Technical Progress, Real Capital Formation and Structural Change

Harald Hagemann

According to Schumpeter technical progress ist the main cause of cyclical fluctuations as well as of long-run growth. Since Ricardo's analysis of the machinery problem the employment consequences of new technologies have been in the focus of attention. The analysis of Ricardo, who was the first to emphasize real capital formation as the decisive compensating factor, has inspired many important modern economists. Among them Paul Samuelson (1988, 1989) wrote two famous articles in which he defended Ricardo against Wicksell, Kaldor, et al.

Modern analyses of the machinery problem, such as the contributions by John Hicks, Adolph Lowe and Luigi Pasinetti, although focussing on different analytical representations of a disaggregated production structure, all emphasize the relevance of structural change during the adjustment process (‚traverse') of the economy and the importance of capital accumulation to overcome the problem of technological unemployment. The decisive compensating factor, investment in new real capital, has a dialectical quality since the new capital goods are embodying technical progress, i.e. the higher productivity. As has already been emphasized in an article by Hans Neisser, (AER 1942), the capitalist process is a race between displacement of labour through technological progress and reabsorption of labour through accumulation.

The contribution compares the advantages and disadvantages of the different analytical perspectives, ‚horizontal' (sectoral model) versus ‚vertical' (stages or Austrian model) approaches of structural economic dynamics to deal with these genuine dynamic problems which become even more complex in a 'monetary theory of production' linking the financial with the real sphere.

In his Nobel lecture Robert Solow (AER 1988: 311-2) has pointed out that "it is impossible to believe that the equilibrium growth path itself is unaffected by the short-to medium-run experience. In particular the amount and direction of capital formation is bound to be affected by the business cycle. … So a simultaneous analysis of trend and fluctuations really does involve an integration of long run and short run, of equilibrium and disequilibrium. However, despite the rise of notions such as path dependency and a great advancement in technical methods compared to the time of Schumpeter and Harrod, a quarter-of-a-century after Solow's Nobel lecture the important problem of integrating short-, medium-, and long-run macroeconomics has not yet been solved and, with rational expectations, will not be solved in a satisfying way in the near future.