Comments by Alan Gustman on Laitner and Stolyarov

"Technical Progress and Worker Productivity at Different Ages"

Major Contributions

- A rigorous framework to organize our thinking about how aging affects productivity.
- An analytical foundation that can be readily built on.

Their analytical framework focuses on importance of three issues.

- Extent to which average experience, which increases with population aging, increases productivity.
- Whether technology is embedded in the worker only at the time of labor market entry?
- Or whether technology affects productivity for more experienced workers?

Their empirical approach

- Aims to determine the effect on wages of
  - Experience
  - Technology at entry
  - Technology's effects on older workers
- They estimate a nonlinear specification of a wage equation with complex interactions among education, experience and time.
- Productivity is approximated by annual earnings for full time white males in Census data.
- A second equation for output per labor hour, assuming a Cobb-Douglas, augments the estimation for missing data.

Questions about their empirical approach.

- What identifies the wage equation as a demand side rather than reduced form equation?
  - Interactions with the supply side may be important.
- Important determinants of wages are omitted from the analysis, and may be correlated with the included explanatory variables:
  - Education
  - Experience
  - Time.

Simple Human Capital Model with Identical Abilities, Access to Capital and Preferences

- In the long run, overall wage level increases with productivity.
- But differences in earnings by years of schooling reflect cost of schooling, not productivity.
- Shifts in demand due to productivity changes induce adjustments on the supply side – here supply is perfectly elastic.
- In this model, shifts in demand due to productivity changes may affect employment by schooling level, but not wage differentials.
- The supply side response causes a movement along the “new” demand curve, so that wage differences do not necessarily reflect differences in the height of demand curve and productivity at a given level of employment.

In more complex models with differences in abilities and tastes:

- Supply curves to occupations are upward sloping.
- Wage increases due to productivity growth are partially determined by elasticities of both supply and demand curves.
- Shifts in supply, e.g., due to expansion of subsidized higher education, can also affect wages.
- Other models, e.g., where education is a screening device, have different implications for wages.

In models with different occupations and industries, like Triest, Sapozhnikov and Sass

- Substitution on the demand side by education, age, industry and occupation becomes an issue.
- Aggregation of demand curves becomes an issue.

Omitted variables with effects on wages that also vary by time, age and education:

- Unions
  - From 1973 to 2002 private section unionization fell from 24% to below 8.6%.
  - Decline of unions may affect both employment and wages.
- Minimum Wages
  - Were 50% of average manufacturing wages in 1970.
  - 1/3 of manufacturing wage in 1989; 42% in 1997; now below 1/3 again.

Omitted variables with effects on wages that also vary by time, age and education:

- Women's Labor Force Participation
  - In 1960, most professional women were nurses or teachers.
  - Now women compete differentially in may other jobs, affecting ***men's wages*** observed in this study.
- Immigration
  - Affect wages of those with less education.
- Affirmative Action
  - Increased supply of highly educated workers.
  - Reduced crowding into certain occupations.
  - Both may affect ***wages of white men*** observed in this study.

Omitted variables with effects on wages that also vary by time, age and education:

- Trends in Retirement
  - Labor force participation of 55-59 year old men fell from 90% in 1965 to 80% in 1985.
  - For 60-64 year old men, the decline was 20 percentage points.
  - If implicit contract view is right, and the wage is below productivity at older ages, earlier retirements should imply higher wages will be paid at younger ages.
- Others:
  - changes in industry mix, government employment, changes in Social Security, changes in pensions.

Other Views Imply Technological Change Is Not Exogenous

- Is technology itself a function of the age of the population?
  - Does a country with an older workforce innovate more slowly?
  - Fewer young Bill Gates, young google entrepreneurs?

The authors also promise to examine the effects of technical progress on wealth accumulation in a life cycle model.

- The idea is that the kind of technical progress affects the path of earnings, which will affect the paths of saving and work.
- But life cycle analysis often assumes a perfect capital market where borrowing and saving are available at the same market interest rate.
- When they conduct that analysis the authors should consider:
  - That half of retirement wealth is from social security and pensions.
  - SS and pension benefits are concentrated after retirement and there is limited or no borrowing on these benefits.
  - Many do not save outside of pensions and social security.
  - Heterogeneity in time preference rates creates different paths of wealth accumulation and creates different “cases” for analysis.

Conclusion: Laitner and Stolyarov

- Provide a framework for analyzing how effects of aging on productivity depend on:
  - Relation of experience to productivity.
  - Extent technology is embedded in the worker at the time of entry into labor market.
  - Extent to which experienced workers benefit from technological change.
- Provide a foundation for future work.