

Productivity and Labor Services with Age and Vintage Adjustment of U. S. Market Hours, 1975-2013

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The genesis of this paper came from an interest in including human capital stocks in a production model, followed by a concern about mismatches, accounting identity violations, and inconsistent treatment of inputs. Production models can take a variety of forms, but frequently there is a mismatch between inputs or between inputs and output or an inconsistency in treatment between inputs, which impacts on productivity estimates, as well as sometimes an accounting identity problem. These considerations led to a decision to recommend age and vintage efficiency adjustment of hours.

Interest in mismatches and inconsistencies arose from a desire to measure human capital productivity or total factor productivity (TFP) when human capital is a stock, such as that in Jorgenson-Fraumeni (J-F).

There are four conclusions of the methodological investigations in this paper. The first is that current and/or lifetime hours should be efficiency adjusted. The efficiency adjustment should be of two types: efficiency variations as individuals age and to recognize vintage effects. The second conclusion is that more research is needed to identify both types of efficiency effects, particularly vintage effects across all hours worked. The third conclusion is that a labor input index of current hours, adjusted or not, should be the labor input measure in such a production model rather than an index of Fraumeni lifetime adjusted hours human capital stock or J-F human capital stock. This is to avoid a greater likelihood of a violation of the requirement that the quality of these hours be constant over time, particularly to avoid problems with unrecognized future vintage effects. However, the best human capital companion measure to a production model with efficiency adjusted current hours and TFP is Fraumeni lifetime adjusted hours human capital stock. The last conclusion is that much more research is needed to update and refine the efficiency adjustments of physical capital stock. Many service lives and the shape of their age-efficiency functions are dated, and rarely differ by vintage; this probably impacts on all methodologies whether they be geometric (e.g., the US Bureau of Economic Analysis) or hyperbolic (e.g., the Australian Bureau of Statistics and the U.S. Bureau of Labor Statistics).

TFP results in this paper are only suggestive because of issues with the underlying data, but is hoped that a consistent data base can be constructed by someone in the future to estimate TFP, however, the categories of over time country representative data may not be very detailed.