



Instability, stationary utilization and effective demand: A structuralist model of endogenous cycles[☆]



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ABSTRACT

Within the framework of an aggregative macro model with equilibrating output adjustment, Harroddian instability and a constant long-run utilization rate are reconciled with the principle of effective demand by endogenizing the capacity output-capital ratio. As stabilizing forces, distribution and debt dynamics are considered. Introducing non-linearities in the investment function, our model generates limit cycles consistent with empirical observations for the US, i.e. counter-clockwise in the utilization-wage share and utilization-debt space. We argue that with an endogenous capacity-capital ratio the principle of effective demand, the paradox of thrift as well as the paradox of cost may hold despite a constant long-run utilization rate.

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1. Introduction

The structuralist growth model in the vein of Kalecki (1971) and as formalized by Rowthorn (1981), Dutt (1984) and Taylor (1985) rests upon two core pillars: first, the *principle of effective demand* states, in general, that output is

determined by demand. In the present paper, however, it is defined as permanent demand shocks affecting the growth rate of output rather than its level, as well as the possibility of the *paradox of thrift* and the *paradox of cost*.¹ Second, it is adjustments in quantities which align aggregate output to aggregate demand rather than adjustments in prices. Variants and extensions of the baseline model have been

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¹ Note that this definition of the principle of effective demand is much narrower than stating that output is demand-led. In the growth model by Duménil and Lévy (1999), for instance, output is determined by spending decisions. Yet, a monetary policy rule implies that the growth rate of output is independent of demand in the long run. This violates the principle of effective demand as defined here.

used extensively for theoretical and empirical analyses of economic growth.²

The structuralist growth model with instantaneous output adjustment, however, faces a few serious challenges (cf. Skott, 2012): First, the baseline model does not require the equilibrium utilization rate to be consistent with the firm's target rate.³ Second, given a series of persistent demand shocks such as the decline of the saving rate in the US since the 1980s, the model typically predicts a non-stationary rate of capacity utilization which, however, contradicts the stylized fact of a rather stationary utilization rate as reported, for instance, by the Fed (cf. Skott, 2012; Schoder, 2012b; Taylor, 2012). Third, stability requires the savings effect of a change in capacity utilization to be stronger than the investment effect. Yet, the long-run effect of utilization on investment is typically strong likely exceeding its effect on savings and indicating Harrodian instability (Skott, 2012). Fourth, much of the theoretical and almost all of the empirical work based on structuralist models with instantaneous output adjustment relies on static models neglecting the stylized fact of cyclical growth.⁴ In particular, there seems to exist strong evidence for Goodwin-type of cycles with the wage share following utilization as observed by Barbosa-Filho and Taylor (2006), Zipperer and Skott (2010) and Flaschel (2009). The existence of similar cycles between utilization and debt, with the latter following the former, has been implied by the work of Minsky (1976).

Alternatives to the baseline structuralist model with instantaneous output adjustment which have sought to resolve the above shortcomings have been proposed in the literature. Yet, they typically do not maintain, at the same time, both instantaneous output adjustment in the short run and the principle of effective demand as defined above in the long run, while featuring Harrodian investment dynamics and constant long-run utilization. Taylor (2012) puts forward various aggregative growth models one of which features de-stabilizing Harrodian investment dynamics as well as a constant steady-state utilization rate. Yet, the economy in this model is supply-determined in the

long run and the possibility of the paradoxes of thrift and cost disappear.⁵

The growth models proposed by Skott (1989a,b), Skott (2010) and Flaschel and Skott (2006) include Harrodian investment dynamics and are built around a constant steady-state utilization rate. Among these, only the Kaldorian model for the *mature* economy also predicts Goodwin-type of cycles between utilization and distribution. It is characterized by instantaneous price adjustment and sluggish output adjustment as well as a constrained labor supply with the labor market condition affecting the desired output growth rate: With low employment, output expands fast causing utilization and, therefore, investment (through the investment function) and the profit share (through the endogenous change of distribution to align savings to investment) to go up. This tightens the labor market which, overall, impairs the business climate and causes the expansion of output to slow down. With the labor market driving the long-run growth rate, the principle of effective demand, i.e. long-run growth effects of permanent demand shocks, can be introduced by assuming the growth rate of the labor supply to depend on employment through hysteresis. Three objections may be put forward: First, the assumption of an instantaneous price adjustment may be questioned due to evidence of considerable price rigidities (cf. Blinder et al., 1998; Klenow and Kryvtsov, 2008; Nakamura and Steinsson, 2008). Second, the notion of a pre-determined output may be seen as too strong an assumption in light of widespread *just-in-time* production, delivery lags instead of production lags as well as the existence of considerable amounts of inventories. Third, the argument that the adjustment costs for a given output expansion or investment increase with the level of employment is not fully convincing (cf. Hein et al., 2012).⁶

The model presented here seeks to reconcile the empirical observations of local Harrodian instability, counter-clockwise utilization-wage share and utilization-debt cycles, respectively, as well as a mean-reverting long-run utilization rate with the principle of effective demand and instantaneous output adjustment instead of instantaneous price adjustment.

The core innovation of the paper is explicitly implementing the endogeneity of the capacity output-capital ratio in a macro model with instantaneous output adjustment. Its change over time is assumed to be a positive function of the utilization rate. This model feature allows demand shocks to have long-run impacts on steady state growth through endogenous changes in capital productivity, despite long-run forces on investment which bring the utilization rate back to target.

A pro-cyclical capacity-capital ratio is the core result of Schoder's (2012a) theoretical and empirical analyses. For various US industrial sectors since the late 1940s, studies

² The effects of distribution on capacity utilization and growth have been studied by, among others, Naastepad and Storm (2006), Stockhammer et al. (2009) and Hein and Vogel (2008). Open economy issues have been discussed, among others, by Blecker (1989). Endogenous labor productivity and distribution have been added by Taylor (2004, Ch. 9) to study the dynamic interaction of distribution and growth. The phenomenon of *financialization*, i.e. institutional changes on financial markets in favor of shareholders' interests as well as debt-fueled consumption and investment, has been recently discussed by Lavoie (1995a), Stockhammer (2004), Dutt (2006b), Hein (2007) and Hein and Schoder (2011).

³ For the debate on this issue see Comitteri (1986), Auerbach and Skott (1988), Lavoie (1995b, 1996), Dutt (1997, 2009) and Schoder (2012b).

⁴ See, for instance, the influential theoretical contributions of Bhaduri and Marglin (1990), Lavoie (1992) and Hein (2007). For empirical studies relying on static models, see Naastepad and Storm (2006), Stockhammer and Onaran (2004) and Hein and Schoder (2011). As notable exceptions, the importance of endogenous cycles has been emphasized by Taylor (2004) using models with instantaneous output adjustment and Skott (1989a, 2010) using models with instantaneous price adjustment.

⁵ Barbosa-Filho (2000) presents some flow-flow simulations where capacity utilization can be both endogenous and stable in the long run. While his model is related to the present one, it does not feature explicitly local Harrodian instability.

⁶ Even if such a relationship exists, the model neglects the impact of labor market conditions on distribution, which is purely an accommodating variable, despite the emphasis on conflict.

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