Fixed Assets 2006 Revision

December 20, 2006

This release of 2006 Fixed Assets includes not only the normal update of an additional year of data along with the standard revisions to the most recent years but also an updating of the basic parameters used in the perpetual inventory method (PIM) and a significant change to the level at which the PIM is applied.

The PIM generates an estimate of the capital stock by accumulating past purchases of assets taking account of asset lives and depreciation. In essence the PIM adds each year's gross investment (gross fixed capital formation) to the capital stock of the previous year. The PIM requires: information on the value of investment, price indexes for capital goods, mean service lives, and depreciation profiles.

The application of the PIM methodology employed in the capital stock estimates for this release is the same as previously but changes have been made to the level at which the PIM has been applied for the calculation of the Canada by industry stocks and depreciation. Where as previously the PIM was carried out at a very aggregate component level (Building Construction, Engineering Construction, Machinery and Equipment), it is now carried out at the asset level of detail. Prior to this release asset detail was calculated as a second step after the component detail and necessarily benchmarked to the component values. The provincial dimension of the data is still developed at the component level and benchmarked to the national level.

In the past, working at the more aggregate component level meant that there was no allowance for the compositional changes to the investment and stock series that were taking place. For example, the PIM parameters of price and mean service life where applied at aggregate component levels and therefore did not reflect year to year compositional shifts, or perhaps more importantly trend shifts, that may have taken place. That is, it was necessary to calculate an average price or life based on a period of time. So a shift from investing in longer lived assets to shorter lived assets would not necessarily be captured as declining average age at the aggregate level. This applies equally to the price side. An example that would affect both the life and price parameters would be any relative shift to or away from investing in computers. The Machinery and Equipment component was most heavily affected by the change to working at the asset level. The effect on Building Construction and Engineering Construction was comparatively much less.

Following is a summary by PIM parameter of changes (other than the move from working at the component level to the asset level) taking place with this release:

Investment

Only the data from 2000 forward have been affected by standard revisions to the current dollar investment series. There have not been any changes to the way current dollar

investment series are developed and revised. The year 2006 has been added and revisions to the years 2000-2005 have been incorporated.

Price Indexes

Price indexes have been revised back to 1997. This is a somewhat longer revision period than the normal case. It stems from the revisions to the Machinery and Equipment Price Indexes (MEPI) announced in The Daily, Wednesday, May 31, 2006. The index was reweighed and rebased to 1997=100. At the same time the index was changed to the North American Classification System from the Standard Industrial Classification. Stock and depreciation estimates and all constant price estimates are affected from 1997 forward.

Service Life

Service lives have been updated. As before, the information on service lives gathered by the Capital Expenditure Survey were used to establish estimated mean service lives by asset. These new estimates of mean service lives have been introduced in 1997 at the asset level, and are then held constant from 1997 forward to 2006. In general, the new lives are shorter than previously used lives. For the building component, the service lives are 6 years shorter dropping from about 37 to 31 years on average. The estimated mean life for the engineering component declined by 2 years (24 year to 22 years) and for the machinery equipment component by 1 year (10 years to 9 years). A geometric interpolation was used to smooth in the new lives over the years 1987 to 1997, effectively introducing a gradually falling life from old to new over the phase in period.

The previous update of survey-based service lives was introduced in the 1987 data year; again then the lives were generally shorter than the assumed service lives that had been in use in the calculation of the capital stock estimates prior to the availability of the survey-based lives. At that time mean service lives were held constant after 1987. The same geometric method was used to phase in the changes at that time. This is more fully described in Investment Flows and Capital Stocks - Methodology (in PDF format) in Technical box 1 starting on page 6.

Depreciation Profiles

Traditionally, from the Investment and Capital Stock Division, three measures of net capital stocks are available and result from the application of three distinct profiles of depreciation, being linear, hyperbolic and geometric. In this release, aside from the effects of the noted updating of mean service life and working at the asset level, there have been no other changes to the linear and hyperbolic estimates.

On the other hand, as a result of new research, the geometric estimates have been affected in a much more substantive way. From the research, new estimates of geometric rates of depreciation were developed for a subset of assets and then propagated to all assets. Geometric rates of depreciation are equal to what is called the declining balance rate divided by mean service life. In equation form:

$$\delta = R/L;$$

where δ is the geometric rate of depreciation, R is the declining balance rate and L is the mean service life.

Previously, only 2 declining balance rates were used: one for the Building and Engineering construction components, and the other one for the Machinery and Equipment component. About 36 rates of depreciation were estimated from the research. For these assets it was then possible to estimate 36 declining balance rates (R) as life (L) was known. The resultant declining balance rate (R) for an individual asset was then assigned to an asset group, deemed similar, for which there was no research estimate available. Combining R with the estimate of mean service life for these assets yields an estimate of the geometric rate of depreciation. The new depreciation rates were applied at the asset level and affect the entire history of the estimates. The result is generally much higher rates of depreciation and lower stock levels.

Summary revision measures are presented below. However, almost all the revisions are attributable to the introduction of the new depreciation profiles.

Average Percentage Revisions to the Level		
	1960-1987	1988-2005
Net Stock		
Linear	0.0%	-0.9%
Hyperbolic	0.0%	-0.3%
Geometric	-35.2%	-41.1%