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Fixed capital stock depreciation in developing countries: Some evidence from firm level data

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Abstract

Previous growth accounting studies suggest severe capital underutilisation and mismeasurement of the stocks of capital in some developing countries. Using the firm level data sets from the World Bank surveys, this paper estimates the economic depreciation rates of fixed capital stocks in the manufacturing industries of seven developing countries. The findings indicate that the stocks of fixed capital may depreciate at higher rates in these countries, as compared with the normal rates usually assumed for advanced industrial countries. This study also discusses the economic and social forces that may influence the incentive to maintain capital appropriately and the implications of high depreciation for the total factor productivity (TFP) growth estimates and volatility of capital accumulation.

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Notes

1. Easterly and Rebelo (1993) use the depreciation rate of 7 per cent uniformly for all countries and all periods, as compared to 0.04 in Nehru and Dhareshwar (1993). Penn World Table 5.6 uses 15 per cent for machinery, 24 per cent for transport equipment, and 3.5 per cent for constructions including both residential and non-residential structures.

2. The aggregate capital stock data sets currently available for economic research are constructed by using the perpetual inventory method and the standard assumptions about the capital depreciation rates.

3. In the presence of inefficiency, as argued in Pritchett (1997), the accounting cost incurred during creating new capital may well exceed the economic cost, which is defined as, by Pritchett, the minimum cost of creating the same amount of capital given the optimal (or undistorted) market prices of investment goods.

4. As Leonard (1985) points out, there is no systematic financial account in the government to keep track of the accumulated depreciation on infrastructure capital. Also even though capital maintenance is investment-type expenditure in the sense that it yields returns over a much longer run than most ‘current’ expenditures, maintenance expenditure has long been treated as a current operating cost of the government.

5. Net book value, as defined in the survey, is the initial value or acquisition cost of fixed assets less accumulated depreciation charges. Here, it is considered as an approximate for the asset market value.

6. The capital depreciation rate estimates obtained through the above equation are de facto the assets-weighted averages of the depreciation rates during the time period

under study. However, the capital depreciation rates, especially at the firm level, should vary in response to various factors such as corporate tax policies, and reallocation of physical capital assets across firms and sectors.

7. Such factors may include the corruption surcharge in corporate procurement of assets, which may differ across firms.

8. However, if firm-specific investment goods deflators are used for each individual firm, such deflators, which are calculated from the replacement values for the firm's fixed assets and investment, could be heavily biased due to measurement errors and reporting errors.

9. Using the equipment level data from aerospace industry auctions, Ramey and Shapiro (2001) show that capital is sector-specific, and reallocation of sector-specific capital, combined with thinness of asset resale markets, results in substantial decline in market value.

10. Undermaintenance on public capital in particular is commonly observed for many developing countries (World Bank, 1994).