Productivity and Growth Over the Years at BPEA

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Productivity and Growth Over the Years

• U.S. labor productivity (LP) growth has always been a prime BPEA topic
  • Early 1970s, why did LP growth slow after 1965?
  • Early 2000s, why did LP growth revive after 1995?

• More recent concern, rich vs. poor countries
  • Why haven’t the poor countries converged?
  • What are the secrets to growth?
  • Is there an empirical strategy to reveal secrets?

• Criteria for my selections:
  • Two early LP papers, flavor of early BPEA
  • Three more LP papers and three growth papers
Average BPEA Citations per Paper, Inequality by Decade

- 1970s: 227 citations
- 1980s: 274 citations
- 1990s: 1,067 citations
- 2000s: 591 citations
- 2010s: 227 citations
Citations Across Decades

• Reasons for high citations in 1990s and 2000s
  • Editors’ taste in topics broadened out
  • Many authors were already prominent

• Reasons citations so low in 2010s
  • No good reason besides their youth

• Reasons citations so low in 1970s
  • Original BPEA model, equations of a macro model
  • Half the papers were short sector reports
  • Short-run orientation, intro to 1970, no. 1:
  • “particular attention is devoted to recent and current economic developments that are directly relevant to the contemporary scene. . . “ (1970:1, p. 1).
Citation Inequality Across Papers

- Top paper had 7,500 citations
- Top 20 out of 646
  - 3% of BPEA papers
  - Cutoff for top 20: 1,239 citations per paper
- Mean citations per paper: 250
- Median citations per paper: 103
- Leads to question, more or less unequal than U.S. income?
Inequality: BPEA Paper Citations And U.S. Income

- **Top 0.1 Percent**
  - BPEA Citation Share: 5.0
  - US Income Share: 9.3

- **Top 1 Percent**
  - BPEA Citation Share: 15.4
  - US Income Share: 20.1

- **Top 10 Percent**
  - BPEA Citation Share: 51.9
  - US Income Share: 47.0
Productivity Growth Viewed from the Early 1970s

- Perry (1971) and Nordhaus (1972) both sought to explain first stage of LP growth slowdown
- Data refer to total economy, not NFPB sector
- Total economy LP growth averaged 2.8% per year 1920-1970
- Postwar: 3% accepted as normal
  - Remember 3.2% criterion for Kennedy-Johnson wage-price guideposts
- By 1971 evidence of a slowdown was there
Total Economy Productivity Growth per Year, Selected Intervals

- 1948-1965: 2.85%
- 1965-1970: 2.11%
- 1970-1980: 1.43%
- 1980-1995: 1.50%
- 1995-2004: 2.58%
- 2004-2010: 1.68%
- 2010-2019: 0.82%

• Highlighted drop from 3.4% 1948-55 to 1.6% 1965-70.

• Explanation of this 1.8 point drop:
  • 0.4% change in age-sex mix to more women and teens who were assumed to have lower productivity
  • 0.7% cyclical effect, recession in 1970
  • 0.7% unexplained residual

• Projected for 1970-80, Y 4.3%, Y/H 2.9%

• Actual 1970-80, Y 3.2%, Y/H (graph) 1.43%
William Nordhaus, “The Recent Productivity Slowdown” (1972)

• 1.2% decline to be explained vs. Perry’s 1.8%
• Rejected age-sex adjustment (discrimination)
• Instead, 0.9 of 1.2 point decline due to a changing mix to industries with a lower level of productivity
• Solow suggested compatible explanations
• Nordhaus productivity forecast for 1972-80
  • Predicted 2.1%, same as 1965=71
  • Actual for 1972-80, 1.2%

• Their slowdown 1.6% between 1948-73 and 1973-87
• Most measurement errors equal pre- and post-1973
• Identified 0.5 of measurement issues
  • Age-sex composition, other labor quality issues
  • Computer power? Emphasized advances in finance, communications should be credited to durable mfg

• Conclusion: most of slowdown was real
  • “the impetus to productivity advance in the early postwar years, perhaps a backlog of innovations and investment opportunities delayed by depression and war, followed, after the mid-1960s, by a depletion of opportunities”

- New income-side industry database
- Distinguished between
  - “Pure productivity effect” with constant output shares
  - “Baumol effect”, impact of shifting output shares (0 for post-1977)
  - “Denison effect”, impact of hours-output interaction
- Headline result: post-1995 revival not primarily due to ICT, only a 13% contribution to post-1995 revival in NFPB sector
- Discrepancy with other authors finding much higher ICT shares. Why?
- Discussants: Nordhaus only counted contribution of ICT-producing industries, not ICT using industries
- Current consensus: ICT production and use explains most post-1995 revival
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• Studied hundreds of computer-using firms over 11 years

• Effectiveness of ICT on productivity depends on business organization and practices
  • Use of teams, individual decision making authority, broadly defined jobs, investment in skills and education

• Headline result: Firm market value responds MUCH more to computer capital than to other types of capital
  • $1 of computer capital produced $15 of market value
  • Addition of organizational capital didn’t change much

• Concern: reverse feedback. High MV firms can buy computers

• Example of successful ICT-using firm: Walmart
  • Big-box store format, computer-driven redesign of supply chain
The Rich vs. the Poor, or, Why the Poor Don’t Converge

- New attention of BPEA to international growth issues in 1990s
- One reason why average citations were so high in 1990s and 2000s: Robert Lucas “. . . it is hard to think of anything else”
- Papers broaden the traditional sources of growth literature
- Traditional: $Y = AF(K,H,N)$
- Where added growth contributions come from
  - $T$ = Technology
  - $G$ = Geography
  - $P$ = Political and Other Institutions
  - $R$ = Infrastructure, particularly electricity
Greg Mankiw,

- Why some nations so rich, other so poor
  - Long neglected topic in economics, now much attention
- Well-known failings of Solow growth model with only K
  - Predicted smaller differences rich vs. poor
  - Predicted faster convergence
  - Predicted larger differences MPK, much higher in poor countries
- Difficulties fade away with K and H, capital’s share 2/3 not 1/3
- Endogenous growth models?
  - Hard to check with international data
  - Didn’t explain East Asia where growth in K,H more important, not TFP
- Flaws in cross-country regressions
  - Simultaneity (growth made RHS variables larger)
  - Multicollinearity, low degrees of freedom (few years, many variables)
- Concl: not enough progress on why S and I so high vs. low
David Bloom and Jeffrey Sachs, “Geography, Demography, and Economic Growth in Africa (1998)"

- Downplayed macro policy, market liberalization, institutions
- Geography:
  - Hot, humid, host to infectious diseases
  - No monsoon, frequent droughts
  - Natural toll, plus deterred foreign settlement and investment
- Topography
  - Lack of deep harbors and navigable rivers in some countries
  - Some countries land-locked, high transportation costs
  - Isolation a major cause of slow growth
- Demography
  - High fertility (social norms, lack of education)
  - High ratio of dependent youth, deterred S and I
Bloom and Sachs, (continued)

- Conclusion: Causation ran from geography and demography to politics and institutions with little reverse causation
  - Geography and demography explained 2/3 of growth deficit
  - Africa only place where 1980-96 negative growth in real net exports

- Policy
  - Encourage low capital-intensive manufacturing
  - Encourage privately financed infrastructure (cash-strapped governments)

- Discussants strongly disagreed
  - Civil wars, dictatorships
  - High political risk of appropriation
  - Poor information, lack of telephone service, electricity

- Growth accounting vs. regressions, differing conclusions regarding importance of S & I vs. TFP
- Differences depending on direct or indirect measures of K
- Differing results on role of H reflected differing measures of educational quality that were poorly correlated w/ each other
- New data, 84 countries, 1960-2000, improved measurement
  - Increased emphasis on K due to improved measurement
  - Less emphasis on H due in part to problems w/ educational quality
- Strongly correlated with growth
  - Initial life expectancy
  - Law and order, absence of corruption, protection of property rights
- Negative results
  - No role for macro policy or openness to trade
  - No explanation why growth slowed after 1980
Concluding Comments

• U.S. productivity growth
  • 1970-1995 slowdown, only limited role for age-sex composition or industry composition, more important was diminishing returns to the great inventions of the second industrial revolution
  • Post-2010 slowdown remains unexplained. A role for diminishing returns to computer investment, plus a lot of unmeasured consumer surplus coming from new devices and free internet

• Rich vs. poor countries
  • No convincing explanation yet why slowed post-1980, revived post-2000, even to some extent in Africa
  • Remaining puzzles about huge success of East Asia, partial success south Asia, relative to other places

• Plenty of remaining puzzles for future BPEA authors