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Commentary

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In my remarks I am restricting my commentary to the contribution by R. Färe, S. Grosskopf and D. Margaritis, who measure TFP change by the Bennet–Bowley (BB) indicator

$$(1/2)\sum_{m=1}^{M}\left(\tilde{p}_m^t+\tilde{p}_m^{t+1}\right)\left(y_m^{t+1}-y_m^t\right) - (1/2)\sum_{n=1}^{N}\left(\tilde{w}_t^t+\tilde{w}_n^{t+1}\right)\left(x_n^{t+1}-x_n^t\right),$$

where normalized prices are defined by

$$\tilde{p}_m^\tau \equiv p_m^\tau \Big/ \left(\sum\nolimits_{m=1}^{M} p_m^\tau + \sum\nolimits_{n=1}^{N} w_n^\tau\right) \quad (m=1,\ldots,M) \quad (\tau=t,\,t+1)$$

$$\tilde{w}_n^\tau \equiv w_n^\tau \Big/ \left(\sum\nolimits_{m=1}^{M} p_m^\tau + \sum\nolimits_{n=1}^{N} w_n^\tau\right) \quad (n=1,\ldots,N) \quad (\tau=t,\,t+1).$$

This indicator can be derived from a Luenberger productivity indicator by assuming quadratic directional distance functions and profit maximization. This theory is well known.

In this article the BB indicator is basically used as an *empirical* TFP indicator, and related to R&D expenditure data by time series methods. However, no argument is advanced why this indicator should be preferred over an empirical TFP index such as

$$\exp\left\{(1/2)\sum_{m=1}^{M}\left(u_m^t+u_m^{t+1}\right)\ln\left(y_m^{t+1}/y_m^t\right) - (1/2)\sum_{n=1}^{N}\left(s_n^t+s_n^{t+1}\right)\ln\left(x_n^{t+1}/x_n^t\right)\right\},$$

where value shares are defined by

$$u_m^\tau \equiv p_m^\tau y_m^\tau \Big/ \sum\nolimits_{m=1}^{M} p_m^\tau y_m^\tau \quad (m=1,\ldots,M) \quad (\tau=t,\,t+1)$$

$$s_n^\tau \equiv w_n^\tau x_n^\tau \Big/ \sum\nolimits_{n=1}^{N} w_n^\tau x_n^\tau \quad (n=1,\ldots,N) \quad (\tau=t,\,t+1).$$

This is the Törnqvist productivity index, which can also be rationalized by well-known economic theory.

On the contrary, it seems to me that from the *data* point of view, the Törnqvist index is more appropriate than the BB indicator. For the BB indicator one needs quantities and prices, whereas for the Törnqvist index one needs quantity relatives (index numbers) and value shares. The actual computation of the BB indicator from the data is not explained in this article, which is a shortcoming.

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