convenes prominent academics, economists, local and state school administrators, civic leaders, community officials, educators, business leaders, public policy officials, economic development leaders and educational policymakers to discuss the role of education—at all levels—in economic development.

The first day of the conference offers participants a research focus—six economics scholars will analyze the latest thinking about education finance, school administration, and the economic returns to education. The second day presents a policy focus—a group of nationally respected economists will take a broad look at what we know about public returns to investment in education at all levels and common obstacles to achieving the highest possible results.

Thursday, November 18, 2004

8:00—9:05 a.m. **Registration**
Federal Reserve Bank of Cleveland
Superior Gallery

Continental Breakfast
Auditorium—10th floor

9:05—9:15 a.m. **Welcome**
Sandra Pianalto
President and CEO
Federal Reserve Bank of Cleveland

Research focus: Presentation and Discussion Sessions

9:15—9:45 a.m. **Investing in Early Childhood Education in Ohio: An Economic Appraisal**
Conference presentation (to come)
Clive Belfield
Professor of Economics
Queens College, City University of New York

9:45—10:00 a.m. **Open Discussion**

10:00—10:15 a.m. **Break**

10:15—10:45 a.m. **Estimating Dynamic Treatment Effects from Project STAR**
Conference presentation (to come)
Steven Lehrer
Assistant Professor of Economics and Public Policy
School of Policy Studies, Queens University, Kingston, Ontario

10:45—11:00 a.m. **Open Discussion**

11:00—11:15 a.m. **Break**

11:15—11:45 a.m. **Teacher and Student Achievement in the Chicago Public High Schools**
Conference presentation (.ppt)
Daniel Aaronson
Senior Economist and Economic Advisor
Federal Reserve Bank of Chicago

11:45—12 noon **Open Discussion**

12 noon—1:30 p.m. **Luncheon**
Federal Reserve Bank of Cleveland
Auditorium—10th floor

1:30—2:00 p.m. **Estimating the Effects of Private School Vouchers in Multi-District Economies**
Conference presentation (.ppt)
Maria Marta Ferreyra
Assistant Professor of Economics
Tepper School of Business, Carnegie Mellon University, Pittsburgh, Pennsylvania

2:00—2:15 p.m. **Open Discussion**

2:15—2:30 p.m. **Break**

2:30—3:00 p.m. **A Panel-Data Analysis of State Preferences for Funding Higher Education, 1977–2001**
Conference presentation (.ppt)
Michael J. Rizzo
Assistant Professor of Economics
Centre College, Danville, Kentucky

3:00—3:15 p.m. **Open Discussion**

3:15—3:30 p.m. **Break**

3:30—4:00 p.m. **Estimating the Scope for Governmental Interventions to Improve Education Performance**
Conference presentation (.ppt)
Emmanuel Abuelafia
Economist
Centre for the Implementation of Public Policies Promoting Equity and Growth,
Buenos Aires, Argentina

4:00—4:15 p.m. **Open Discussion**

4:15—4:30 p.m. **Break**

4:30—6:00 p.m. **Reception**
Federal Reserve Bank of Cleveland
Main Foyer Reception Room—8th floor

CONFERENCE AGENDA

Friday, November 19, 2004

9:00—9:30 a.m. **Registration**
Federal Reserve Bank of Cleveland
Superior Gallery

Continental Breakfast
Auditorium—10th floor

9:30—10:00 a.m. **Welcome and Opening Remarks**
Sandra Pianalto
President and CEO
Federal Reserve Bank of Cleveland

Policy focus: Presentation and Discussion Sessions

10:00—10:30 a.m. **Maximizing Returns from Prekindergarden Education**
Conference presentation (.ppt)
W. Steven Barnett
Professor, Education Economics and Public Policy, and
Director, National Institute for Early Education Research
Rutgers University, New Brunswick, New Jersey

10:30—10:45 a.m. **Open Discussion**

10:45—11:00 a.m. **Break**

11:00—11:30 a.m. **The Public Interest in Higher Education**
Conference presentation (.ppt)
Michael J. Rizzo
Assistant Professor of Economics
Centre College, Danville, Kentucky

Ronald G. Ehrenberg (unable to attend)
Irving M. Ives Professor of Industrial and Labor Relations and Economics and
Director, Cornell Higher Education Research Institute
Cornell University, Ithaca, New York

11:30—11:45 a.m. **Open Discussion**

11:45 a.m—12 noon **Break**

12 noon—1:30 p.m. **Luncheon—Keynote Address**
Public Returns to Education
Conference presentation (.ppt)
Robert Topel
Isidore Brown and Gladys J. Brown Professor in Urban and Labor Economics
University of Chicago, Graduate School of Business, Chicago, Illinois

Federal Reserve Bank of Cleveland
Auditorium—10th floor

1:30—2:00 p.m. **The Economic Value of Improving Local Schools**
Conference presentation (.ppt)
Eric Hanushek
Paul and Jean Hanna Senior Fellow at the Hoover Institution
Stanford University, Stanford, California

2:00—2:15 p.m. **Open Discussion**

2:15—2:30 p.m. **Break**

2:30—3:00 p.m. **Improving Public Education through Strengthened Local Control**
Conference presentation (.ppt)
Robert P. Strauss
Professor of Economics and Public Policy
H. John Heinz III School of Public Policy and Management,
Carnegie Mellon University, Pittsburgh, Pennsylvania

3:00—3:15 p.m. **Open Discussion**

3:15—3:30 p.m. **Break**

3:30 p.m. **Tour of the Federal Reserve Bank of Cleveland**
Small group tours will depart from the 10th floor Auditorium
Tour includes the Bank's main lobby, the old vault, and historic 8th floor

4:00—5:30 p.m. **Reception**
Federal Reserve Bank of Cleveland
Main Foyer Reception Room—8th floor

A (Less Than) Zero Sum Game?

State Funding for Public Education:

How Public Higher Education Institutions Have Lost

Michael J. Rizzo

Centre College

Research Objectives

1. Determine what observable factors affect preferences for public higher education and which, if any, might be correlated with this relative decline (or perhaps cause?)

2. Understand the wide variation in budget processes and higher education systems across states

3. The bigger picture

Research Strategy

- Construct an expansive state-level panel data set spanning 26 fiscal years (1972, 1977-2001)
- Control for factors that have systematic effects on state funding allocations
- Employ a variety of econometric models to analyze how idiosyncratic shocks affect three outcomes within states:
  1. EDSHARE
  2. HESHARE
  3. INSHARE

Preview of Findings

"Robbing Peter to Pay Paul"

- Efforts to reform elementary and secondary (K12) school district spending programs have led to an expansion of education's share of state discretionary budgets

- At the same time, these efforts are correlated with a steep decline in higher education's share of the education budget

Preview of Findings

A Cycle of Retaliatory Behavior

- Public institutions increase tuition rates both in response to, and in anticipation of, declining budget shares. Simultaneously, states decrease higher education budget shares both in response to, and in anticipation of, increasing tuition rates

- Further, states have responded to public college and university efforts to raise funds from private sources by cutting budget shares

Preview of Findings

School Funding is Shifted Away from Under-represented Segments of the Population

- All else equal, as the college-aged population becomes more non-white relative to the K12-aged population, states shift funding away from higher education and toward the K12 sector

- All else equal, as the college-aged population becomes more non-white relative to the adult population, states shift funding away from broad-based institutional aid and toward targeted student-aid

Preview of Findings

Support for the "Bennett Hypothesis"?

- All else equal, as more households in a state become eligible to receive federal grant aid, states respond by shifting funds away from broad-based institutional aid and toward targeted student-aid

→ This IS a conscious decision

Preview of Findings

Strategic Behavior is a Conscious Decision

"I would suggest that there should be (a tuition increase) …

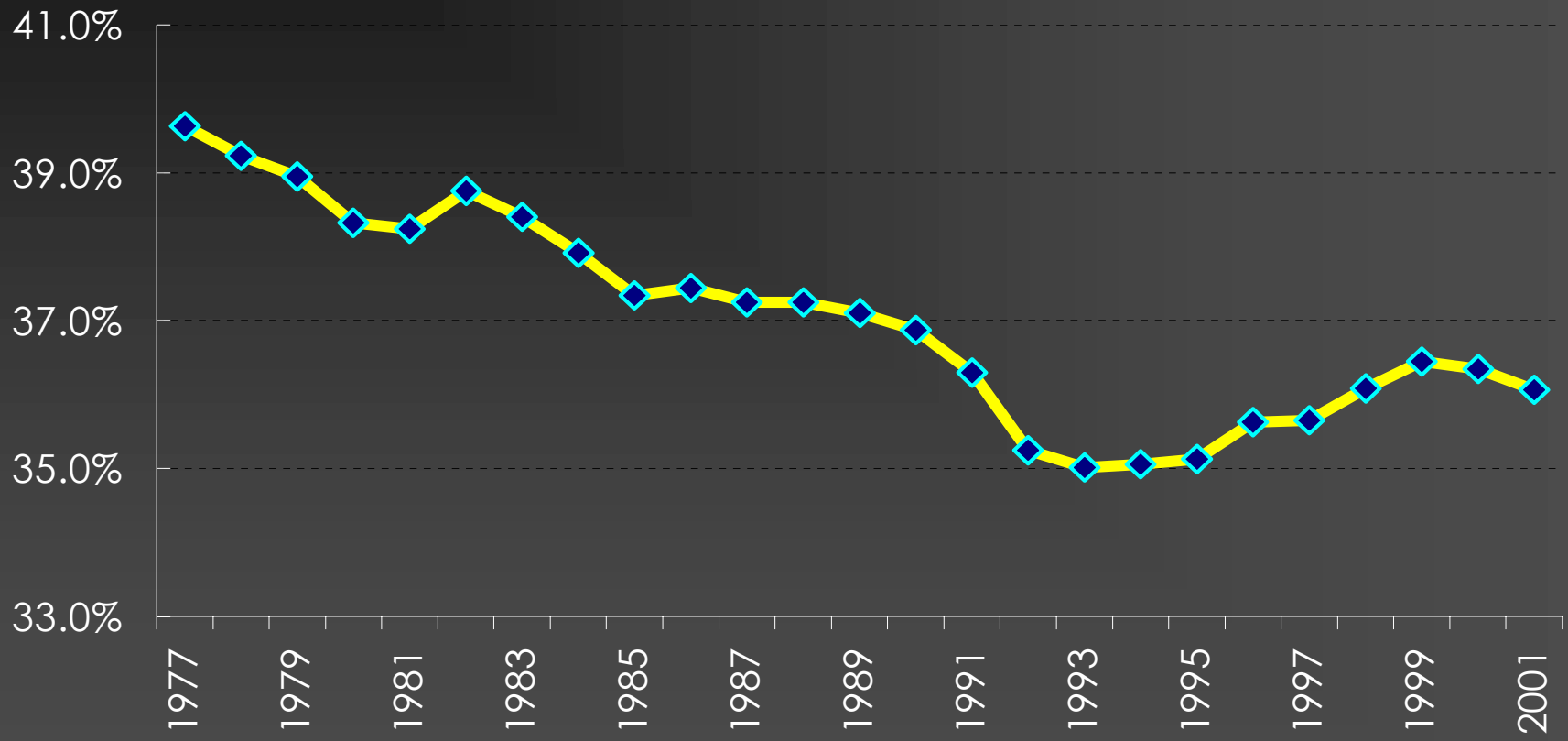
… For students whose family's incomes is $50,000 or less, the state's tuition assistance program picked up the entire $950 of last year's hike …

… Students from most needy families are pretty much insulated from this … For those families that can afford to pay, eventually, we're gonna say, you gotta pay a little more. "

→SUNY Chancellor Robert King

The Size of the Educational Pie is Shrinking …

Share of State GF Expenditures on Education (EDSHARE)



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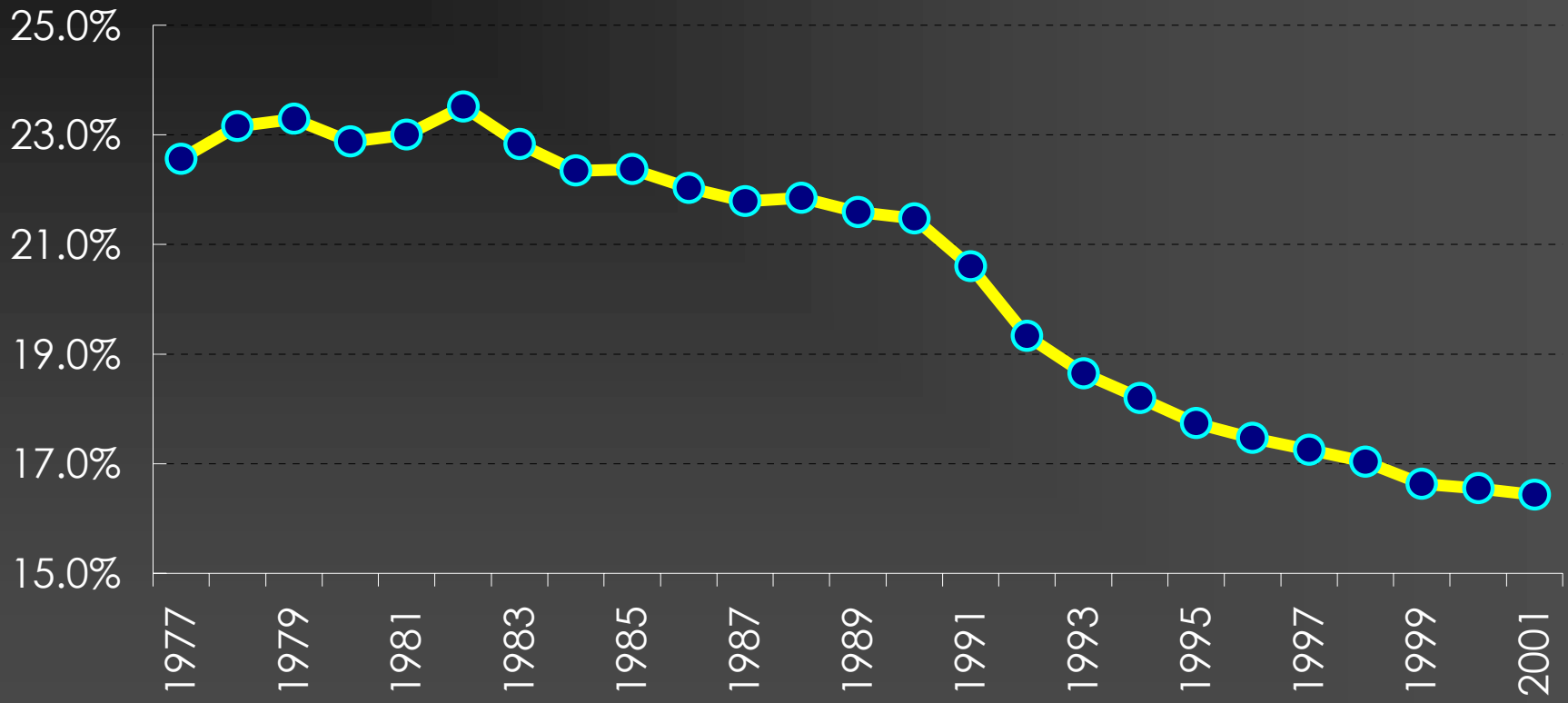
… and Higher Education Gets a Smaller Slice

Share of Education Expend. to Public Higher Education (HESHARE)



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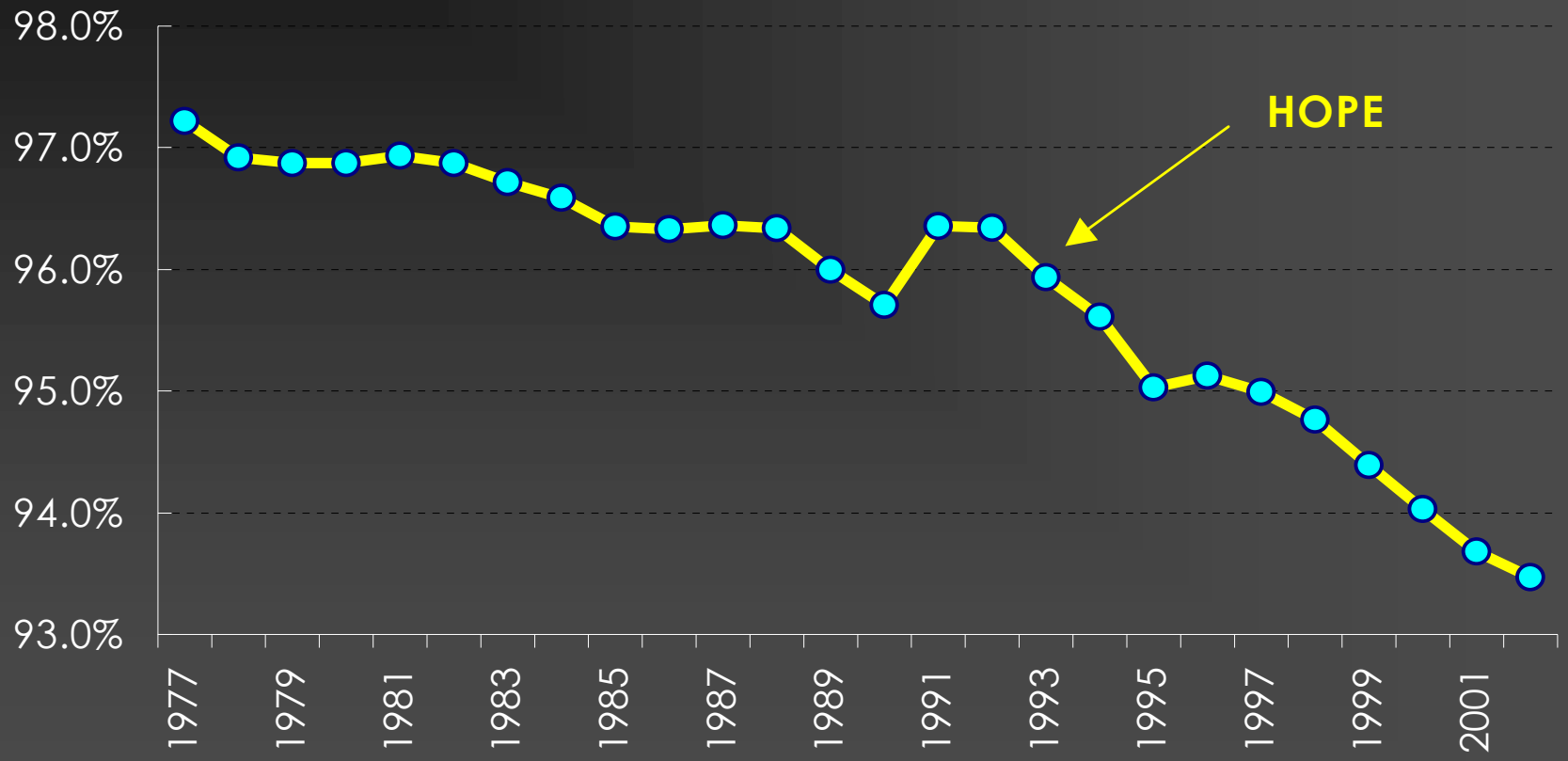
The Institutions are Hit Hardest

Share of Public Higher Education Expend. to Institutions (INSHARE)



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In Dollar Terms

Table 2 in the Paper: Fiscal Year 2001 Budgets in $Billions

	General Fund	Education (share of GF)	Higher Education (share of Ed)
National Average	*20.9*	*7.5 (36.1%)*	*1.2 (16.4%)*
Ohio	39.0	14.6 (37.3%)	2.3 (15.5%)

Impacts of Budget "Losses"

Compared to 1977 Budget Shares:

- Public institutions in "average" state lost $625 million
- State funds cover 22% points less of the educational & general operating expenses at public institutions
- State appropriations per student (FTE) are $3,750 lower:
  - Represents over 50% of current level of per student appropriations (≈ $7,150)
  - Represents over *twice* the amount that tuition has increased since 1977 (≈ $1,750)

Increasing Inequality Across Sectors

	Year	Public	Private	Premium
Expenditures Per Student ($1,000)	*1977*	8.1	11.2	3.1
	2000	12.6	20.0	7.4
	growth	*(56.4%)*	*(79.7%)*	*(140.6%)*
Faculty Salaries ($1,000 - Assoc.)	*1978*	54.3	55.9	1.6
	2002	61.5	74.1	12.6
	growth	*(13.3%)*	*(32.6%)*	*(687.5%)*
Student - Faculty Ratio	*1977*	20.4	26.4	-6.1
	1999	25.4	24.1	1.3
	growth	*-(24.6%)*	*(8.9%)*	*(121.7%)*
Part-Time Faculty Share	*1989*	38.1	33.3	4.8
	1998	43.5	37.8	5.7
	growth	*(14.2%)*	*(13.5%)*	*(18.8%)*

Why I Analyze Budget Shares

- ✯ Analytical Tractability

- ✯ Behavioral Evidence
  - i. State budgeting practices
  - ii. Legislative and voter debates in SC, AL, ME and elsewhere
  - iii. Tax effort

- ✯ Empirical Support

Empirical Model *Specification*

$EDSHARE_{it}$

$HESHARE_{it} = f$

$INSHARE_{it}$

- resources
- relative prices (Eq 1&2 only)
- demographic characteristics
- characteristics of competing budget interests
- enrollment pressures
- economic factors
- state institutional characteristics
- political factors
- other factors

$_{it} + c_i + g_t + e_{it}$

Empirical Model

Strategies

- Multiple variable transformations tested
- Multiple empirical models employed

- Sensitivity analyses and robustness checks:
  - Dynamic relationship between tuition and shares
  - Augmented specifications
  - Incremental budgeting
  - Splitting the sample

Data

- State-level panel data:
  - Covers all 50 states
  - Spans 26 fiscal years: 1972 & 1977 through 2001
- Assembled from over 30 sources including:
  - Census of Governments, Census of Population, CPS, IPEDS, NASBO, Grapevine, NASSGAP and more
- Summary statistics

Table 3: EDSHARE Preferred Results

Variable	Coefficient (SE)	77-01 Δ
Median Income ($1,000)	-1.3 (0.3)	+$7
75-25 Income Ratio	-5.1 (1.8)	+0.2
Share Pop. > 65	-0.4 (0.2)	+2.0
Share Pop. b/w 5-24	0.6 (0.1)	-9.2
COURT	**1.2 (0.3)**	**22 states**

Within $R^2 = 0.32$

Table 3: HESHARE Preferred Results

Variable	Coefficient (SE)	77-01 Δ
Median Income ($1,000)	0.6 (0.2)	+$7
75-25 Income Ratio	4.1 (1.5)	+0.2
Share Pop. > 65	0.22 (0.13)	+2.0
Share Pop. 18-24 / 5-17	0.13 (0.04)	-0.05
Racial Heterogeneity	**0.04 (0.01)**	**+5.4**
Out-migration Rate	-0.13 (0.06)	-1.3
Unemployment	-0.22 (0.05)	-3.1
COURT	**-1.2 (0.3)**	**22 states**

Within $R^2 = 0.66$

Table 4: INSHARE Preferred Results

Variable	Coefficient (SE)	77-01 Δ
Share Pop. > 65	0.38 (0.10)	+2.0
Share Pop. 18-24	0.37 (0.08)	-3.9
Out-migration Rate	-0.11 (0.05)	-1.3
Share HH Income < Pell	**-0.07 (0.03)**	**-7.7**
Regional Tuition ($1,000)	-0.14 (0.09)	+$1.6
Share College Enroll in Privates	0.03 (0.01)	+2.9
Merit Aid State	**-6.9 (3.5)**	**10 states**
Merit x Income x Racial Het.	**-0.003 (0.001)**	

Within $R^2 = 0.41$

Sensitivity Analysis & Extensions

Tuition – HESHARE Relationship (Preliminary)

i. Non-instrumented equations indicate that when one-period lagged tuition increases by (real) $1,000, this year's HESHARE is cut by 3.4 points. Other findings unaffected.

ii. Instrumented equations indicate that when one-period lagged tuition increases by (real) $1,000, this year's HESHARE will be cut by 6.3 points. Other findings unaffected.

Sensitivity Analysis & Extensions

Augmented Specifications

- ✯ Political and Voting Characteristics
- ✯ Sources of General Fund Revenues
- ✯ Industrial Composition Mix
- ✯ Higher Education Institutional Characteristics
- ✯ Other Demographic Variables

Sensitivity Analysis & Extensions

Incremental Budgeting

Rather than estimating:

$$Outcome_{it} = \beta \mathbf{X}_{it} + c_i + g_t + e_{it}$$

I consider:

$$Outcome_{it} - \gamma Outcome_{it-1} = \beta \mathbf{X}_{it} + c_i + g_t + e_{it}$$

$\gamma = 0$ → completely discretionary

$\gamma = 1$ → strictly incremental

$0 < \gamma < 1$ → partial discretion

Sensitivity Analysis & Extensions

Problem:

Standard assumptions on unobservables result in violation of key orthogonality assumption

Solution:

Estimate using Dynamic Panel GMM IV Estimator

Result (Table 5):

→ Major findings largely invariant to treatment

→ Considerable discretion over HESHARE, with only 56% determined by prior year

Sensitivity Analysis & Extensions

Splitting the Sample

1. Time (3 periods: 72-82, 83-92, 93-01)
2. Funding Formula (29)
3. Autonomy (25)
4. Biennial Budget Cycle (23)
5. Governor Can Reduce Appropriations without Explicit Legislature Approval (37)
6. Political Competition (25)
7. Population Density (25)
8. Uniparty Government
9. Northeastern States

Sensitivity Analysis & Extensions

Splitting the Sample – Summary of Major Findings

- Impacts of main findings stronger over time
- Funding formula states are more responsive to changes in enrollment pressures than non-formula states
- Evidence that the "usual suspects" have a direct impact on education spending in densely populated states, in states with split governments and where governors enjoy expansive veto powers

Conclusion

- Quality implications
- "Semi-private" equilibrium may not be desirable
- Directions for future research
- Policy recommendations

Conclusion

" In general, however, my impression is that the great danger is not so much institutional extinction, or even that there will be a sudden, dramatic downward shift from one level of quality to another. The greater danger, I believe, is that there will be a slow, unspectacular, but cumulative decline in what it is possible to achieve – and then, as a next step in the process, in what one tries to achieve. Gradual changes of this sort are, in their nature, impossible to measure with any precision, and they may not even be noticeable to quite experienced observers until some considerable time after they have occurred."

→*William Bowen (1977)*

The Public Interest in Higher Education

by

Michael J. Rizzo

Assistant Professor of Economics

Centre College (Danville, KY)

Overview

- Apx. 2/3 of all high school graduates have spent some time in college, 75% attending public institutions
- Over $130 billion dollars of taxpayer money funds higher education each year
- Clearly, the public is **interested**

Social Returns = Private Returns + Public Returns

Overview

3 Considerations

1. How to identify and quantify the financial and non-pecuniary benefits and costs to both the public and individuals?

2. To whom do these positive externalities spillover (if they exist)?

3. How to optimally implement policy?

What are the Returns? *Benefits - Private*

Financial

1. Higher earnings
2. Financial "option"

Non-Pecuniary

1. Consumption
2. "Opportunity option"
3. Technology hedge
4. Dynastic effects
5. Expansion of cultural horizons
6. Alumni networks
7. Health outcomes

What are the Returns? *Costs - Private*

Financial

1. Tuition, books and supplies
2. *Incremental* living costs
3. Opportunity costs – foregone earnings

Non-Pecuniary

1. Psychic costs
2. Displacement effects

What are the Returns? *Benefits - Public*

Financial

1. Higher tax revenues
2. Workforce productivity spillovers
3. Lower dependency

Non-Pecuniary

1. Public consumption
2. Supply of trained workers to economy
3. Higher growth and productivity
4. Mechanism to achieve social goals such as mobility and income equalization
5. Extension

What are the Returns? *Benefits - Public*

Financial

1. Higher tax revenues
2. Workforce productivity spillovers
3. Lower dependency

Non-Pecuniary

6. Public health
7. Research stock (basic)
8. Social investments such as reduced crime
9. Labor markets clear more quickly
10. Enhanced civic behavior
11. "Personal economies of scope"

What are the Returns?

Costs - Public

Financial

1. Subsidies
2. Excess burden
3. Rent seeking

Non-Pecuniary

1. Moral hazard
2. More competent criminals?
3. Mismatching of students and institutions
4. Leakage
5. Out-migration
6. Signal only

When is Public Support Justified?

3 Economic Criteria Must be Met

1. Positive net social benefits

2. Individuals must be restricted from investing in socially optimal level of schooling

3. Net social return to higher education investments must (weakly) exceed the net social returns to any competing use of public monies, at the margin

How do Economists Measure Social Returns?

3 Methods

1. Rate of return studies

2. Economic impact studies

3. Contributions studies

What do Economists Know About Social Returns?

Private Returns

- Earnings premium enjoyed by college graduates over high school graduates has expanded from 50% in 1976 to 80% in 2003

- Real wages of colleges graduates have fallen or remained stagnant over past three decades
  - Full-time workers aged 25-34 earned $52,000 in 1973
  - They earn just under $50,000 today

What do Economists Know About Social Returns?

Classic Rate of Return Studies

- (1957) Griliches → social return on hybrid corn seed research apx. 700%; b/w 35% and 170% on all agricultural research

- (1971) Weisbrod → social return on Polio vaccine 14%

Income Growth and Stock of Human Capital

- (1995) Glaeser et al. → cities with higher stock of human capital in 1960 grew faster until 1990

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What do Economists Know About Social Returns?

Income Growth and Stock of Human Capital, Cont'd

- (2004) Glaeser and Saiz → Boston vs. Detroit; cities with high skills better able to adapt to economic shocks
- (2004a) Moretti → Gross-complementarity between high-skilled and less-skilled workers
- (2004b) Moretti → Manufacturing plants are more productive in cities with larger share of college graduates

What do Economists Know About Social Returns?

Income Growth and Stock of Human Capital, Cont'd

- (2004) Bound et al → Little relation between stocks and flows of college educated workers

- (2004) Groen → Attending college in a state only modestly linked to remaining (and working) in-state

Civic Returns

- (2003) Dee → Each additional year of schooling increases voter participation rates by 7% points

What do Economists Know About Social Returns?

Civic Returns, Cont'd

- (2004) Milligan et al → In U.K. and U.S. also finds that voter participation increases with education levels

Unconditional Evidence

- BLS → 46% of four-year grads volunteer (60 hrs/wk)

  → 22% of HS grads volunteer (48 hrs/wk)

- DDB Worldwide → 17% of college grads donate blood

  → 11% of HS grads donate blood

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What do Economists Know About Social Returns?

Unconditional Evidence, Cont'd

- (1999) RAND → Government spending on social programs substantially lower for college graduates

Economic Impact Studies

- (2003) NASULGC → Spending by land-grant colleges has substantial economic impacts

- (1987) Leslie & Brinkman → Meta-analysis; also finds large positive impacts

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What do Economists Know About Social Returns?

Contributions Studies

- (1987) Leslie & Brinkman → Higher education directly accounts for 5% of national income growth; b/w 20% - 40% of national income growth due to TFP

It is clear that there are substantial public benefits emanating from higher education investments, so what else do policymakers need to consider?

Considerations

1. Heterogeneity of public benefits
2. Form of public support
3. Student price elasticity
4. Access is important, but what of choice & retention?
5. Impact of education subsidies on income distribution
6. It is not entirely clear that many of the foregoing public benefits would not be achieved absent public support

Public Service

- Land grant college & university Extension services
- Does declining (relative) state support for public higher education fall disproportionately on Extension?
- Share of E&G expenditures to Extension fell from 6.1% in 1994 to 5.3% in 2001
- (2003) Huffman & Evenson → share of Extension funding from state sources fell by 6% points since 1980 to less than 50% of overall funding

Higher Education and K-12 Education

- No consensus in K12 literature on impact of increased funding on student and school outcomes

- However, strong consensus that student performance is stronger when they have bright teachers (Rockoff 2004, Schacter & Thum 2004, Hanushek, Kain & Rivkin 1998, Ehrenberg & Brewer 1995)

- (2004) Reback → Selective colleges can substantially increase pool of talented teachers

Nonresident Enrollments

- At public flagships between 1979 – 1998, share of full-time first year students from out-of-state increased from 16% to 18.5%
- Capacity
- (2004) Groen → Nonresident students are not overwhelmingly likely to remain in-state upon graduating
- (2004) Rizzo & Ehrenberg → Flagships, once at capacity, use nonresidents to augment quality

Two-Year Colleges

Do student enrollments follow highest returns?

- (2003) Gill & Leigh → CC grads of terminal training programs enjoy returns equal to 4-year non-completes
- (1998) Krueger & Rouse → Manufacturing earnings only slightly increase after CC workplace training
- (1997) Leigh & Gill → Importance of job retraining

Two-Year Colleges

Transfer Function

- (2003) Leigh & Gill→ CC may help raise completion rates
- (1998) Rouse → CC may be efficient in expanding access
- (1997) Hilmer → CC may expand quality choices

Higher Education and the Workforce

- (2004) Sumell, Stephan & Adams → Local areas capture a good portion of knowledge spillovers from Science & Engineering Ph.D. production
  - 2,102 new Ph.D.s trained in ENC region (97-99)
  - 794 stayed to work (38%); 552 imported
- (1993) Beeson & Montgomery → R&D funding levels and program quality leads to stronger labor markets
- (1990) Hedrick et al → Areas with larger college enrollments and expenditures have larger employment in FIRE, service and retail sectors

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"Big Science" and Technology Transfer

Do research and "big science" crowd-out undergraduate education?

- (2004) Ehrenberg & Rizzo → This is happening, but magnitude is not enormous

Does commercialization of university inventions lead to windfall profits?

- (2004) AUTM →No

"Big Science" and Technology Transfer

The Public Good in University Research

- (2004) AUTM → 67% of new business start-ups since 1980 are still in business; of the 450 new startups in 2002, 83% located in state where technology was created
- (2004) Helpman → R&D capital stocks lead to large increases in total factor productivity
- (2004) Nordhaus → Most of gains from technical change between 1948-2001 captured by consumers

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Summary

1. Public **benefits** likely exist and sizable

2. There are strong links between higher education and the workforce

3. Research & development and technical advancements are important for economic development

4. Community colleges may be most efficient mechanism to improve access, completion rates and choices – and serve as vital retraining grounds during times of rapid job creation and destruction

Policy Questions

1. Should the individual or society pay more?

2. What form should public subsidies take (institutional block grants, student aid, research support, sector)?

3. Who is the system serving (or not serving)?

4. Why is retention dreadfully low, and why is problem worse for minority and low-income students?

5. Are complementary investments necessary to achieve economic growth?

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Recommendations

1. Market driven cost controls

Recommendations

1. Market driven cost controls

2. Appropriations banking and smoothing

3. Alter form of public support and encourage change in institutional pricing policies

Recommendations

4. Governance and discount rates

5. Goals, outcomes and accountability

Recommendations

4. Governance and discount rates

5. Goals, outcomes and accountability

6. Coordination