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The Interdependence between the Saving Rate and Technology across Regimes: Evidence from South Africa

By Kevin S. Nell and Maria M. De Mello

A major policy issue in developing economies is whether a faster rate of physical capital accumulation is a key determinant of growth transitions in output per capita, or whether growth shifts are primarily the outcome of an ‘unexplained’ or ‘mysterious’ total factor productivity (TFP)/technology progress component. To shed some new light on the issue, this paper hypothesises that the saving rate and the growth rate of technology are *interdependently* determined by a common exogenous source across regimes, so that an exogenous shock to the saving rate determines long-run growth transitions. We further advance the idea that in an open-economy setting the saving rate, rather than the investment rate itself, serves as the most suitable measure of the quality or productivity of investment, that is, whether changes in capital investment induce changes in the growth rate of technology.

The empirical application re-examines the role of physical capital accumulation and technological progress across South Africa’s different growth regimes over the period 1952-2012. The evidence shows that the down-break across South Africa’s ‘faster-growing’ regime (*FGR*) over the period 1952-1976 and ‘slower-growing’ regime (*SGR*) during 1977-2003 was caused by a negative exogenous shock to the saving rate that simultaneously led to a slowdown in the rate of technological progress. Or put in another way, the negative exogenous shock to the saving rate resulted in a downward shift in South Africa’s per capita income growth rate via a slowdown in the rate of physical capital accumulation and a structural decrease in the technology (learning-by-doing) parameter from 0.54 in the *FGR* to 0.10 in the *SGR*.

The down-break results suggest that the saving rate, as a measure of the quality of capital investment, is potentially an important policy variable to engineer a sustainable up-break in South Africa’s growth performance. To assess this prediction with real data, we look at what happened in the post-2003 period when output per capita grew at a ‘super fast’ rate during 2004-2007 and then slowed down during the global financial crisis years from 2008 to 2012. During this period the upward break in the aggregate fixed investment rate was not matched by the saving rate, implying that the observed increase in the growth rate of physical capital did not generate a faster rate of technological progress. The econometric evidence verifies this proposition by showing that the learning-by-doing parameter of 0.14 over the extended sample period 1977-2012 is close to the 0.10 estimate obtained over the *SGR*. Although the results

indicate that investment was less productive over the post-2003 period, it is important to take into account the negative impact of the global financial crisis in 2008.

The stylised facts across South Africa's FGR and SGR, together with the post-2003 analysis, further suggest that a sustained increase in the total investment rate, which not only includes infrastructure investment, but also other technology-enhancing investment in machinery and equipment and complementary foreign direct investment, may be an effective investment-led strategy to raise the economy's growth rate on a sustainable basis. Thus, policies that raise the quality of capital investment, which is captured by the saving rate, will also increase the rate of technological progress and, in the process, perpetuate the growth effect of capital accumulation through stronger learning-by-doing effects.