

Reliability of the NIA Fixed Asset Values

In the paper, equation (7'') is used to obtain real original fixed asset values with scrap values that are deflated by a lagged deflator. This assumes that the depreciation-based scrap rates are correct, and that the derived NIA original values of fixed assets are correct. Alternatively, equation (7') could be used, which would further require the use of official economy-wide effective investment values. However, the economy-wide effective investment values combined with the NIA original value of fixed asset values imply scrap rates that stretch credulity.

Implicit NIA scrap rates are obtained by inserting NIA original fixed asset values and official economy-wide effective investment values (1978-85 effective gross fixed capital formation) into equation (10). Figure 1 shows the implicit NIA scrap rates, for NIA original values of fixed assets obtained by dividing depreciation by the approximate depreciation rate series, or by the 5% depreciation rate. It also shows, for comparison, the depreciation-based scrap rates. While the depreciation-based scrap rates are rather stable, the implicit NIA scrap rates vary widely, with a minimum rate of negative 25% and a maximum rate of about 12%. This implies that in one year fixed assets are decommissioned whose purchasing value many years ago (at the then price level) is equal to 12% of the original value of fixed assets of the previous year (which includes many more recent fixed assets purchased at a presumably higher price level), and that in another year the official effective investment value underestimates true effective investment to the tune of 25% of the original value of fixed assets of the previous year. This is not plausible. Even the implicit scrap rates prior to 1993 (when revaluations and their effects set in) are not plausible.

Viewed differently, the depreciation-based scrap rate series can be applied to the NIA original values of fixed assets (equation 3) to obtain scrap values, and implicit NIA effective investment then follows from equation (2). (Or, alternatively, the depreciation-based scrap rate series can be inserted into equation (10) or (2') solved for investment.) Figure 2 shows the ratio of thus obtained implicit NIA effective investment values to the official economy-wide effective investment values (1978-85 effective gross fixed capital formation). Again, even prior to 1993, the ratios are not plausible. The implicit NIA effective investment values suggest that official economy-wide effective investment in 1992 was only 40% of actual economy-wide effective investment—at a time when official economy-wide effective investment matches gross fixed capital formation, and gross fixed capital formation equals one-third of GDP.

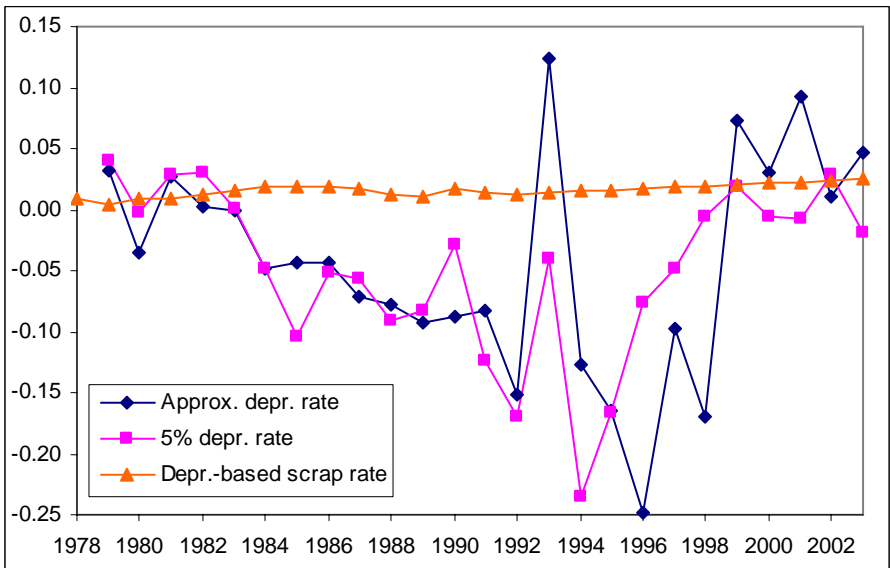
The inevitable conclusion is that one (or more) of the underlying series in the NIA approach is (are) defective. (i) One possibility is that the depreciation-based scrap rate series used here is defective. This is highly unlikely given the way it was constructed (and given the comparison with the investment-based scrap rate series). The alternative implicit NIA scrap rate is so patently implausible that it also suggests problems elsewhere.

(ii) A second possibility is that the depreciation rate series is defective. This is unlikely given the underlying data from which the approximate depreciation rate series was derived. Both the approximate and the 5% depreciation rate series yield similar results; the variability in the approximate depreciation rate series, thus, is not at fault. Assuming a uniform 8% depreciation rate yields a ratio of implicit NIA effective investment to official economy-wide

effective investment that is on average around unity; but it still varies from 0.4 to 1.6 (too much to be plausible).

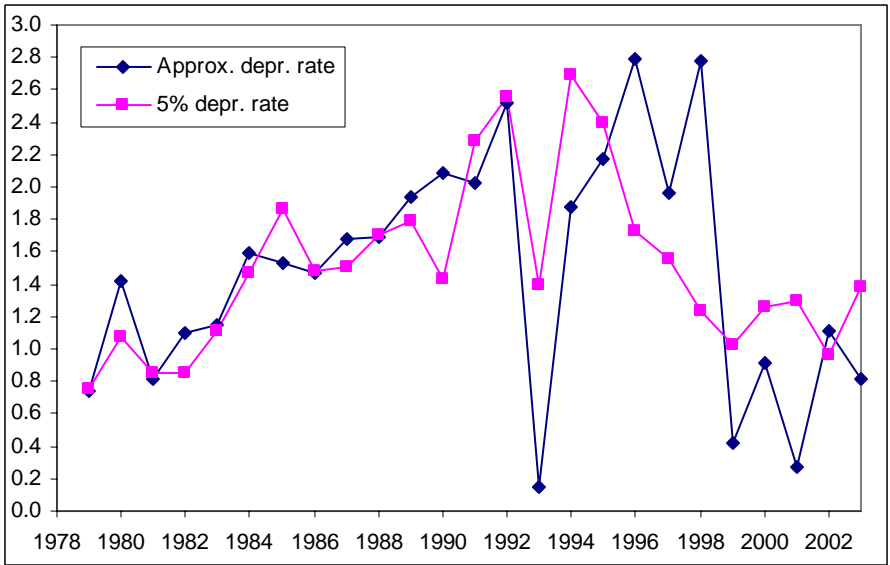
Solving from the available depreciation, official economy-wide effective investment, and depreciation-based scrap rate values for a depreciation rate is not straightforward because the equation invariably involves an original fixed asset value. Accepting the 1978 NIA original midyear value of fixed assets as correct, a new original value of fixed asset series can be approximated using the (end-year) depreciation-based scrap rate and economy-wide effective investment (equation 2'). Dividing the official depreciation value by this original value of fixed asset series yields an implicit depreciation rate. Figure 3 shows the resulting two depreciation rate series. (The 1978 NIA original midyear value of fixed assets can be obtained by dividing depreciation by either the approximate economy-wide or the 5% depreciation rate.) Starting from around the mid-1980s, the implicit depreciation rates are significantly higher than the economy-wide approximate depreciation rates (or any official or calculated depreciation rates for any subset of the economy). These implicit depreciation rates at their maximum come close to 10%, which appears too high.

(iii) The last possibility is that the official depreciation values in the income approach to the calculation of GDP are defective. There is possibly little time consistency in their compilation, which includes the underlying fixed asset values and the underlying depreciation rates the NBS uses. Overall, the depreciation data appear the most defective, with possible a minor question mark about the depreciation rates used here. As the paper shows, the growth rates in NIA real original fixed asset values prior to 1992, especially when the approximate depreciation rate is used, do not differ much from the series in the cumulative approach. The issue is primarily one of absolute values.



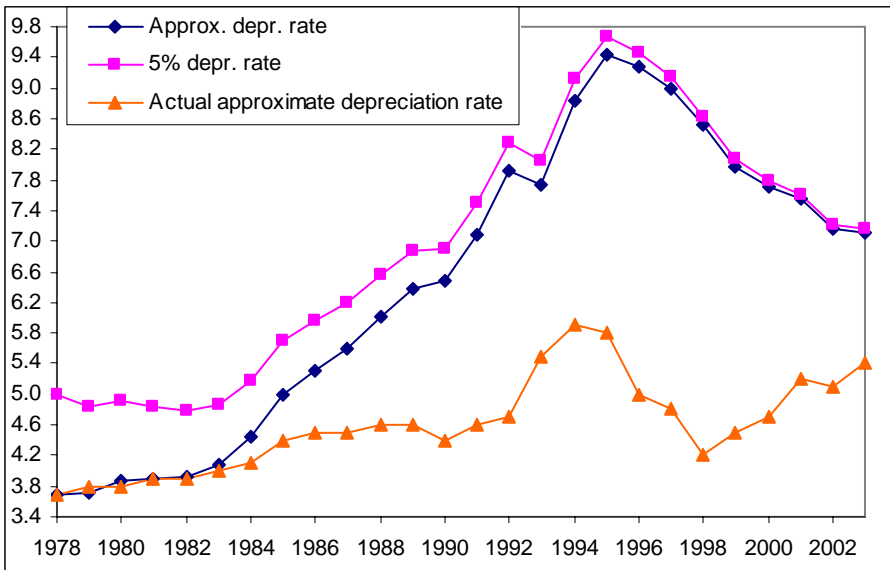
The depreciation-based scrap rate is from the paper. The implicit NIA scrap rates are obtained by inserting NIA original fixed asset values and official economy-wide effective investment values (1978-85 effective gross fixed capital formation) into equation (10). Effective investment values are reported in Table 2 of the paper, NIA original values of fixed assets in Table 8 of the paper.

Figure 1. Implicit NIA Scrap Rates Vs. Depreciation-based Scrap Rate



Data points are the ratio of implicit NIA effective investment to official economy-wide effective investment values (1978-85 effective gross fixed capital formation). Implicit NIA effective investment values are obtained by applying the depreciation-based scrap rates to the NIA original values of fixed assets to obtain scrap values, and then backing implicit NIA effective investment out of equation (2). The depreciation-based scrap rate series is from Table 4 in the paper, the NIA original values of fixed assets from Table 8 in the paper.

Figure 2. Implicit NIA Effective Investment Relative to Effective Investment



The depreciation rate is the ratio of depreciation to the original value of fixed assets. The 1978 original value of fixed assets is the NIA original value of fixed assets; later year values are obtained using the depreciation-based scrap rate and economy-wide effective investment (equation 2'). "Approx. depr. rate" and "5% depr. rate" in the legend refer to the depreciation rate used to construct the 1978 NIA original value of fixed assets.

Figure 3. Implicit NIA Depreciation Rate If Previous-Year Original Value of Fixed Assets Were Correct