Methodology for Projecting Multifactor Productivity

Introduction

Section 3401 of the Affordable Care Act requires the incorporation of productivity adjustments to the market basket updates for select Medicare Prospective Payment Systems. The statute defines the productivity adjustment to be equal to the 10-year moving average of changes in annual economy-wide private nonfarm business multifactor productivity (MFP) (as projected by the Secretary for the 10-year period ending with the applicable fiscal year, year, cost reporting period, or other annual period) (the “MFP adjustment”). The Bureau of Labor Statistics (BLS) is the agency that publishes the official measure of private nonfarm business MFP. We refer readers to the BLS Web site at http://www.bls.gov/mfp to obtain the BLS historical published MFP data and to http://www.bls.gov/mfp/mprtech.pdf for detailed information regarding the BLS method for estimating multifactor productivity.

Methodology for Projection of MFP

The projections of the components of MFP are currently produced by IHS Global Insight, Inc. (“IGI”), a nationally recognized economic forecasting firm with which CMS contracts to forecast the components of the market baskets and MFP. In order to generate a projection of MFP, IGI replicates the historical MFP measure calculated by the BLS using proxy series derived from IGI’s U.S. macroeconomic models, which take into account a broad range of factors that influence the total U.S. economy. In Table 1 below, we identify each of the major MFP component series and the corresponding IGI proxy series.


**TABLE 1 —MULTIFACTOR PRODUCTIVITY COMPONENT SERIES**

<table>
<thead>
<tr>
<th>BLS Series</th>
<th>IGI Proxy Series</th>
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<tbody>
<tr>
<td>Real value-added output</td>
<td>Nonhousing, nongovernment, nonfarm real GDP</td>
</tr>
<tr>
<td>Labor input</td>
<td>Hours of all persons in private nonfarm establishments, adjusted for labor composition effects</td>
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<tr>
<td>Capital services</td>
<td>Forecasted BLS capital inputs developed using a regression model¹</td>
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¹ Effective for the IHS Global Insight, Inc. 2015q1 forecast. Prior MFP calculations used IGI’s Real Effective Capital Stock used for Full Employment GDP as the proxy series for capital inputs.

IGI found that the historical growth rates of the BLS components series used to calculate MFP and the IGI proxy series were consistent and, therefore, the IGI proxy series were suitable proxies for calculating MFP. We note that for benchmarking purposes, the historical growth rates of IGI’s proxy series were used to estimate a historical measure of MFP, which was compared to the historical MFP estimate published by the BLS. This comparison validated the use of the proxy variables in generating the MFP projection.

To create a projection of BLS’ MFP index, the projected annual growth rates of each proxy series are used to “grow” the levels of the series published by the BLS. Using these three key concepts, MFP is derived by subtracting the contribution of labor and capital input growth from output growth using the following formula:

\[
MFP \text{ growth} = Output \text{ growth} - [(labor \text{ input growth} \times labor \text{ share})  \\
+ (capital \text{ input growth} \times capital \text{ share})]
\]

BLS calculates the labor share and capital share by adding together the value of labor compensation and capital income to get total income (in current dollar terms) and dividing each measure by the total. IGI identified two proxy series that can be used to derive these BLS’ income measures in the projection period: *Total wages, salaries, and...*
supplements less total government employee compensation and Rental cost of capital for nonresidential fixed investment. These derived income measures in the projection period are then used to calculate projections of the labor share and capital share.

Finally, the growth rates of MFP in the projection period are applied to the latest published historical level of BLS’ MFP to derive a projection of annual index levels of MFP. The resulting MFP annual index levels were then interpolated to a quarterly frequency using the Bassie method for temporal disaggregation. The Bassie technique utilizes an indicator (pattern) series for its calculations. In this case, the index of output per hour for the nonfarm business sector (published by the BLS) is used as an indicator when interpolating the MFP index.