

Study: Adjusting for variations in capital utilization in the measurement of multifactor productivity growth in Canada, 1961 to 2007

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The decline in the multifactor productivity (MFP) growth in Canada since the year 2000 is largely because of lower capacity utilization, according to the research paper "Productivity Growth and Capacity Utilization" released today.

This paper uses an experimental approach for adjusting the MFP growth measure for the variations in capacity utilization.

Over the 2000-to-2007 period, the annual MFP growth in the total business sector changes from a decline of 0.37% to a 0.02% gain by adjusting for variations in capacity utilization. The change is much larger in goods-producing industries than in services-producing industries. For manufacturing, the annual MFP growth changes from a decline of 0.28% to a gain of 0.94% over the same period.

Adjusting for variations in capacity utilization has a small impact on the long-run trends in MFP growth rates. Annual MFP growth over the 1961-to-2007 period ranged from 0.36% to 0.41% for the total business sector, but remained virtually unchanged (at about 1.65%) for the manufacturing sector.

Note to readers

Capacity utilization rises and falls over the business cycle. Variations in capacity utilization need to be taken into account when measuring multifactor productivity (MFP) growth as the MFP growth estimate can more closely reflect technological progress. However, statistical agencies including Statistics Canada do not make such an adjustment when measuring MFP growth as the rate of capacity utilization is often not observed as accurately measured. In the empirical literature, ad-hoc indicators are sometimes used for this purpose.

This paper develops a non-parametric approach for adjusting the MFP growth measure for variations in capacity utilization of capital over time. In this approach, a new measure of capital utilization is derived. In particular, the capital utilization rate is defined as the ratio of capital-in-use to capital-in-place, whereas capital-in-use corresponds to the minimal capital input required together with the observed labour input to produce the observed output. This paper shows that the capital utilization rate can be estimated by comparing the ex-post return with the ex-ante expected return on capital. This approach offers a practical solution that can be used by statistical agencies to adjust for capacity utilization in their MFP growth measures.

The research paper "Productivity Growth and Capacity Utilization," part of the *Economic Analysis Research Paper Series*, no. 85 (11F0027M), is now available from the *Browse by key resource* module of our website under *Publications*.

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