

3. Technical progress, innovation and income distribution

A transition into a low growth path, necessary for protecting nature rests on a higher capital productivity for which the key is higher resource productivity. To begin with, we introduce first exogenously higher capital productivity and exclude price substitution, which would always result in a return back to high capital intensity. By looking only on consistencies we will then discuss the implications for employment and income distribution. By referring to the equation $g = s_p \cdot r + s_l \cdot l \cdot m$ six steps can be enumerated, which assure a desired level of consumption and augments employment and wages without high economic growth. For a low accumulation rate g : (1) the profit rate $r = P/K$ can be kept constant by lower capital inputs (K) and for a given output Y the wage rate $l = L/A$ will augment, (2) as $s_p > s_l$ savings will reduce and the consumption-investment relation (C/I) will augment. (3) lower capital intensity (K/A) will reduce labour productivity t ($t = f(K/A)$) and for a given output Y also the quantity of labour A will rise, (4) as labour intensity (A/K) has risen, the demand for the higher consumption quota (C/Y) is assured, (5) the consumption productivity of capital (C/K) has augmented and (6) for a desired level of consumption (C) the accumulation rate remains at the previous low level.

Evidently, this contradicts traditional theories of technical progress. Post-keynesians argue that every technical progress is labour-saving.¹² This is not surprising, because in an economy with a positive surplus and even in cases where it is not fully invested ($I < S$) growing capital intensity must by definition crowd-out labour and be labour-saving. The same applies also for the neoclassical theory of price substitution, where rising capital productivity would augment capital intensity and vice versa, but in the long-run growth is always capital-augmenting. Both theoretical strands have their foundations on Ricardo, that more capital augments economic welfare. Growth theories strive always for higher growth by higher capital intensity and this applies also for the new growth theory. Referring again to the general accumulation model ($s = t/m$) higher qualification will augment labour productivity ($t' > t$) and more innovation will augment capital productivity ($m' > m$). Here too, if labour productivity rises more than capital productivity, savings augment ($s' = t'/m' > s$) and for $I = S$ economic growth rises. But if the growth rate of capital productivity is higher than that of labour productivity, the rates of savings, accumulation and economic growth will decline in favour of higher consumption and employment. The latter case corresponds to the above sketched labour-augmenting technical progress, where the basic assumption is that lower capital inputs are compensated by higher labour inputs and not by price relations, but by technological imperatives. In any case, a transition to higher labour intensity needs an innovation system, which can be most effectively initiated by higher resource productivity. Higher resource efficiency in Europe 2020 is a step towards it. We will argue, that an innovation system as part of the knowledge economy is bound to a higher quantity of labour inputs and if labour is remunerated according to its contribution to production the wage quota (L/Y) will rise.

In former discussions of logical alternatives of technical progress most models consider higher capital productivity as „*mana from heaven*“ without cost. On the contrary, it needs not only economic resources, but primarily higher labour inputs.