A System Dynamics Approach to the Bhaduri-Marglin Model

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Abstract

This paper starts from the observation that the global financial and economic crisis cannot be explained by mainstream neoclassical models. There is a need to promote the development of macroeconomic models that put emphasis on the demand side. A promising starting point for such a development is the Bhaduri-Marglin model. A drawback of this model is the lack of dynamics. As the first part of a more comprehensive research program this paper proposes a system dynamics approach to the Bhaduri-Marglin model which yields additional insights into this model.

Keywords: Post-Keynesian Economics, Macroeconomics

1. Introduction

The current global financial and economic crisis is not only shaking the worldwide economic development – it is also shaking the beliefs of many neoclassical economists. The long dominating paradigms of pure market economics and supply side economics are questioned now, and Keynesian and Post-Keynesian ideas gain new interest. It is not only the economic downturn that is in focus of the public but also distributional issues have gained much interest.

Distributional issues have been a core issue in Post-Keynesian economics from the very beginning. In contrast to neoclassical distribution theory which depends on profit maximizing behavior Post-Keynesian distribution theory is based mainly on Kaldorian or Kaleckian grounds.

In the older strand of Keynesian-Kaleckian models of growth and distribution (henceforth: KK-models), rising wages rates and rising wage shares lead unambiguously to positive macroeconomic effects: they cause an increase in capacity utilization, which in turn leads due to a strong accelerator effect to an increase in investment and capital, and to a higher profit rate. Sometimes this line of reasoning is called the 'stagnationist' view. Today, the term "wage-led growth" is more common. Important contributions have been made by Rowthorn (1981), Dutt (1984, 1987, 1990) and Amadeo (1986a, 1986b, 1987). This type of KK models was questioned on the grounds that they neglect the contractive effects of rising costs and the fall in the profit share.

However, in a seminal paper Bhaduri and Marglin (1990) have demonstrated that a KK-model is, generally, able to create economic development that can be both wage-led and profit-led. Whether growth is wage-led or profit-led depends on the relative response of saving and investment to changes in the profit share. If the direct and indirect effects of changes in the profit share on investment are dominated by the effects on saving, growth is wage-led. If the direct and indirect effects in the profit share on investment dominate the effects on saving, growth is profit-led. One central insight gained from this research is that KK-models based on the principle of effective demand can be applied to a much farther range of economic policy problems than is often believed.

Another insight is that it is an empirical question whether a specific economy is at a specific point of time in the wage-led or in the profit-led regime. Consequently, a growing body of literature has emerged that tries to identify the regimes specific countries at specific periods of time are in. Important contributions to this strand of literature are Bowles and Boyer (1995), Ederer and Stockhammer (2007), Naastepad and Storm (2007), and Hein and Vogel (2007, 2008).

As with all models the Bhaduri-Marglin model has several limitations. One example is the assumption of constant productivity[1]. Another even more important limitation is the lack of dynamics. The Bhaduri-Marglin paper uses a static approach similar to the traditional IS/LM model. This shortcoming is acknowledged by the authors themselves (Bhaduri and Marglin 1990: 390). In two recent papers Bhaduri discusses some aspects of how to bring dynamics explicitly to the original model (Bhaduri 2006, Bhaduri 2007). The presentation of dynamics in both Bhaduri papers is limited in the sense that they follow a mere analytical approach using phase diagrams but give only few room for tracking and discussing the time paths of the important variables explicitly.

Transforming the Bhaduri-Marglin model into a System Dynamics (SD) model will be a valuable amendment of the existing literature and improve our understanding of short and long run macroeconomic developments. For several reasons the SD approach seems to be especially suited to build dynamic models in the Post Keynesian tradition (Radzicki 2008).

This paper reports on the first step of a more comprehensive research program. Its purpose is to develop a system dynamics model that translates the ideas developed in the Bhaduri-Marglin paper as close as possible into a system dynamics model. This course of action imposes tight restrictions on the way the SD modeling is done. These restrictions will be relaxed in a separate paper that develops a complete SD model based on the Bhaduri-Marglin model. In this research the link to other SD models in the Post Keynesian tradition will be illuminated.[2]

The present paper is organized as follows: The next section will introduce the Bhaduri-Marglin model briefly. Subsequently, a SD variant is developed that closely follows the ideas of Bhaduri and Marglin. Finally, I draw some conclusions and point to further directions of research.

[1] Recent research tries to endogenize productivity. An example is Schuetz (2008).

[2] See for earlier work Saeed and Radzicki (1993), Torres (1993) and for more recent work Nichols, Pavlov and Radzicki (2006). Also the model of Richardson and Courvisanos (2008) can be seen as a variant of a SD model.

2. The Bhaduri-Marglin Model

The starting point of the Bhaduri-Marglin model is the observation that in market economies changes in the wage rate affect the level (and the development) of output and employment in a complex way. On the one hand wages are the most important element of production costs and on the other hand they are the main source of income of the biggest part of the population and, hence, have a prominent influence on aggregate demand. The main point of the Bhaduri-Marglin model is to demonstrate how changes in the real wage rate which is treated as an exogenous variable can have a twofold effect on the level of output depending on the sensitivity of investment demand (Marglin-Bhaduri 1990: 375-6).

The model assumes that workers income is labor income only, and that workers do not save.[3] The entire income from property is modeled as profit that goes to the capitalists. A constant fraction of profit is saved. These assumptions can be summarized as

$$S = s\frac{R}{Y}\frac{Y}{Y^*}Y^* \quad . \tag{1}$$

(S – saving, s – propensity to save, R – profit, Y – income, output, Y* - full-capacity potential income.) Bhaduri and Marglin (1990:377) assume that full-capacity output can be treated as constant in the short period. This allows to normalize full capacity output to Y*=1 and to express all relevant variables as proportions of full-capacity output. After normalization equation (1) can be written as

$$S = shz, \quad h = \frac{R}{Y}, z = \frac{Y}{Y^*} \tag{2}$$

(h – share of profit and z – degree of capital utilization.) It is assumed that $0 < h < 1$ and $0 < z < 1$. Further it is assumed that the representative firm is vertically integrated and that the

[3] For the discussion of the building blocks of the model see Bhaduri and Marglin (1990: 376-384).

labor coefficient (and, hence, the productivity of labor) are constant. [4] Following the Kaleckian line of reasoning price setting behavior is modeled by mark-up pricing:

$$p = (1+m)bw \tag{3}$$

(m – mark-up, b – labor coefficient, and w – nominal wage rate.) Equation (3) can be rewritten as

$$h = \frac{m}{1+m}, \quad \frac{\mathrm{d}h}{\mathrm{d}m} > 0 \tag{4}$$

which means that an increase in the mark-up will lead to an increase in the profit share.

Bhaduri and Marglin point to the observation that equation (3) expresses the distributional conflict between profit margin (profit share) and real wage at a given labor productivity which becomes more obvious after rewriting this equation as

$$(1+m)\frac{w}{p} = \frac{w}{p}\left(1-h\right)^{-1} = \frac{1}{b} \tag{5}$$

Given the productivity of labor, any increase in the real wage rate must lower profit margin and profit share resulting in a decrease of savings and an increase in consumption. Whether aggregate demand (C+I) will rise or fall depends on the impact of the change in the profit share on investment. Consequently, the investment function plays an important role in the model. Bhaduri and Marglin (1990: 379-380) argue along the following line. The crucial determinant for investment is the rate of profit which can be defined as:

$$r = \frac{R}{K} = \frac{R}{Y}\frac{Y}{Y^*}\frac{Y^*}{K} = hza \tag{6}$$

where K stands for the accountants' book value of capital and (Y*/K) = a stands for the full capacity output capital ratio. The book value of capital and, hence, the full capacity output ratio are assumed to be given in the short period. Equation (6) shows that a certain rate of profit can

[4] Bhaduri and Marglin are aware of the limitations brought to their analysis by this assumption – see Bhaduri and Marglin (1990: 377).

be as well the result of a high profit margin and low capacity utilization as well as vice versa. Therefore, it is unsatisfactory to take the profit rate alone as the argument of the investment function: a high profit rate might very well not lead to high investment if this profit rate is the result of a high profit margin but very low capacity utilization. Bhaduri and Marglin (1990: 380) propose the following investment function in which profit share and capacity utilization enter as independent arguments:

$$I = I\left(h, z\right), \quad Y^{*} = 1, I_{h} > 0, I_{z} > 0 \tag{7}$$

In their eyes this investment function has the advantage of "… clearly separating the 'demand side' impact on investment operating through the acceleration effect of higher capacity utilization from the 'supply side' impact operating through the cost-reducing effect of a lower real wage and higher profit margin/share." (Bhaduri and Marglin 1990: 380). Because the variables s and z also show up in the savings equation (2) a IS-curve in (z, h) space can be (re-) constructed:

$$shz = I = I\left(h, z\right) \tag{8}$$

The slope of the IS-curve (8) is given by

$$\left.\frac{\mathrm{d}z}{\mathrm{d}h}\right|_{IS} = \frac{I_{h} - sz}{sh - I_{z}} \gtreqless 0 \tag{9}$$

The sign of (9) depends on the relative sensitivity of investment and saving to profit share and capacity utilization. Bhaduri and Marglin (1990: 381) assume that

$$sh - I_{z} > 0 \tag{10}$$

on the ground that investment should be less sensitive than saving to changes in capacity utilization in order to get a stable Keynesian income adjustment process. But they caution

against taking condition (10) for granted under all circumstances:[5] In a dynamic framework with simultaneous adjustment of quantity and price variables (10) is neither a necessary nor a sufficient stability condition. In addition, if the IS-curve (8) is non-linear then its slope (9) is only defined locally even if condition (10) holds. "This could introduce significant non-linearity into the IS-curve to make local stability analysis, based on linear approximation, an insufficient or even misleading guide to the actual stability properties of the system." (Bhaduri and Marglin, 1990: 390).

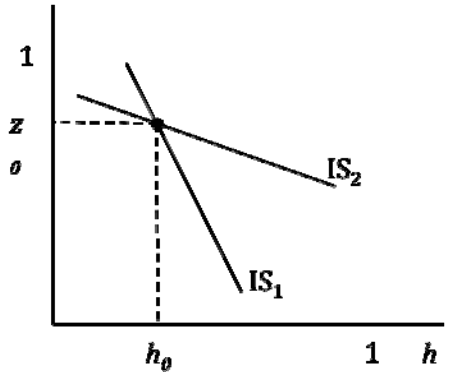

Fig. 1 Regime of wage-lead expansion

Putting these concerns aside for now, one can distinguish two regimes depending on the sign of the numerator of (9). The first one is characterized by a negative numerator ($I_h - sz < 0$) which implies a comparatively small reaction of investment demand to a change in the profit share and a negative slope of the IS-curve in (z, h) space (see fig. 1). The second one is characterized by a positive numerator ($I_h - sz > 0$) which implies a comparatively strong reaction of investment demand to a change in the profit share and a positive slope of the IS-curve in (z, h) space (see fig. 2).

[5] See Bhaduri and Marglin (1990) p. 381, fn. 1 and p. 390.

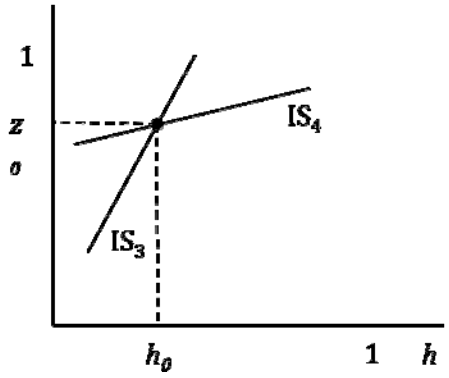

Fig. 2 Regime of profit-lead expansion

The first regime describes a situation of wage-led expansion: a lower profit share (higher real wage rate) is connected with a (consumption driven) higher aggregate demand, higher capacity utilization, and higher employment. Because both the real wage rate and employment increase the real wage bill must increase inevitably. Despite this fact, the lower profit share does not necessarily mean a decrease in total profit. Contrariwise, the lower profit share may come along with a higher total profit, provided that expansion of sales overcompensates the decline in the profit share. Because the accountants' book value of capital is assumed to be constant in the short period, a higher total profit implies a higher profit rate as well. Hence, given this constellation rational capital owners would accept an increase in the real wage rate because the wage-led expansion would increase their profit rate. This condition may be restated in the following form

$$\frac{\mathrm{d}(hz)}{\mathrm{d}h} < 0 \tag{11}$$

Equation (11) may be rewritten in the following form to show clearly that it describes the elasticity of the IS-curve in (z, h) space:

$$-\frac{dz}{dh}\frac{h}{z} > 1 \tag{11'}$$

Following Bhaduri and Marglin (1990: 382) a regime of wage-led expansion may be characterized as *cooperative capitalism* if in the point of interest the (negatively sloped) IS-curve is elastic. Making use of equations (9) and (10) the elasticity condition (11) may as well be expressed as

$$zI_z > hI_h \tag{12}$$

Equation (12) shows that cooperative capitalism requires a stronger reaction of investment demand to a change in the degree of capacity utilization than in the profit share. If this is not the case, then a fall in the profit share (increase in the real wage rate) leads only to a comparatively small increase in consumption demand and a relatively strong decline of investment demand. The net effect is still an increase in capacity utilization (the IS-curve has a negative slope), but the increase is so small that the fall in the profit share (profit margin) dominates. Hence, total profit and profit rate decrease. This creates a situation of conflict between the interests of workers and capitalists because, from the viewpoint of capitalists, a real wage increase allows for higher output and employment, but at the price of lower profits and a lower profit rate.

The second regime characterized by a positively sloped IS-curve describes a situation of profit-led expansion: a higher profit share (lower real wage rate) is connected with a (investment driven) higher aggregate demand, higher capacity utilization, and higher employment. Because both the profit share (profit margin) and total profit of the capitalists increase this regime is definitely advantageous to them. Not only the capitalist but also the workers benefit from a higher profit share (lower real wage rate) in the sense of a real wage bill increase in the case that

$$\frac{\mathrm{d}\left(\frac{W}{Y^*}\right)}{\mathrm{d}h} = \frac{\mathrm{d}\left[(1-h)z\right]}{\mathrm{d}h} > 0, \quad Y^* = 1 \tag{13}$$

(W – real wage bill.) Equation (13) may be rewritten in the following form to show clearly that it describes the elasticity of the IS-curve in (z, h) space:

$$\frac{dz}{dh}\frac{h}{z} > \frac{h}{1-h} \tag{13'}$$

In other words, workers benefit from a higher profit share (lower real wage rate) in the sense of an increase in the real wage bill if in the point of interest the (positively sloped) IS-curve has an elasticity greater than the profit margin.

Table 1 summarizes the development of the important model variables in reaction to an increase and a decrease, respectively, of the real wage rate depending on the elasticity of profit share with respect to capacity utilization (η).

Table 1: Reaction of model variables

	Slope of the IS-curve			
	negative		positive	
	$\eta < -1$	$-1 < \eta < 0$	$0 < \eta < h/(1-h)$	$h/(1-h) < \eta$
Real wage rate	+	+	–	–
Profit share	–	–	+	+
Wage share	+	+	–	–
Wage bill	+	+	–	+
Profit rate	+	–	+	+
Total profit	+	–	+	+
Capacity utilization	+	+	+	+
Employment	+	+	+	+

The significance of the work of Bhaduri and Marglin lies in the demonstration that a Post Keynesian model that stresses the importance of aggregate demand can capture quite different regimes of macroeconomic policy. If, for example, the slope of the IS-curve is negative and $\eta < -1$ then an increase in employment via expansion of effective demand can only be achieved by increasing the real wage rate. But this is not only beneficial to the workers but also to the recipients of profit income. In contrast, if the IS-curve is positively sloped then an increase in employment can only be achieved by decreasing the real wage rate. With elasticity $h/(1-h) < \eta$ this is beneficial for labor not only due to higher employment but also due to a higher wage bill.

In short, especially in times when the importance of effective demand is acknowledged even by policy advisor that, formerly, have strongly advocated supply side ideas, it is necessary to work harder on the development of models that are based on aggregate demand. The Bhaduri-Marglin model seems to be a promising starting point for such work.

As I stated in the introduction, Bhaduri-Marglin acknowledged right from the beginning that their model could be improved by taking into account dynamics and non-linearity. Bhaduri (2006) and Bhaduri (2007) are examples for expanding the original model in this direction. But the analytical approach these papers follow has its limitations, as two quotes from Bhanduri (2007: 13) make clear: "The dependence of the speeds of adjustment and on the variables h and z might result in non-linear trajectories with complex properties that need further exploration." and "However, since the determinant is strictly zero in the degenerate system of this model, it rules out possibilities of sustained fluctuations until richer dynamical systems are considered."

In the following section a system dynamics model will be presented that tries to keep as close as possible to the static Bahduri-Marglin model. This will then be the reference point for further models in the spirit of Bhaduri-Marglin that make more use of the rich possibilities the system dynamics toolbox offers.

3. Bringing (System) Dynamics to the Bhaduri-Marglin Model

The Bhaduri-Marglin model is a static equilibrium model and as such quite different from models that start from scratch with disequilibrium, dynamics, complexity, delays, etc., which are important aspects of system dynamics models. But to convey the value of system dynamics to economists who not (yet) use the rich research tools it offers, it seems a reasonable strategy to show how an important model can be complemented by system dynamics reasoning. The pivotal equation of the Bhaduri-Marglin model is equation (8) which represents the IS-curve in (z, h) space. But as the IS-curve describes a set of equilibrium combinations of *z* and *h* there is no room for dynamics. Dynamics arise when we look at points off the IS-curve. Bhaduri (2007: 4)

offers a simple adjustment scheme for such disequilibrium by assuming that the degree of capacity utilization reacts to excess demand:

$$\dot{z} = \alpha\left[I\left(h, z\right) - shz \right], \quad \alpha > 0 \tag{14}$$

The parameter α denotes the given speed of adjustment, the dot denotes, as usual, a time derivative. Hence, $\dot{z}$ is the change in capacity utilization.

In the original Bhaduri-Marglin model the share of profit *h* is completely determined by the profit margin *m* which in turn is determined by the real wage rate w / p. This is essential for the model because the authors wanted to inquire the effect of autonomous changes of the real wage on central macroeconomic variables. In the comparative static framework of Bhaduri and Marglin this is an acceptable approach because the IS-curve delivers the capacity utilization connected to a specific profit share (which, in turn, is equivalent to a specific real wage rate). If we look at points off the IS-curve and at dynamical adjustment processes, the assumption of an exogenous income distribution is not reasonable anymore.

Following Bhaduri (2007: 4) the same structure as in equation (14) is chosen for endogenous adjustment of the profit share:

$$\dot{h} = \beta\left[I\left(h, z\right) - shz \right], \quad \beta \gtrless 0 \tag{15}$$

In contrast to (14) excess demand can as well lead to an increase in the profit share ($\beta > 0$) as to a decrease ($\beta < 0$). The condition $\beta > 0$ reflects the view of the neoclassical synthesis because excess demand leads to an increase in production only if the real wage rate declines (and the profit share increases). The condition $\beta < 0$ reflects the case of a profit squeeze in the sense that excess demand leads to a decrease in the profit share. The decrease of the profit share reflects an increase in the real wage rate which implies that the money wage rate increases faster than the price level when demand exceeds supply.

Equations (14) and (15) describe the flows which change the stock variables *h* and *z*. Both flows are determined by the investment function, the saving function, and the adjustment speeds. In the form of equation (2) the savings function is already parameterized. In order to formulate a simulation model it remains only to choose reasonable values for the parameters.

For the investment function (7) a simple suitable functional form which fulfills the requirements of the partial derivatives ($I_h > 0, I_z > 0$) is

$$I = a\left(\gamma h + \delta z\right), \quad a, \gamma, \delta > 0 \tag{16}$$

where *a* represents (as in equation (6)) the full capacity output capital ratio. The parameters γ and δ are the partial derivatives of the investment function with respect to the profit share and the degree of capacity utilization, respectively.

Figure 3 shows a simplified causal loop diagram which reflects the dynamic structure of the model. Assuming $\beta > 0$, this structure consists of two positive and two negative feedback loops.

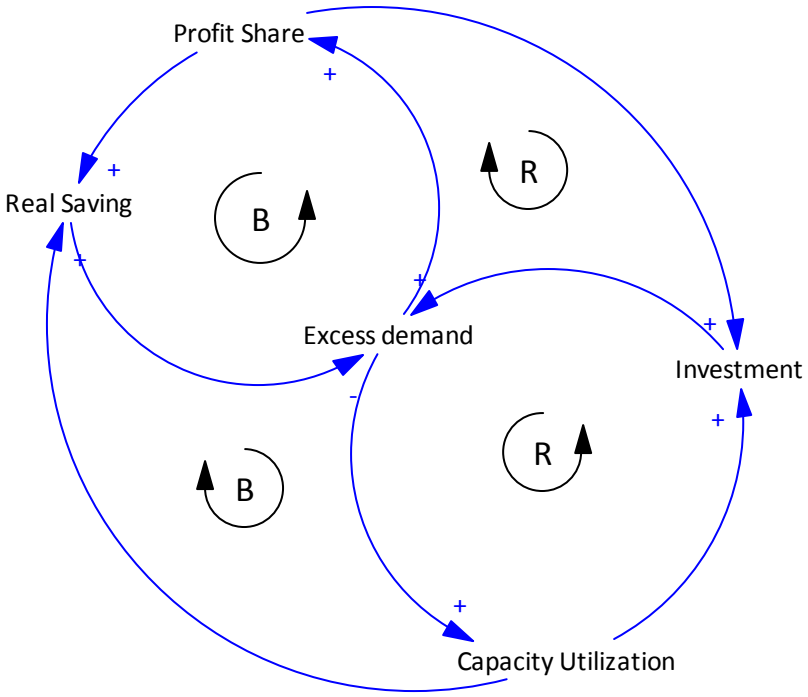

Fig. 3: Simplified causal loop diagram

An increase in the profit share leads to an increase in investment because the now higher profit rate makes it more lucrative to build capital. The higher investment raises excess demand above the level it otherwise would have been. Higher demand asks for higher production but producers will only increase output at a lower real wage rate. The lower real wage rate in turn leads to an increase in the profit share which closes the first loop. An increase in the profit share leads also to an increase in saving because all saving is done by the capitalists. Higher saving in turn lower excess demand beneath the level it otherwise would have been. Lower demand leads to lower production which in a setting of profit maximizing firms implies a higher real wage which in turn decreases the profit share.

The third loop describes the causal links between investment, excess demand, and capacity utilization: an increase in investment raises excess demand, higher excess demand leads to an increase in production and a higher degree of capacity utilization which in turn stimulates investment. Hence, this is a reinforcing loop. The remaining loop reflects the causal links

between saving, excess demand, and capacity utilization: an increase in saving lowers excess demand which in turn leads to decrease in capacity utilization leads lower saving.

Note that the causal loop diagram in fig. 3 and the explanation of the causal loops is not satisfying from a system dynamics point of view because many of the behavioral elements that drive the loops are not explicitly shown. This enhancement will be the task of further paper.

The next step in developing a working simulation model is to create a stock and flow representation. This representation is shown in fig. 4.

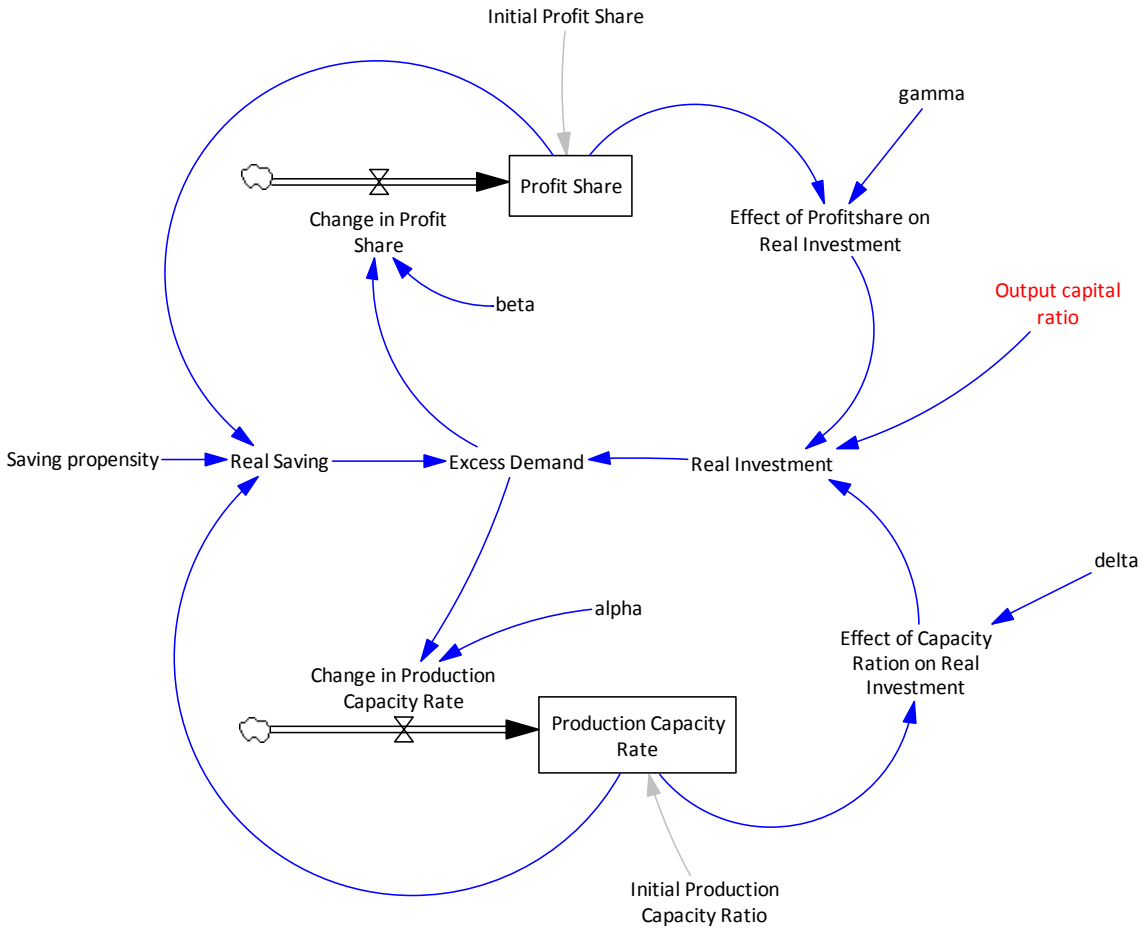

Fig. 4: Stock and flow representation

The stock and flow diagram shows explicitly the two stock variables, profit share and capacity utilization, along with the two flows which change these stocks over time. The diagram conveys the idea that investment and saving together determine excess demand. Excess demand

leads to a change in the profit share and, respectively, in the capacity utilization. The speed of change is determined by the parameters alpha and beta. The profit share influences saving and investment. The same holds for the degree of capacity utilization. The effects of the profit share and, respectively, the degree of capacity utilization are modeled here indirectly via variables called effect of profit share on real investment and effect of capacity ratio on real investment. This was done because the investment function (16) is probably much too simple. This can easily be changed by using appropriate look up functions for these effects. Look up functions allow to do experiments with more complicated (non linear) functional forms very conveniently.

The parameter values for the base run along with the initial values of profit share and degree of capacity utilization are given in table 2. These values generate a steady state which is used as a reference scenario (Base run).

Table 2: Model parameters

Initial profit share	≈ 0.2 (0.19565)
Initial production capacity ratio	= 0.9
Saving propensity	= 1
Adjustment speed of profit share (beta)	= 0.04
Adjustment speed of capacity utilization (alpha)	= 0.06
Partial derivative of investment w. r. t. profit share (gamma)	= 0.65
Partial derivative of investment w. r. t. capacity utilization (delta)	=0.25
Output capital ratio	= 0.5

The Base run reproduces the steady state values of the model. These values are summarized in table 3.

Table 3: Steady state values

Initial profit share	≈ 0.2 (0.19565)
Initial production capacity ratio	= 0.9
Investment	0.176085
Saving	0.176085

To demonstrate the usefulness of the dynamic model the results of two simulation experiments are reported. The first experiment analyzes the dynamic impact of a change in the initial profit share. This comes as close as possible to the most important intention of the original Bhaduri-Marglin paper, to show what impacts an exogenous variation of the real wage rate has on macroeconomic key variables. The Simulation results are shown in fig. 5 – fig. 9 in the appendix. An initial decrease in the profit share implies a decrease in investment and a decrease in saving. But as the decrease in saving is larger than the decrease in investment excess demand becomes positive. The positive excess demand leads to an increase in capacity utilization. Starting from the low initial values, the excess demand driven expansion leads also to an increase in the profit share, in saving, and investment. Because saving is increasing faster than investment the gap between both variables closes over time.

The second simulation experiment analyzes the impact of an initial change in the propensity to save. The results are shown in fig. 10 – fig. 14. The lower value of the propensity to save leads immediately to a decrease in saving. As investment is not affected by the lower propensity directly the decrease in saving arouses a positive excess demand. This positive excess demand triggers an expansion process which leads to an increase in capacity utilization and the profit share. This increase in the profit share leads to an increase of saving above the reference value of the base run. Obviously, the model reproduces the dynamics of the well known *paradox of thrift*.

4. Concluding observations

This paper started with the argument that the recent global and financial crisis questions the main stream economic view of free markets that are driven by supply side forces and deliver beyond any doubt optimal results. Neoclassical economists have brought (neoclassical) economic reasoning to nearly every sphere of life. Presumably, the swing back has already begun before the crisis of pure market economies became evident, and, maybe, the swing back may take world economies too far with respect to government regulation. But these questions have to be discussed by economists, and this discussion needs analytical frame works beyond

neoclassical supply side economics. This paper takes the view that the Bhaduri-Marglin model can very well serve as a starting point for the development of models that take care of demand side and distributional aspects. But, certainly, these models have to go beyond the static approach of Bhaduri and Marglin (1990). A first step to dynamize the Bhaduri-Marglin model has been presented in this paper.

From a system dynamics perspective the presented model still has many flaws: the dynamics are brought to the model quite mechanically, the feedback loops are rudimentary, behavioral elements are underdeveloped, the model contains assumptions and exogenous variables that call for endogenization, etc. But this opens a research program, and it will be interesting to see how models based on the Bhaduri-Marglin approach will fit to other dynamic Post-Keynesian models that are under development as for example the PKI-SD model (Nichols, Pavlov, and Radzicki 2006) or the model of Richardson and Courvisanos (2008).

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Appendix

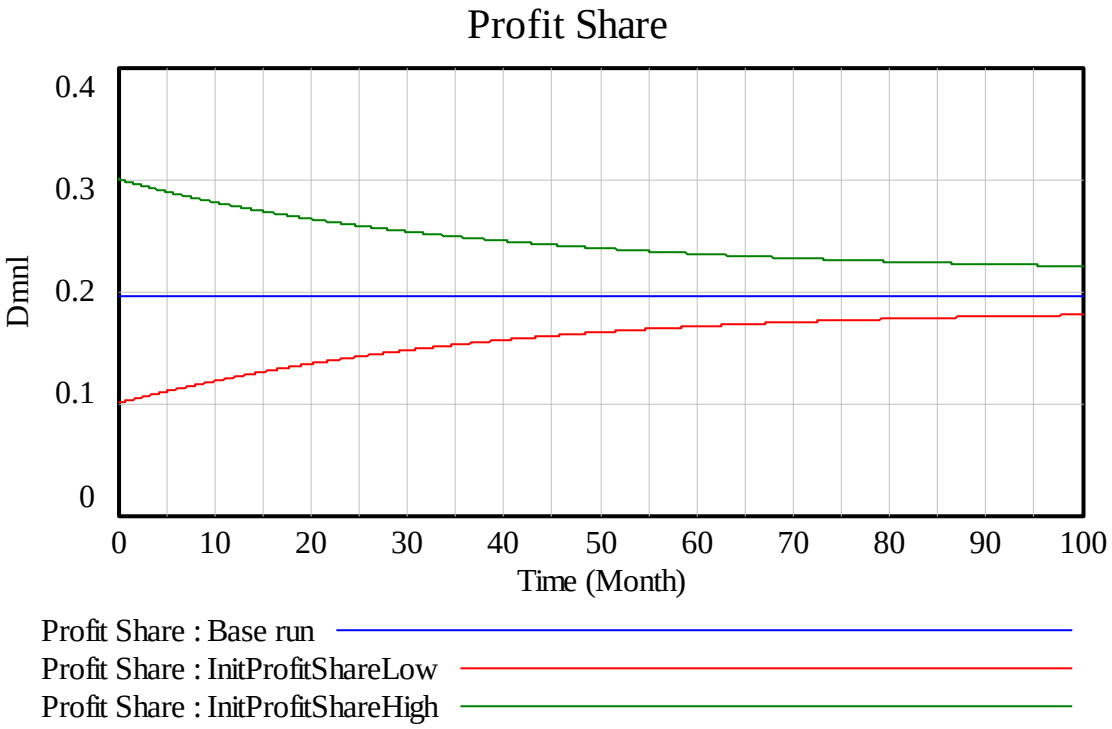

Fig. 5: Variation of the initial profit share - Profit share

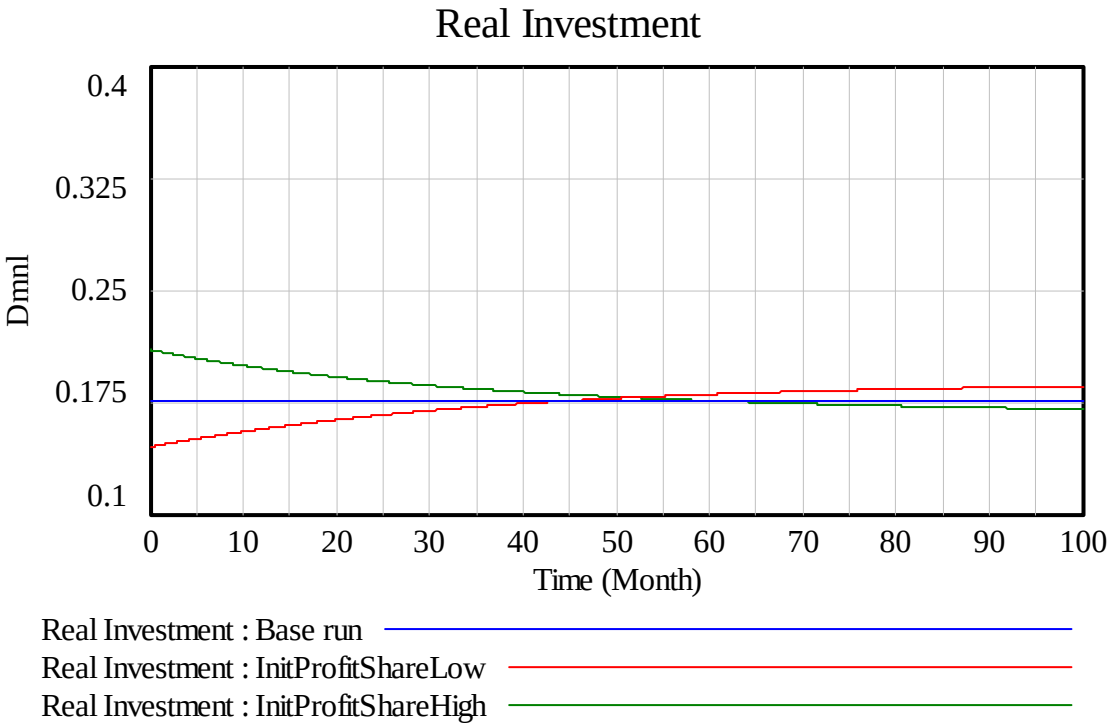

Fig. 6: Variation of the initial profit share - Real investment

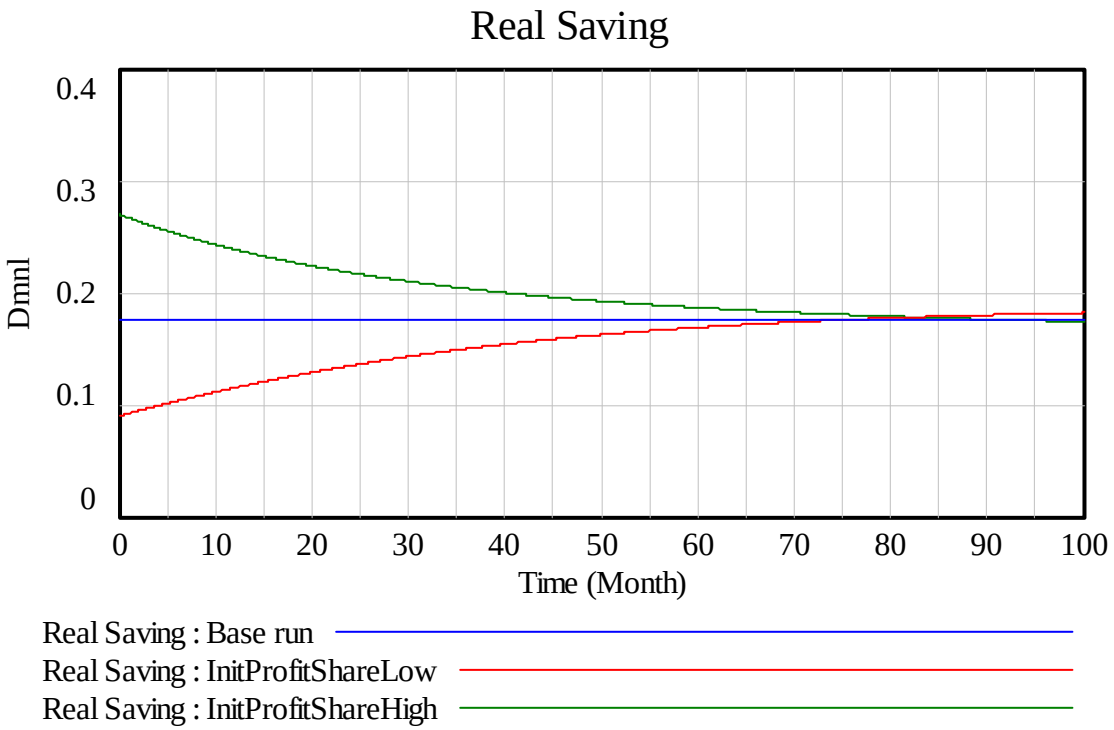

Fig. 7: Variation of the initial profit share - Real saving

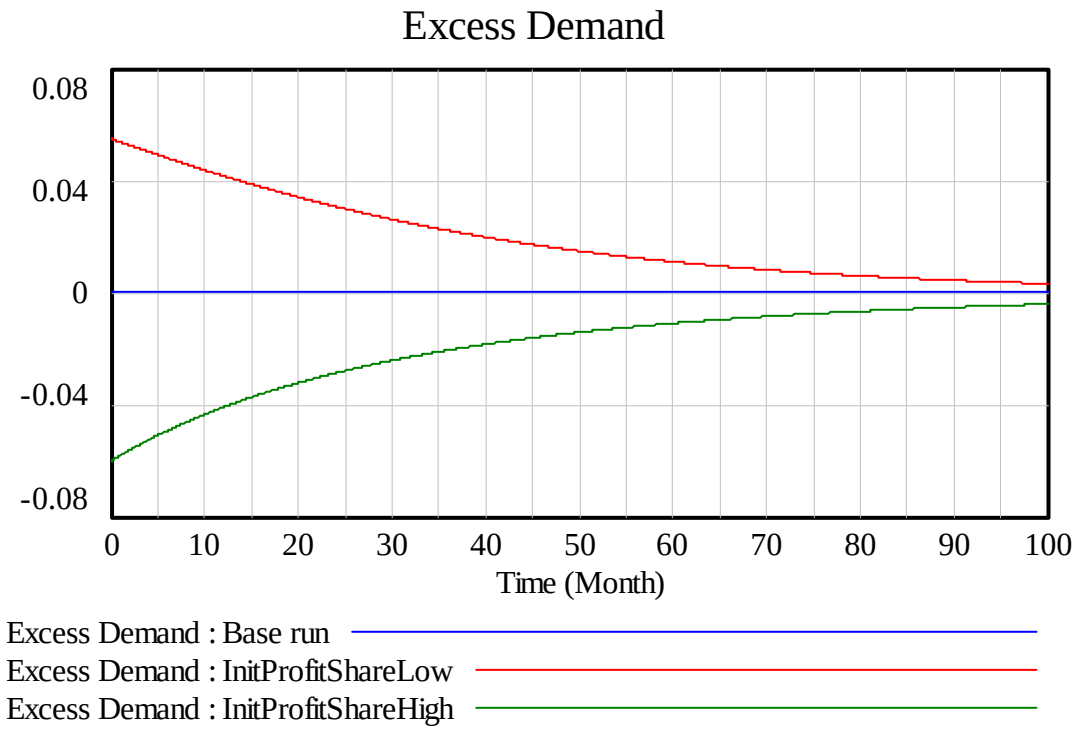

Fig. 8: Variation of the initial profit share - Excess demand

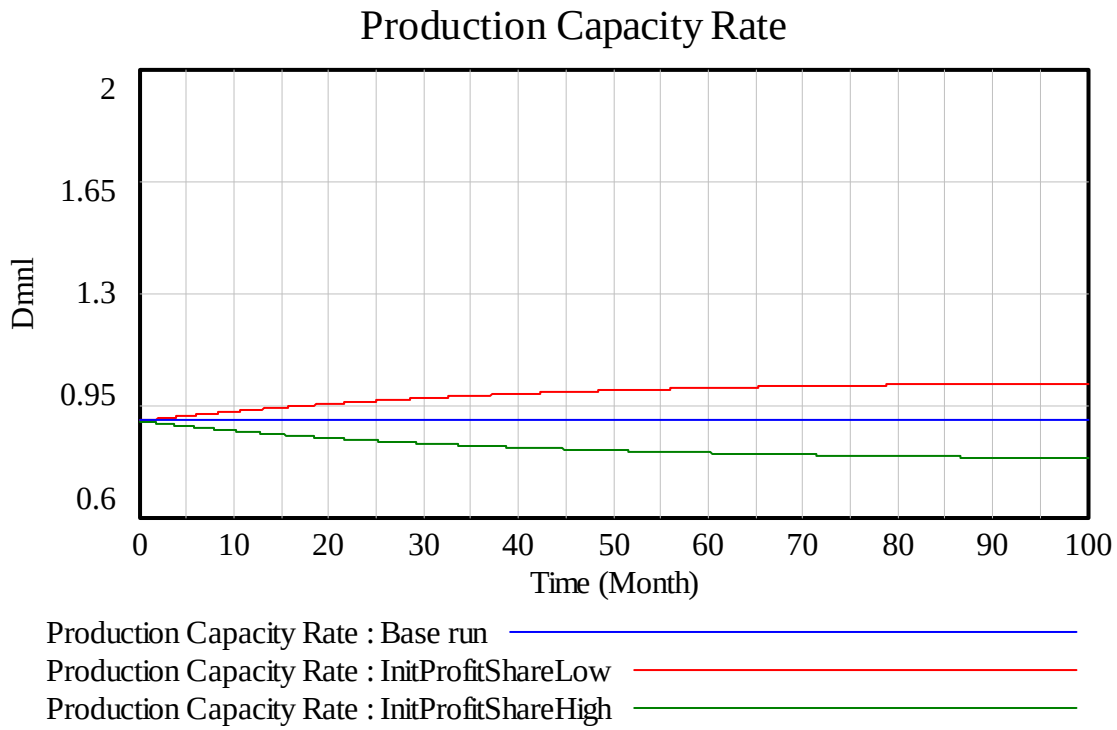

Fig. 9: Variation of the initial profit share - Capacity utilization

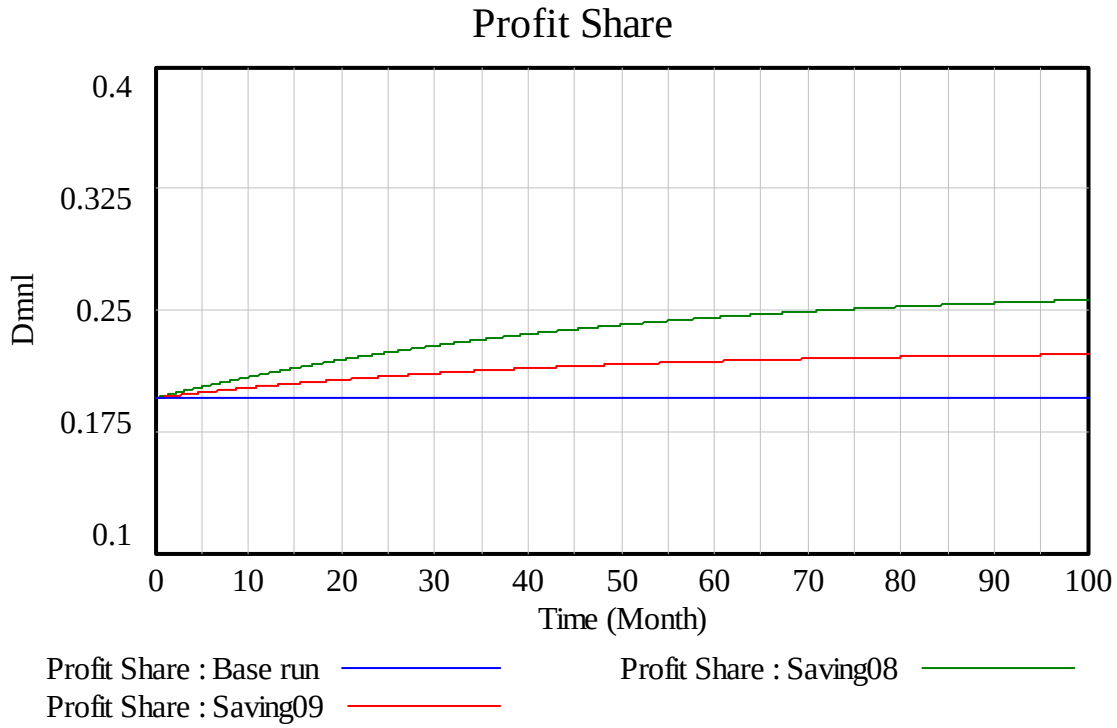

Fig. 10: Variation of the propensity to save - Profit share

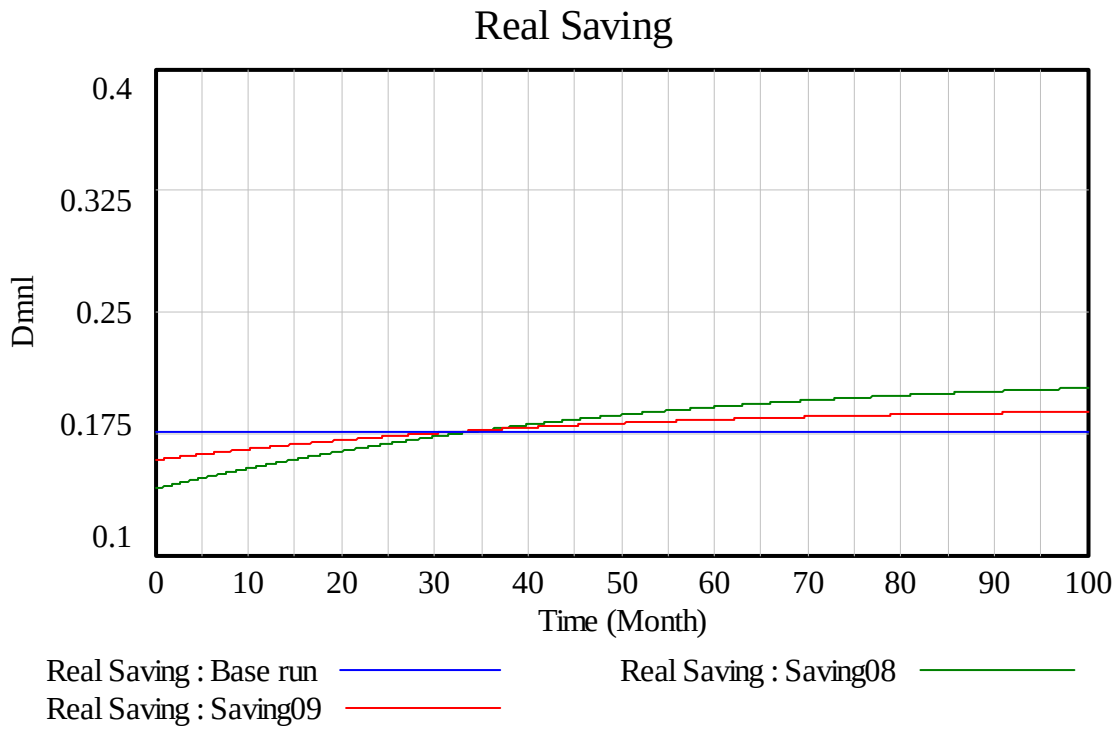

Fig. 11: Variation of the propensity to save – Real saving

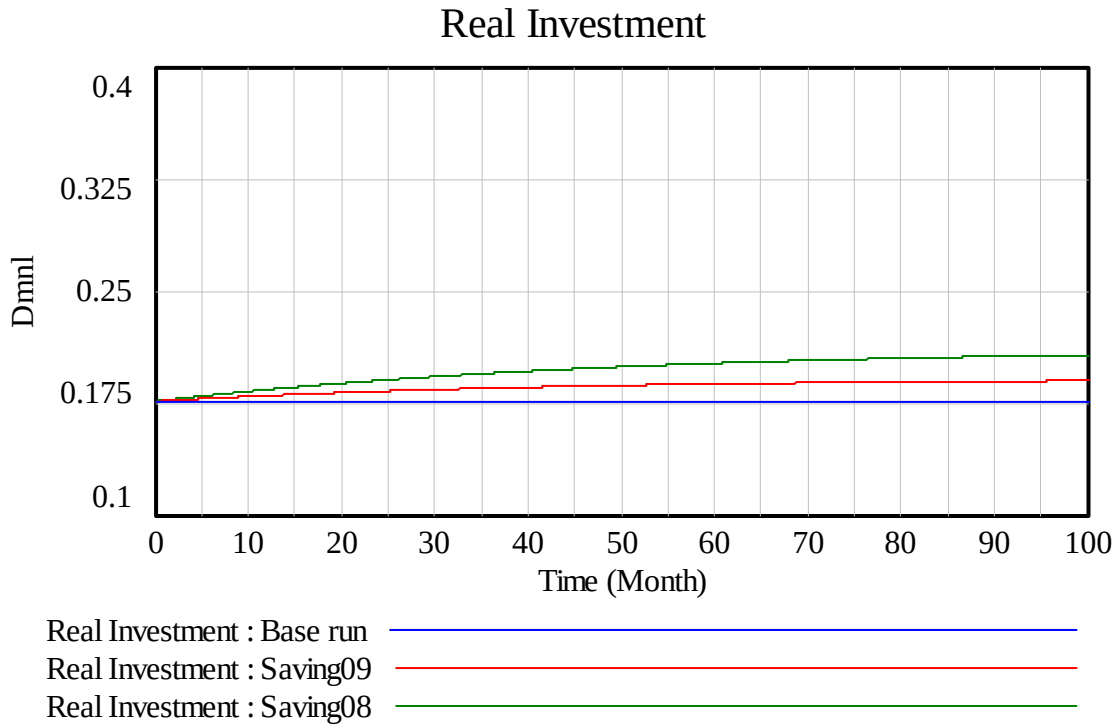

Fig. 12: Variation of the propensity to save - Real investment

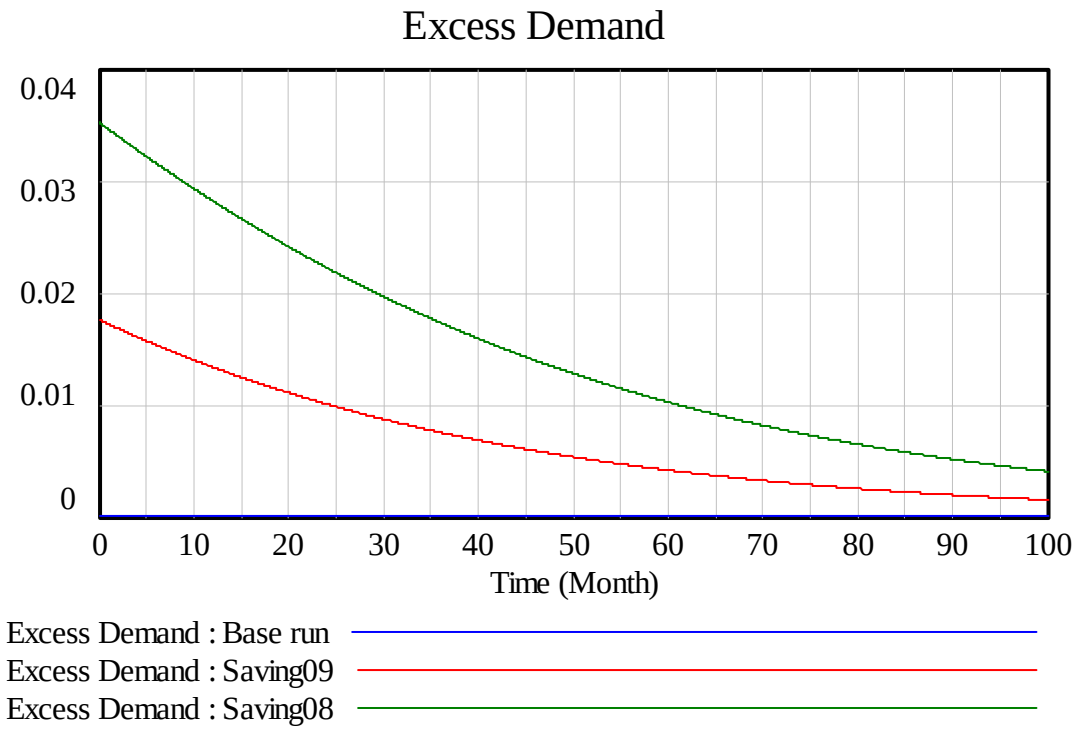

Fig. 13: Variation of the propensity to save - Excess demand

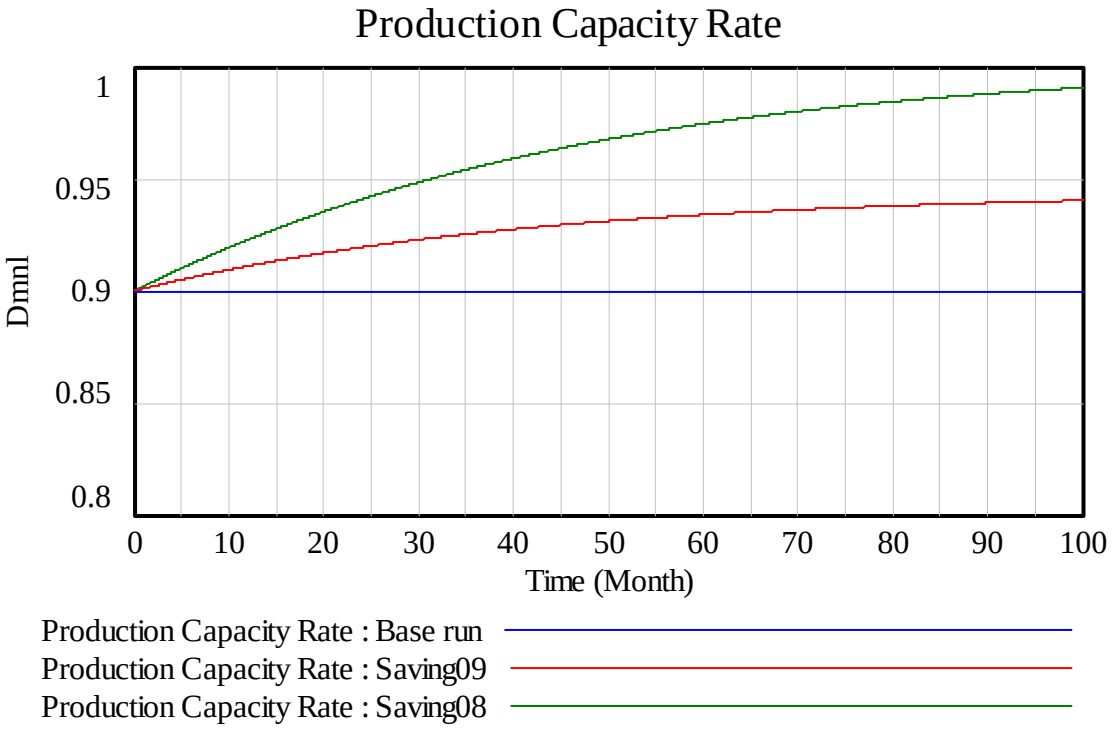

Fig. 14: Variation of the propensity to save - Capacity utilization