Price and Real Output Measures for the Education Function of Government: Exploratory Estimates for Primary & Secondary Education

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What Quality Adjustments?
U.S. Exploratory Estimates

• Enrollments as the Base Index
• Significant Research Has Been Done on Possible Quality Adjustments, But Still Only a Beginning
  – Teaching Staff Composition
  – Class Size
• Research Yet to be Done
  – High School Drop-Out Rate
  – College Enrollment Rate
What Quality Adjustments?
U.S. Exploratory Estimates
Teaching Staff Composition

• No Question That Teacher Quality Matters
  – Most Significant Source of Achievement Variation - Rivkin, Hanushek, & Kain (2001)
  – Can Result in a Difference of 1.5 Grade Levels of Achievement Within a Single School Year - Hanushek (1998)
What Quality Adjustments?
U.S. Exploratory Estimates
Teaching Staff Composition

The National Center for Educational Statistics (NCES 2000) of 13 Factors of School Quality That Are Related to Learning Identifies 4 Related to Teacher Quality:

– Teacher Academic Skills
– Teacher Assignment
– Teacher Experience
– Professional Development
What Quality Adjustments?
U.S. Exploratory Estimates
Teaching Staff Composition

- National Education Association (NEA) and NCES Surveys
  - Currently Used by BEA to Create a Teaching Staff Composition Index for Primary & Secondary Public Ed
  - Is a Fixed Weight Labor Compensation Index
  - 6 Categories of Experience & 5 Categories for Highest Degree Obtained
    - From 1960-1990 the Number of Teachers With a Master’s Degree Doubled
    - Some Categories Have a Small Number of Entries
What Quality Adjustments?
U.S. Exploratory Estimates - Class Size

- Intuition Says That at Some Level, at Some Point, Class Size Must Matter, BUT
  - Hanushek
    - Only 14% of 277 Independent Studies Found a Statistically Significant Correlation
    - Notes Intra-School Class Sizes Not Determined at Random
  - Krueger Uses Same Data and Disagrees
What Quality Adjustments?
U.S. Exploratory Estimates - Class Size

- BEA Exploratory Estimates Use Minus the Pupil-teacher Ratio with a .1 Weight for Primary Ed Only as a Proxy for Class Size
  - Many Factors Affect the Pupil-teacher Ratio
  - These Include the Possible Increase in the Number of Teacher Specialists and Special Classes
What Quality Adjustments?
U.S. Exploratory Estimates - High School Completion

- A Decrease in High School (HS) Drop-out Rates is Indicative of Greater Success with at Least Those Students
- Drop-Out Rates Fall From 14% in 1980 to 11% in 2001
- But to What Extent are Drop-out Rates Determined by Non-school Factors, Such as Social Capital?
- Minus the Drop-out Rate with a .1 Weight Is Applied to HS Enrollments

- Further Research Needed
What Quality Adjustments?
U.S. Exploratory Estimates - High School Completion

- College Enrollment Rate as a Proxy for the Quality of HS Ed Received
  - But These Rising Enrollments May Be Primarily a Function of Changing Labor Market Conditions
  - Accordingly, College Enrollment Rates Are Not Used as a Quality-Adjuster
### U.S. Exploratory Estimates - Table 2

% Annual Rates of Growth in Perspective Volume Indicator Quality-Adjusters

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<td><strong>Teaching Staff Composition</strong></td>
<td>0.13</td>
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<td><strong>Pupil-teacher Ratio</strong></td>
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<td><strong>College Enrollment Rate</strong></td>
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Price Change vs. Quantity Change

Table 3

• For Periods Listed
  – Price Change Always > than Quantity Change
  – Education Price Changes About 2X Gross Domestic Purchases Price Changes

• BUT Price Changes Probably Overestimated
Rates of Growth of Prices as a % of Rates of Growth of Nominal Expenditures

- If Not All Quality Changes Are Captured, Quantity Changes My Be Underestimated and Price Changes May be Overestimated
- Rise In Numbers of Special Ed Students
  - 30% Increase Over Last 10 Years
  - Average Ed Cost 2X Average Ed Cost Across All Students
- Education Inflation May Differ From General Inflation, e.g., for Compositional Reasons
Rates of Growth of Prices as a % of Rates of Growth of Nominal Expenditures

- For Available Periods in the 90’s
  - UK 80%
  - Netherlands 75%
  - Australia 66%
  - US 75% Based on Quality-Unadjusted Index for Higher Education

- Rates of Growth of GDP Prices May Be < 50% of Rates of Growth of Nominal GDP
U.S. Exploratory Estimates
Table 3: % Annual Rates of Growth in Price & Volume Indicators - Quality Adjusted

• Show Quality-Adjustments Applied One-at-a-time

• Quality-Adjustment Impact On Prices For the Preferred Index Is:
  – 1980-2001 -.21%
  – 1980-1990 -.63%
  – 1990-2001 +0.17%

• However, All Are Exploratory
Conclusion
Research, Research, & More Research
And Feedback Needed

• Higher Ed, Libraries, & Other
• Primary & Secondary Ed
  – High School Completion Factors
  – Special Classes & Teaching Specialists
  – Scope of School-related Activities
  – Composition of the Student Body
• Approach of Stripping Non-school Factors From an Outcome Measure

• Exciting Area With Many Challenges