# GROWTH, AUTONOMOUS DEMAND AND TECHNICAL PROGRESS IN A SIMPLIFIED FIXED CAPITAL SYSTEM

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## Abstract

An interesting and important question running through recent literature on alternative, non-marginalist approaches to explaining growth, is the precise detail of an alternative which would encompass a coherent long-run version of Keynes's principle of effective demand and be consistent with a classical-Sraffian perspective on value and distribution (*cf*. Trezzini, Serano, Park). Debate over this question has focused particularly on the nature of autonomous demands and their relation with both steady-state and non-steady-state growth paths, an integral part of that relation being the so-called "Sraffian supermultiplier". For the most part however, this debate has taken place in the context of aggregative models, while explicit consideration of sectoral independencies has remained largely implicit and submerged in assumptions about relative prices and distribution.

The aim of this paper is to shed further light on the idea of demand-led growth and in particular the debate referred to above, by exploring the relation between growth and autonomous demands in a fixed capital model proper – viz., where used fixed capital is treated as both output and input. As is well known, this treatment of fixed capital allows for a richer consideration of technical progress. In turn this allows for a coherent interpretation of "autonomous" investment demand (which is commonly identified with technical change), and a clarification of the sense in which one can talk of "non-capacity creating" autonomous demands.

The intention of the paper is also to bring together the debate over growth in a Sraffa-Keynes framework and the arguments presented by others (e.g. Caminati, 1986) regarding the demand effects of technical change. This will allow some assessment of the extent to which recent literature about autonomous demand and long-run growth can be thought of as applicable to growth with technical progress.

The paper considers a simplified two sector model producing a pure consumption good and a machine with variable efficiency and in the process attempts a clarification of the "Sraffian supermultiplier" and autonomous investment demand. A "fixed-price" model is considered whereby relative prices and the real wage are held at their long-period equilibrium levels, so that disequilibrium in the model is limited to quantities. Thus there are no "cross-dual" dynamics, but only "dual" dynamics which are limited to the interaction of output and demand.

However, these dynamics are nonetheless complicated by the treatment of fixed capital as a joint product, since depreciation allowances impact on net profit and hence on capitalists' consumption. The dynamics of quantities are also complicated by the fact that both investment decisions and depreciation allowances are influenced by the age composition of the capital stock in each sector.

Mathematically the dynamics of quantities are represented in terms of first order difference equations in growth rates of demand, investment growth rates, utilization rates and the relative size of the two sectors. In order to simplify the analysis it is assumed that the autonomous demand effect of new technology is a once-for-all effect so that over time the autonomous demand effect dissipates so that the growth rate of autonomous demand will be less than the steady state growth rate. Though admittedly highly simplified, this may be a useful starting point in the treatment of autonomous demand associated with technical change.

In attempting to clarify the nature of the quantity dynamics one of the questions the paper attempts to answer concerns the effect of new technologies and their adoption on the stability of long-period equilibria. The paper seeks to identify the conditions for local stability of the steady state and in turn to relate these conditions to those required for new technologies to be adopted. The adoption of new technologies and hence a positive effect of new technology on investment demand will have implications for relative prices in so far as positive demand effects require early truncation of older technologies. Yet changes in relative prices and distribution will effect the stability of the steady state.

However the effect of new technologies on the stability of long-run growth equilibria is not limited to the effects of new technology operating via changes in relative prices and the real wage. To the extent that new technology brings with it changes in the rate at which the efficiency of fixed capital declines with age (even taking as unchanged the life of the machine), this will have a direct effect on the stability of steady state outcomes.