On 'Grand Traverses' and the Changing Morphology of Growth in the U.S. Domestic Economy during the 19th and 20th Centuries

Explaining quantitative economic history with heterodox macro-dynamic 'parables'

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The microeconomic foundations of the theory of localized technological change due to learning that is neutral in its implications for factor-use are understood to give rise to trajectories of innovation that can be path dependent and non-neutral ("biased") in their global factor-saving implications. That analytical construct, initially developed in David's (1975) eamination of sectoral processes of innovation and technology diffusion and further elaborated by David (1977), inspires this discussion of two heterodox "parables" of the altered form and acceleration of aggregate economic growth in the U.S. during the nineteenth and twentieth centuries.

Each of the historical episode is seen to have been driven by Harrod-biased technical changes involving tangible reproducible capital-deepening in the first instance, and intangible capital deepening in the second. Aggregate-level data (from David and Abramovitz, 2000) on real GDP, real factor service inputs, factor shares and nominal and real gross domestic savings rates during the first of these epochs are used to estimate the parameters of a growth-theoretic model in the non-neutral innovation-driven shift in the economy's steady-state equilibrium growth path accelerated the growth of real output per man-hour, and boosted its real gross savings rate.

During the 19th century "traverse" towards a more 'roundabout' (tangible capital-deepening) mode of production, the policy of free immigration from Europe played a crucial role, in damping the incipient upward pressure exerted on real wage rates by the rise in the reproducible capital per man-hour, and thereby served to augment the shift in the functional distribution of real GDP towards recipients of property income. The parameters of a Pasinetti (1962) gross savings function estimated using decadal observations for the 19th century imply that the latter distributional shift accounted of the dominant part of the accommodating endogenous rise of the real gross savings rate.

This suggests an analogous parable for the mid-20th century experience, during which Harrod-biased technical and organizational innovations induced another intangible capital-deepening 'traverse' which raised the marginal and average productivities of human capital and cumulative real R&D investments, while lowering the marginal ratio between aggregate output and the tangible reproducible stock of capital. The endogenous adjustments in the supply of savings involved greater recourse to international capital markets for loanable funds to finance private (and public) investment expenditures for which the corresponding assets could be hypothecated, leaving household savings and retained corporate profits to finance educational and civilian R&D expenditures. During this episode, however, the emerging international debtor position of the U.S. accommodated those augmented elements of capital accumulation. The non-neutral direction of innovation did not have a significant overall impact on the functional distribution of income, and on private domestic savings rate via that channel – as had been the case during the grand traverse of the preceding century.