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Technical change, effective demand and economic growth

In this paper we start with an aggregate model which shows the classical features of the von Neumann type or dynamic Leontief type models. That is, in the steady state the growth rate of output equals the real profit rate (if all profits are reinvested), the real wage rate is constant and employment is growing in line with output. In this steady-state version of the model growth occurs without innovation, hence no 'surplus profits' arise and the model does not show Schumpeterian features.

The model becomes interesting once one examines off-steady state dynamics. In this case, the model reveals both Schumpeterian and Keynesian features. In particular, the introduction of productivity-enhancing new technologies changes the functional distribution of income ('rents' emerge) if the market structure is not fully competitive and thus prices do not adjust immediately to unit costs.

An examination of the 'transitional dynamics' (before a new steady-state is reached) focuses on the determinants of the actual growth path relative to the potential growth path. The latter is defined as the path which the economy would follow if the productivity-enhancing effects of new technologies were fully exploited; this implies a particular investment behaviour which ploughs all profits (including surplus profits) back into the diffusion process of the new technologies. In the aggregate version of the model, we shall show that the 'potential path' is uniquely defined with a given real wage path. (In a disaggregated version of the model (see Landesmann and Stehrer, 2000, and Stehrer, 2001) the situation becomes more complicated as the investment pattern across industries has to be taken into account.) The actual path of the economy, as compared to the potential path, allows the wage-price (and hence the real wage and price-cost) dynamic to be determined by behavioural equations. Wage bargaining over 'technological rents' and the unemployment rate as well entry and exit dynamics of the labour market determine the wage rates and price-cost adjustment, which then determine the path of 'surplus profits' and hence the scope for investment activity. The actual growth path is affected by the parameters determining the distributional dynamics and market structures in product and labour markets. (Again, the disaggregated version of the model adds substantially to the picture of how distributional and price-cost dynamics across sectors determines the actual growth path in relation to the 'potential' growth path.)

The model is designed to show that the distributional and market structure dynamics which emerge from the introduction of new technologies opens the model to effective demand constraints which lead to a deviation of the actual from the potential growth path. This means, that if for some reasons actual investment is lower than potential investment, this lowers first the actual growth rate, reduces actual effective demand (due to lower wage and rent income) and further reduces the growth capacity of the economy. (In its disaggregated version the model shows in addition that the speed of structural change (towards the output composition which determines the new long-run steady-state) is again determined by industry-specific and economy-wide wage-price, price-cost and investment dynamics.)

In an extension to the model, we introduce a financial sector which absorbs and distributes (both 'ex ante' in the form of pre-financing and 'ex post' in the form of interest bearing

deposits and loans) 'technological rents'. The operation of the financial sector in turn affects the actual growth path. An introduction of the financial sector then may also allow to model the effects which arise from consumer behaviour (saving). Lower consumption (final demand) reduces the effective demand, but on the other hand raises resources available for investment.

Finally, we relate the results obtained in our model to various research traditions (Schumpeterian, Keynesian, endogenous gowth theory). Here we also want to analyse the stability properties of this model and discuss these in relation to other models which exhibit unstable growth paths.

Related literature:

Landesmann, M.A. and Stehrer, R. (2000*): Industrial specialisation, catching-up and labour market dynamics*, Metroeconomica 51(1), 67-101.

Stehrer, R. (2001): *Industrial specialisation, trade and labour market dynamics in a multisectoral model of technological progress*, WIIW Working paper, No. 15.