**Revisiting (and connecting) Marglin-Bhaduri and Minsky:
a SFC look at financialization and profit-led growth**

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"¿Qué es el tiempo? Si no me lo preguntan, lo sé; si me lo preguntan, lo ignoro"
("What is time? If no one asks me, I know; if someone asks me, I know not")
Saint Augustine, as quoted by Jorge Luis Borges

"For the times they are a-changin'"
Bob Dylan

Abstract

Many heterodox strands of thought share both a concern with the study of different phases or growth regimes in the history of capitalism and the use of formal short-run models as an analytical tool. This text suggests that a. this strategy is potentially misleading; b. the stock-flow (SFC) consistent approach, while providing a general framework that may facilitate the dialogue among those currents, is particularly well-suited to all those who think that macroeconomic models may illuminate historical quests; c. this approach's main intuitions may be conveyed through the "benchmark", post Keynesian SFC model presented by Dos Santos and Zezza (2008), dispensing with the complex computer simulations that are normally employed by SFC authors.

Key words: stock-flow consistency; long-run analyses; Post Keynesian macroeconomics; Neo-Kaleckian macroeconomics; Regulation School; financialization
JEL Codes: B50, E12.

Resumo

Muitas correntes heterodoxas partilham a preocupação com o estudo de diferentes fases ou regimes de crescimento na história do capitalismo, além do uso de modelos de curto prazo como instrumento de análise. Este texto sugere que a. essa estratégia é potencialmente enganosa; b. a abordagem *stock-flow consistent* (SFC) não só oferece um aparato geral que pode facilitar o diálogo entre essas correntes como é particularmente adequada a todos aqueles que julgam que modelos macroeconômicos possam iluminar investigações históricas; c. as principais intuições dessa abordagem podem ser apresentadas por meio do modelo SFC "*benchmark*" apresentado por Dos Santos e Zezza (2008), que dispensa o recurso às complexas simulações computacionais que são normalmente empregadas por autores SFC.

Palavras-chave: Consistência fluxos-estoques; Análises de longo prazo; Macroeconomia pós-keynesiana; Macroeconomia neo-kaleckiana; Escola da Regulação; Financeirização.

Introduction

Most heterodox economists cherish approaches that endeavor not to ignore time and history. They try to cope with uncertainty about the future. They want to state propositions as robust and realistic as possible about an object they know is always changing. They strive to discern both the permanent laws of movement and the historically contingent tendencies of such an elusive subject matter. And they expect their research to be a contribution to politics and policies, so that the change is for the better. However, the "brave army of heretics" (Keynes, 1936) engages very diverse squadrons; more often than not they find it difficult to answer each other's questions about their respective ways to wrestle with time.

The first goal of this paper is to argue that the stock-flow consistent (SFC) approach may contribute to facilitate this dialogue, for it provides a general framework that allows one to integrate some important threads of the heterodox macroeconomic literature: the neo-Kaleckian structuralist current (e.g. Marglin and Bhaduri, 1990, Taylor, 1991), the "formal Minskyan literature" (see, for a survey, Dos Santos, 2005), and many of the various strands of thought (such as the "Regulation" School) that have tried to analyze the so-called *financialization* of modern capitalist economies (see Hein and Van Treeck, 2008, and Van Treeck, 2008 for surveys on financialization). In fact, we suggest that the SFC approach is particularly well-suited to all those who think that macroeconomic models may illuminate historical quests**.**

We are well aware, of course, that SFC heterodox models tend to be somewhat labyrinthine. The urge for realism has fostered the development of very large models which can only be analyzed with relatively complex computer simulations. Nevertheless, we believe that valuable insights can be obtained even with smaller (though still institutionally rich) SFC constructs. Indeed, the second goal of this paper is precisely to argue that the simplified, "benchmark", post Keynesian SFC model presented by Dos Santos and Zezza (2008) (i) sheds considerable new light on the findings of the aforementioned literature while avoiding some of its shortcomings; and (ii) can be analyzed using only reasonably intuitive graphs.

In order to make these two points, we divide the remaining of this paper in four parts. The first one comments on the aforementioned literature, stressing what we believe are their relative merits and shortcomings. The second one revisits the Dos Santos and Zezza (henceforth DSZ) model, tries to explain it with the help of graphs, and argues that it encompasses many of the concerns of the literature discussed in the previous section. The third one attempts to show that the conclusions obtained in the

DSZ model can be quite different in nature than what heterodox conventional wisdom would lead us to believe. The brief fourth section summarizes and concludes.

1 Three related (and particularly interesting) heterodox literatures and the stock-flow consistent approach

Heterodox approaches do not employ the concept of a competitive general equilibrium configuration as a yardstick. That does not mean that they dispense with benchmarks; they rather define them in much looser and contingent ways. They may, for instance, stress (in a Marxian or Keynesian way) some permanent features or tendencies of capitalist economies and/or build upon stylized facts such as those identified by Kaldor. Given those benchmarks, these approaches tend to be much more interested in *structural* – therefore enduring – transformations in the way capitalist economies evolve in space and in time. These structural transformations originate new phases or growth regimes, involve changes in the distribution of income, wealth and political power, create and destroy institutions and redefine their roles. In most heterodox approaches, and certainly in the ones discussed here, history does really matter, for it continually changes some of the dynamic properties and long-run tendencies of the system.

The focus on historical change is clearly expressed in the two seminal papers published by Amit Bhaduri and Stephen Marglin in 1990. In fact, one of their main objectives was to understand why "the gospel of co-operative capitalism", "a sensible one for the particular circumstances of the immediate post-war period" (Marglin and Bhaduri, 1990, p. 175), was replaced by a "conflictual" situation from the 1970s on. It is not an exaggeration, we believe, to suggest that Marglin and Bhaduri's seminal insights are the heart and soul of the so-called "neo-Kaleckian" literature (see Blecker, 2002, for a survey).

Hyman Minsky's main objective, in turn, was to understand the dynamics of capitalists' interrelated portfolios – and the ensuing fluctuations in income and employment – in a specific phase of capitalist development, characterized by the Big Government and the Big Bank. There have been many valuable efforts at formalizing Minsky's insights in a second related literature (see Dos Santos, 2005, for a survey).

Finally, the historical concern is at the heart of the *Régulation* school quest. The school itself was created as an attempt to describe the demise of Fordism, understood as a particular way of conciliating profitability and mass production which blossomed at a global level during the Bretton Wood period. "Regulationist" authors have been busily occupied in identifying the main features of the historical

configuration that has painfully emerged afterwards. Some of its main contributors have, in recent years (see, for example, Aglietta, 1995, and Boyer, 2000) concluded that contemporary post Bretton Woods capitalism is a *finance-led* economy.

The connection between the Bhaduri and Marglin papers and the regulationist *démarche* is pretty obvious: both approaches want to understand what has replaced the sort of historical configuration that allowed for – at least in developed countries – the combination of economic growth and somewhat egalitarian tendencies during the "golden years". Given the upsurge in financial crises in the last (say) 30 years, it is no wonder that Minskyan insights on the factors that may progressively increase the financial fragility of firms and banks should be widely regarded as illuminating by people working in the other two heterodox approaches mentioned. In effect, it seems to us that the historical concern and the Kaleckian/Keynesian influence present in those three streams of literature suggest that a more intense dialogue among them is potentially fruitful, though still incipient.

There are, of course, many differences in scope and method among those currents. Not without a reason, the boldest project – the regulationist – has always tended to be mainly literary. Regulationist economists endeavor to understand the coherence of multiple layers – from the technological to the institutional, paying special attention to the relation between capital and labor and the nature of competition – of a historical configuration. There is no way such a wide purpose could be framed – without drastic simplifications – into the models economists are able to devise. Eventually, however, some regulationist economists felt it would be useful to expose their ideas in simpler and more formal frameworks; there are some attempts at modeling both the Fordist and the contemporary finance-led regimes (on this, see Boyer, 2000).

Both the neo-Kaleckian and formal Minskyan literatures address much more specific questions, more suitable to be analyzed with the use of formal models. Marglin and Bhaduri wanted to know what happens to growth when income distribution changes. The formal Minskyan literature, in turn, strives to formally demonstrate the logical possibility of the financial cycles so richly described in Minsky (e.g. 1982, 1986).

It is not odd in the least that all those models only capture a small fraction of the much wider vision and concerns of their authors. This is only to be expected. This is not even a bad thing, provided one accepts that simplified models (if one allows us a pleonasm) can be useful to make a precise point or to illuminate a result that would tend to remain elusive if lost in a dense forest of words, and provided authors and

interpreters do not treat those models as "a method of blind manipulations, which will furnish an infallible answer" (Keynes, 1936, p. 297).[2] Having said that, we can and should always ask whether the models built by those authors are really up to the task they were meant to perform.

To us, it is certainly striking that all those attempts should be so similar in their nature and so limited in their scope. They are similar (and limited) in that they all appear to be short-run *and* somewhat incomplete (or too partial) models. The remaining of this section tries to develop this point.

As Blecker (2002) makes clear, the papers published by Bhaduri and Marglin in 1990 represented a path-breaking contribution to an ancient yet never-ending discussion, in heterodox quarters, about the dynamic implications of a change in functional income distribution. Bhaduri and Marglin (just like Boyer, as discussed below) intend to provide a model that allows one to "peer over the edge of the short period"[3] and say something about enduring phases – or regimes – in the history of capitalism (Bhaduri and Marglin, 1990, p. 390 and Marglin and Bhaduri, 1990, p. 155).[4] In fact, they do use their model to produce (brilliant) insights about the evolution of capitalism after World War II.

We think there is no need to describe here such a widely discussed model.[5] It suffices to recall that it revolves around the slope and the elasticity of its peculiar IS curve, the properties of which in turn depend on the parameters that link investment decisions, the rate of utilization and the profit share in aggregate income. There is just one conceptual experiment involved: an exogenous change in the distribution of income. The impact on the profit rate and on investment and income levels depend on the aforementioned parameters; the combinations between the possible results allow the authors to define four possible regimes.

The demise of the golden years is then interpreted by the authors as the transition from a "cooperative-stagnationist" regime to a "conflictual-stagnationist"

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(2) As Keynes warns at the same page, we must "keep at the back or our heads the necessary reserves and qualifications and the adjustments which we shall have to make later on", if we are, we add, to study a historical process, make a forecast or recommend a policy.

(3) What Keynes hardly ever did, according to Joan Robinson, and most Post Keynesians hardly ever do, according to Macedo e Silva and Dos Santos (2008).

(4) Moreover, they intend to "release" Keynesian theory "from the marginal role that the mainstream has accorded [it] as a theory of no relevance to understanding the functioning of the capitalist economy apart from the short period" (Marglin and Bhaduri, 1990, p. 183).

(5) Blecker (2002) provides a discussion about the origins of the model, a formal benchmark model and a survey of the literature it elicited.

one (Marglin and Bhaduri, 1990, p. 173). This is certainly a very appealing result and may well be a fairly good approximation at historical truth. Nevertheless, we may question whether this proposition can really be derived, with a fair amount of confidence, *from their model*.

In other words, we are not convinced of Marglin and Bhaduri's (1990, p. 160) claim that their "model describes a longer run than the textbook short run in which capacity utilization is the sole adjusting variable". That is to say, their model effectively goes a step further – for it furnishes the investment in the accounting period immediately after the exogenous shock – but this is as far as it goes.

Marglin and Bhaduri describe their papers as an attempt at rescuing a *sensible* (Keynesian) *conception* from a *misleading* (stubbornly stagnationist) *model*. Though we partake their (Keynesian/Kaleckian) conception, we think that their (short-run) model may be an unreliable guide – thus potentially a misleading one – to long-run concerns. We have two reasons for that. The first is that we subscribe to Kalecki's (1968) view that the long run is nothing but a sequence of short runs, and we believe that this sequence (which may or not lead to a steady state) must be built, laboriously connecting the periods. It cannot be *presumed* on the basis of a single-period exercise: just as we cannot make a movie out of two photograms, we cannot derive a growth *regime* from such a short-run exercise.

The second reason is that we are deeply convinced that heterodox economists must – and already can – develop models that do some justice to the complexity of the political economy of capitalism, as envisaged by Keynes already in his *Tract* (1923). To do that, it is necessary to face some of the "financial complications" – such as the influence of stock exchange and the rate of interest – that Bhaduri and Marglin (1990, p. 377n) chose to abstract in their papers.

At his point, heterodox economists who do not abhor formal models might want to resort to Mynskian models. After all, more than anyone else, Minsky (with Davidson) tried to call forth the financial details that fell "into the background" in Keynes's (1936, p. vii) *General Theory*. Unfortunately, though, this quest is likely to be somewhat disappointing. Most of the formal Minskyan literature spins around the specification of a (often idiosyncratic) investment function that can produce a reversion of the economic cycle (Dos Santos, 2005). Strangely as it may seem, scarce attention is paid to Minsky's stories about how financing and spending decisions determine how interconnected portfolios evolve in time, creating fragility or addressing the problems this fragility poses to economic growth. In other words, such central aspects of the creation and the distribution of financial power in capitalist economies – all the more

essential in the financialization era – that were missing "details" in the *General Theory* (on this, see Macedo e Silva, 2009) are also missing in the formal Minskyan literature.

We will not discuss here the many authors whose contributions to the comprehension of financialization issues were mainly phrased in literary terms. It is only fair to acknowledge that some of them (like Aglietta, 1995) were not only among the first to identify the phenomenon but were capable as well of producing powerful intuitions about it (see for instance Duménil and Lévy, 2005).[6] However, we will stick to our point that our "brave army" needs the discipline that can only be provided by a common formal framework.[7]

Boyer (2000) is an assumedly "preliminary" attempt in this direction. The paper intends to present a "steady state model describing the full implementation" of a "financialized growth regime".[8] We deeply sympathize with Boyer's way of phrasing his quest, for we believe – for reasons to be explored in the next section – that the study of steady states, far from being a sterile abstraction, may reveal some important structural features of a historical formation.

Financialization implies, in Boyer's model, first, that a "profitability norm" is imposed by financial markets on firms,[9] and, second, that changes in the value of financial assets affect consumption decisions in a decisive way**.**

Beginning with the first point, we note that a change in the profitability norm has net effects on consumption and investment (and hence on aggregate production and income) that will depend on the value of the specific parameters used to calibrate the model. Ceteris paribus, a rise in the profitability norm reduces retained profits and (somehow)[10] real wages as well, thus affecting investment and consumption negatively. In the case that Boyer describes as a "fully financialized growth regime", this rise in the norm determines an increase in profits, wealth, aggregate demand and production.[11]

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(6) As other papers in the book edited by Epstein (2005).

(7) In fact, as Van Treeck (2008) shows, the contributions to this literature sometimes falter exactly because of the lack of clarity that a good (Kaleckian, according to him) macroeconomic framework can provide.

(8) Please note that his article is much more ambitious, for, it tries to describe, literarily and with the usage of complex diagrams, "how financialization affects all institutional forms" (Boyer, 2000, p. 118). It also presents a very interesting survey of attempts at coping with contemporary capitalism.

(9) That is to say, shareholder value orientation requires firms to satisfy this profitability norm before accumulating (i.e. retaining) profits.

(10) Boyer does not provide, for example, an (price?) equation that would connect changes in the profitability norm and aggregate real wages.

(11) Compensating at least in part the negative effect over aggregate real wages.

This happens because somehow the reduction in real wages increases profits[12] and therefore wealth, which in turn has a net positive effect on consumption;[13] the net increase in aggregate demand may then produce a net increase in investment.[14]

So a rise in the profitability norm can have "exhilarating" results. Does this mean that Boyer's objective of describing the steady state of a financialized growth regime was accomplished? Unfortunately, it seems to us it did not.

While recognizing – just like us – Boyer's contribution as seminal, Van Treeck (2008, p. 11) criticizes the model for being too simple: some of the many important dimensions of contemporary capitalism are missing.[15] Though this is certainly true, what we want to underline is the fact that Boyer does not seem to go beyond an exercise in short-run comparative statics: all we know is that the exogenous shock just mentioned produces a new (and higher) income level *in the next accounting period*. Boyer does not demonstrate that the system attains or converges towards a higher growth rate.[16] Therefore, the time span of his model seems to be as short as that of Marglin and Bhaduri's.

Some of the missing dimensions pinpointed by Van Treeck (2008) were contemplated in two recent SFC papers: Lavoie (2007) and Van Treeck (2007). The latter[17] can be said to present a simpler model, for it depicts an economy without government.[18] Lavoie's model is by far more complex: besides separating government and central bank, it describes in a more realistic fashion the portfolios of agents

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(12) Since Kalecki we know that there is no *direct* opposition between aggregate wages and profits, for they are not slices of a given pie. Boyer does not make explicit the assumptions he is using to get this result. Of course, a clear explanation of the connections between wages and profits can be obtained in Bhaduri and Marglin's 1990 papers.

(13) Strangely enough, in Boyer's model the fraction of aggregate profits earmarked by the profitability norm does not reappear anywhere.

(14) In a Fordist configuration the final effect of a rise in this norm on the level of activity is a contraction in the level of activity – a "stagnationist" result, in Marglin and Bhaduri's terminology.

(15) "Boyer's (2000) model in incomplete in some respects, such as the absence of a public and a foreign sector, the omission of firms' and households' financial decisions (share issues or buybacks, debt-financing of investment or consumption, distribution of dividends, interest payments), and the absence of an asset price determination mechanism". Skott and Ryoo (2008, p. 828) correctly criticize the lack, in Boyer's article, of "a more careful modeling of the stock flow relations".

(16) It should be mentioned that, although Boyer claims to present a steady state model, he writes that he is only examining its short-run equilibrium.

(17) The conceptual experiments discussed in the paper are "an increase in the dividend payout ration of non-financial firms" and a "reduction in the contribution of new equity issues to the financing of physical investment" (p. 1).

(18) This is also, incidentally, the case of Skott and Ryoo (2008), which differs from ours in that it explicitly plays down the importance of Minkyan insights.

(especially households'). It also explores more changes in parameters.[19] In spite of these differences, both have in common the method chosen to execute the experiments – they resort to simulations. Lavoie is the first to admit one (or, according to him, the major) "drawback" of the method: "some of the results could be, and in many cases certainly are, sensitive to the values taken by the assumed parameters" (p. 2). Though we are convinced that simulations may be quite useful,[20] we contend that their inner complexity – and, in some cases, arbitrariness – may have been acting as a major obstacle to the diffusion of the approach and to the fluidity of the conversation among the many heterodox currents. Happily enough, we think there is an alternative: a simpler SFC model which can simultaneously satisfy some of the heterodox demands for realism and convey at least some of the most important intuitions of the approach, while allowing for analytical solutions for some interesting conceptual experiments. There is room, thus, for recasting (old and new) heterodox issues both in SFC analytical models and in computer simulations.

2 Revisiting the Dos Santos and Zezza (2008) model: structure and graphical analysis of the steady-state equilibrium

Besides necessarily reflecting an aesthetic judgement, the "adequate" level of detail and/or "realism" of any economic model depends crucially on the precise issues it attempts to illuminate. Given our purposes, the highly simplified and stylized model presented by Dos Santos and Zezza (2008) seems a decent starting point.[21] In this section we revisit the nature of the structural assumptions of the latter and present a graphical (and, we hope, intuitive) analysis of its steady-state equilibrium and dynamics – directing readers more interested in the model's algebraic details to the original (and, perhaps, somewhat less accessible) article.

2.1 The structure of the model and its assumed short-period behavior

Like most closed economy SFC models, DSZ assumes an economy consisting of households, firms, banks, and the government. As presented in table 1, households are assumed to hold bank deposits and firms' equities, while firms are assumed to hold

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(19) Such as changes in the target proportion of retained earnings to investment, the households' propensity to hold equities and the latter's propensity to take loans.

(20) In fact, the first author of this paper is responsible for many of them!

(21) According to Dos Santos and Zezza (2008, p. 475) their model was inspired by the seminal contribution by Lavoie and Godley (2001-2002). The idea was to try to both simplify Lavoie and Godley´s original contribution ("in order to get well defined long period results") and to extend it ("so as to allow the discussion of fiscal and monetary policies").

capital goods financed with equity emissions and bank loans (and retained profits, as discussed below). Banks, in turn, are assumed to "use" households' deposits to make loans to firms and to buy government bills – which are issued by the government to allow it to finance its deficits.

Table 1
Aggregate balance sheets of the institutional sectors

Assets/Sectors	Households	Firms	Banks	Government	Total
Bank Deposits	+D		-D		0
Bank Loans		-L	+L		0
Government Bills			+B	-B	0
Capital Goods		+pK			+pK
Equities	+peE	-peE			0
Net Worth	Vh	Vf	0	-B	+pK

Note: Positive variables are assets, while negative ones are liabilities; pe stands for the price of one equity; p stands for the price of the single good produced by firms.

This particular choice of (sectoral) assets and liabilities was not made by chance, of course. In fact, it seems to us that any model economy attempting to illuminate Minskyan or financialization insights has at least to have bank loans to firms, a stock-market, and allow for the possibility of "big government" stabilizing interventions. On the other hand, one has to keep in mind that – despite its apparent simplicity and the fact that no flow variables have been introduced so far – the artificial economy above already has 9 endogenous variables (i.e. D, pe, E, Vh, Vf, B, p, K, L). In order to keep the dimension of the model manageable, DSZ assumed away all features of reality they felt were not crucial for their purposes – such, as for example, high-powered money (so people are assumed to only buy things using bank checks in the model), bank loans to households (so people are assumed to never get into debt), the stock of capital of the government (which is zero because government investment is assumed to be zero), households' holding of government bills (which are zero because government bills are assumed to pay the same interest rates as bank deposits), and so on. Moreover, and also to simplify matters (in a first approximation, at least) the price level p is assumed to be fixed, so the DSZ model is fix-price in the sense of Hicks (1965).

Important as it may be to know the precise composition of the sectoral balance sheets in any given point in time, the focus of SFC models is in the evolution of these balance sheets through time. It so happens – and this is the quintessential SFC insight – that the latter is entirely determined by the assumptions one makes about the short-

period flow behavior and portfolio choices of the sectors. More precisely, both the steady-state and the dynamic trajectory of the system are bound to change with each and every change in the set of hypotheses and parameters assumed about the latter variables (for every sector). For example, the steady-state(s) of a system assuming a simplified Keynesian consumption function (or, say, a Harrodian investment function) will be different from the steady-state(s) of a system assuming that aggregate consumption depends on the level of households' wealth (or, say, a Neo-Kaleckian investment function). And so on.

We therefore feel we have to address a couple of methodological points before we go on discussing the DSZ model. The first point is whether or not it is useful to study the steady-states of these systems. The second point is what can be said in general about the latter (since they depend on so many variables).

In fact, and as discussed in Macedo e Silva and Dos Santos (2008), we believe it is quite useful to know whether or not a SFC system is converging or diverging from any given steady-state. For if the system is diverging, this means that at least some ratios among important macroeconomic variables – say, the firms' loans to capital ratio; or households' wealth to income ratio; or banks' loans to deposits ratio, and so on – are getting increasingly smaller (larger). And, as pointed out by Godley and Cripps (1983), these events often do not last long – for these ratios rarely approach zero or infinity – and one is bound to learn a lot from them whenever they do last long. For example, the debt to income ratio of the American households grew considerably in the 1993-2007 period, and this had a lot to do with the economic crisis of 2008.

To be sure, a full SFC steady-state is only achieved when the (short period behavior) parameters of the system are kept constant[22], and there is no reason to believe this will be the case in any actual economy. Note, however, that even though no one has ever argued that the propensity to consume of American households remained fixed throughout the 1993-2007 years, we believe few would disagree that it remained quite high during this period. In cases like that (at least), the simplifying assumption of fixed parameters – and therefore the use of SFC steady-states (or of the fact that the economy appears to be diverging from them) – dispenses with unnecessary complications and allows one to obtain a decent approximation of the economy's actual dynamic process.

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(22) For that reason Macedo e Silva and Dos Santos (2008) interpret the SFC steady-state as a generalization of Keynes´ long period equilibrium.

Now, it is also fair to point out that the only good reason to leave blank spaces in table 1 above – or, for that matter, to adopt a closed economy as a starting point – is the need to keep the model "under control", so to speak. We are well aware, of course, that the sectoral structure and the actual balance sheets of modern capitalist economies are infinitely more complex than the ones depicted in Table 1.[23] And, as mentioned above, each and every structural change (say, the inclusion of a sector or even an asset) in the artificial balance sheets depicted above is bound to change the nature of the steady-state of the model.

As pointed out earlier, we believe that the level of detail adopted here is sufficient to allow us to make the points we want to make in this particular text. In fact, it seems to us that many of the insights we get from the simplified structure above can illuminate also more complex analyses. No matter how complex the SFC model at hand, it is always true – by definition, of course – that in its (growth) steady-state all components of all balance sheets assumed in the model will have to grow at the same rate. Moreover, this rate will have to be equal to the rate of growth of all flow variables assumed in the model – for these logically determine the growth of the stock variables. We hope readers will agree that these (general) points can be made clearer in the context of the simplified model discussed in this section than in more complex contexts.

It is customary that, after presenting the sectoral balance sheets, authors in the SFC tradition will go on presenting their precise hypotheses about each and every flow variable and portfolio decision assumed in their model. We follow a different approach here, for two basic reasons. First, the algebra of the precise assumptions made in the DSZ model is already carefully presented in the original article. Second, we believe that it is both possible and desirable to present the model in a more intuitive, literary, way. It seems to us, in particular, that having to read very many pages of algebra tend to discourage people who could potentially sympathize with the approach.

We will proceed, then, first by presenting a brief list of what we believe are the most important behavioral assumptions made in the DSZ model and second by discussing their implications to its long-period steady-state. The use of algebra will be kept to a minimum.

The key hypotheses are five. The first one is that aggregate consumption is assumed to depend both on the level and the (functional) distribution of income (as in

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(23) As Duncan Foley has told one of us, the model above can be said to represent much better the financial structures of, say, the 1950s than present ones.

Kalecki, 1954 and Marglin and Bhaduri, 1990, *inter alia*) and on the level of households' wealth (as in Modigliani and Brumberg, 1954; and Godley, 1999, *inter alia*). More precisely, the hypothesis is that households can be divided in workers, who are assumed to consume whatever income they can get (so as to save and have nothing) and rentiers, who are assumed to be rich and to consume a fixed fraction of their wealth.[24] In other words, in any given short period, the aggregate propensity to save is assumed to be a positive function of the profit-share and a negative function of households' (i.e. rentiers') wealth to income ratio.

Two other important features of the DSZ model are the facts that it assumes (i) a neo-Kaleckian investment function, according to which investment responds positively both to increases in capacity utilization and to increases in the mass of profits received by firms; and (ii) that government tax revenues are a fixed fraction of total income while government expenditures are a fixed fraction of the economy's stock of capital.

The fourth hypothesis is that firms are able to finance whatever level of investment they want – getting bank loans if their desired investment is higher than the sum of their retained earnings and the amount of cash they get from selling equities. The stock of issued equities and the liquidity preference of rentiers determine the price of equities.

The fifth hypothesis is that there are no expectation mistakes in the short period. This implies that, in each short period (of, say, one year) the level of output is in equilibrium. Given that rentiers' wealth is assumed to affect consumption positively, this last hypothesis implies also that the level of output is a positive function of rentiers' wealth.

So, in any given year, things happen pretty much as in, for example, Marglin and Bhaduri (1990) – with the important caveats that financial markets are incorporated in the model (in a standard heterodox-Keynesian way) and that our specific consumption function makes the economy decidedly stagnationist (*in the short run*, we emphasize; more on that below).

It is also important to observe that, despite its simplicity, the models allows one to examine many of the phenomena that the recent literature has identified as features of financialization, such as the occurrence of credit or stock-market booms, a

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(24) This assumption merely radicalizes what Keynes (1936, p. 93; see also p. 94) wrote in his *General Theory*: "The consumption of the wealth-owning class may be extremely susceptible to unforeseen changes in the money-value of its wealth. This should be classified amongst the major factors capable of causing short-period changes in the propensity to consume".

rise in interest rates or in the dividend payout ratio.[25] Given the lack of space and the interest in stressing the nature of the steady state in the model, we refrained from exploring such events in this text.[26]

2.2 The steady-state of the model (I): the b-g curve

As mentioned earlier in the text, there is no good reason we should restrict ourselves to the short run. And in the long period the picture gets considerably more complex. We begin by noting that in the steady-state of the DSZ model – and, in fact, in the growth steady-state of all SFC models – it is always true (by definition) that ***all stocks and flows assumed will grow at the same rate***.[27] This is precisely why the SFC steady-state is a useful benchmark, by the way. For if, say, any one stock variable is growing faster than another one, this implies that the sectoral balance sheets (and, therefore, the economy's financial conditions) are changing in a meaningful way.[28]

In particular (and assuming that the liquidity preference of rentiers is fixed and therefore there are no capital gains or losses[29]), the steady-state of DSZ is a situation in which the net wealth of all sectors grows at the same rate as the stock of capital:

$$SAVh_t / Vh_{t-1} = - SAVg_t / B_{t-1} = gk.$$

where $SAVh$ stands for rentiers' saving (since workers are assumed to save nothing), $SAVg$ stands for government's saving (i.e. government tax revenues minus government expenditures in goods and interest payments); and gk stands for the rate of growth in capital stock (i.e $gk = \Delta K_t / K_{t-1}$). In words, in the steady-state of the DSZ model (and of any SFC model, for that matter), the rate of growth of households' (i.e. rentiers', in the case of the DSZ model) wealth is equal to the rate of growth of government debt

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(assumed positive) and the rate of growth of the capital stock.[30] In the remaining of this section we focus on the implications of these equilibrium conditions for the graphical analysis of the long-period steady-state of the DSZ model.

We begin by noting that, given the hypotheses mentioned above, government deficits will be lower the higher is capacity utilization. Indeed, if the latter goes up, then the tax revenue increases relatively to government expenditures (in goods and interest payments), so government saving goes up (or, what is the same thing, government deficit goes down). But we saw before that – in any given short period – capacity utilization is a positive function of rentiers' wealth. So, it is safe to say that, ceteris paribus, the higher is rentiers' wealth, the higher will be capacity utilization and the lower will be the government deficit.

Moreover, DSZ's neo-Kaleckian investment function is such that the higher is rentiers' wealth and therefore capacity utilization, the higher is the rate of growth of the capital stock.

So, it is possible to draw a conclusion that the equality between the rates of growth of the stock of government debt and the stock of capital requires that higher (lower) ratios between rentiers' wealth and the stock of capital are associated with lower (higher) ratios between government debt and the stock of capital, as in Figure 1.[31] It may be easier to grasp the meaning of this point if one supposes two "alternative realities" in which two different steady states have built, at some point, the same stock of capital. In reality A, the rate of growth of the capital stock (gk) has been 3% and the government deficit in the current period is $3. It is then clear that the economy can only be in the steady-state if government debt is $100 – for this would imply a rate of growth of the government debt equal to gk. In reality B, however, rentiers´ wealth is higher, so capacity utilization and gk are also higher and the government deficit is lower. Let us assume that gk has been, say, 5% and the government deficit is (say) $2; then it should be clear that the steady-state requires a government debt equal to $40.[32]
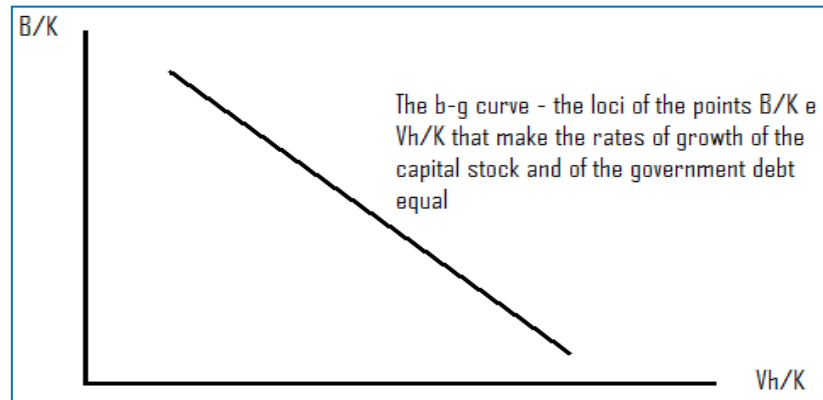
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(30) As discussed in more detail in section 2.4 below, these are necessary and sufficient conditions for the steady-state of the DSZ model.

(31) Note that we are implicitly assuming here what Dos Santos and Zezza (2008, p. 466) call an "American regime".

(32) At a first glance, the fact that the variables in the example above are measured in monetary units may give the impression of lack of generality. After all, we are dealing with an economy in which all stocks and flows are supposed to be growing and, therefore, the relevant steady-state is one in which the *ratios* among the variables are fixed – that is to say, a situation in which all stock-stock, stock-flow, and flow-flow ratios are fixed (and hence the fact that the variables in the graph above are normalized by the stock of capital). We therefore stress that the "lesson" of the numerical example above is true for any given level of the capital stock.

The reasoning above allows us to state that one necessary condition for the steady-state of the DSZ model is that the economy is in the curve b-g in Figure 1.[33]

Figure 1

B/K

The b-g curve - the loci of the points B/K e Vh/K that make the rates of growth of the capital stock and of the government debt equal

Vh/K

2.3 The steady-state of the model (II): the v-g curve

But, in DSZ's steady state, it is also true that the rate of growth of households' wealth should be equal to *gk*. In order to understand how this could happen, we need first to take a closer look at the (admittedly complex) households' saving function assumed by DSZ. Beginning with simpler points, we note that the assumption that workers spend what they get implies that only rentier households save in the model. Moreover, the assumption that rentiers consume a fixed fraction of their wealth implies that rentiers' save whatever income they get above this amount.

And how much is that? Well, rentiers' income is assumed to consist of the distributed profits they receive from banks and firms plus the interest payments they receive on their money deposits in banks. As such, it depends crucially on variables which are quite dear to people discussing financialization issues, such as firms' distributed profits and stock of debt – even though less popular variables, such as banks' distributed profits (and therefore the stock of public debt), also play an important role.

Here a little bit of algebra is in demand. The precise households' (i.e. rentiers') saving equation assumed by DSZ is:

$SAVh_t = ib_{t-1}D_{t-1} + Fd_t + Fb_t - aVh_{t-1}$ (equation 1)

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(33) In DSZ the b-g curve is actually a hyperbola. Rigorously speaking, Figure 1 should be interpreted as depicting a linear approximation of the actual b-g curve.

where $ib_{t-1}D_{t-1}$ is the amount of interest rentiers receive from banks on their money deposits, Fd_t and Fb_t stand, respectively, for the distributed profits of firms and banks, and aVh_{t-1} is rentiers' consumption (which, as noticed above, is assumed to be a fixed fraction, a, of their wealth in the beginning of the "short period").

We need to be more specific, at this point, about the precise assumptions made about Fd_t and Fb_t. Fortunately enough, these are quite intuitive. Banks, for instance, are assumed to distribute all their profits:

$$Fb_t = il_{t-1}L_{t-1}+ib_{t-1}B_{t-1}- ib_{t-1}D_{t-1} \qquad \text{(equation 2)}$$

or, in words, banks' distributed profits are equal to their total profits – i.e. the money they make from their loans to firms and from their holdings of public debt minus the amount of interest they pay to rentiers on their deposits.

The hypothesis about the distributed profits from firms is also quite simple. Firms are assumed to distribute a fixed part of their profits after taxes and interest payments to banks, so that:

$$Fd_t = \mu \ [(1-\theta)\pi Y-il_{t-1}L_{t-1}] \qquad \text{(equation 3)}$$

where $\mu, \theta, \pi,$ and Y stand respectively for (i) the fixed share of firms' total profits that is distributed (μ); (ii) the tax rate (θ); (iii) the profit share (π); and (iv) aggregate income (and product, Y). So πY is the mass of profits before taxes and interest payments, $(1-\theta)\pi Y$ is the mass of profits after taxes but before interest payments, and $(1-\theta)\pi Y-il_{t-1}L_{t-1}$ is the mass of profits after taxes and after interest payments.

Replacing equations (2) and (3) in equation (1) one obtains a more transparent equation for rentiers' saving:

$$SAVh_t= \mu(1-\theta)\pi Y + (1- \mu) \ il_{t-1}L_{t-1} +ib_{t-1}B_{t-1} - aVh_{t-1} \qquad \text{(equation 4)}$$

Indeed, equation (4) makes clear that – as one would expect – rentiers' income depends on very many variables, such as interest rates,[34] the dividend policies of firms, the tax rate on profits, the level of effective demand, the economy's profit share and the stocks of public debt and of bank loans to firms.[35]

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(34) Note that the interest rate paid by firms, $il,$ is assumed to be higher than the interest rate paid by the government and the banks, ib.

(35) Equation (4) is interesting also because it makes clear the fact that the interest payments made by firms to banks reduce the dividends firms pay to households. This is the reason why the amount of interest paid by firms on their bank loans ($il_{t-1}L_{t-1}$) appears multiplied by $(1- \mu)$ in the rentiers' saving equation, even though all interest payments made by firms on their bank loans end up in rentiers' pockets (for banks are assumed to distribute all their profits to rentiers).

In order to proceed with our argument, we need now to take a closer look at the relationship between the stocks of public debt, bank loans to firms and rentiers' wealth. We begin by noting that, by our own hypothesis about the balance sheet of the banking sector (see table 1), we have that L+B≡D. Moreover, the model assumes that the stock of rentiers' bank deposits is a fraction of their total wealth (given by their liquidity preference parameter 1-δ), so that D = (1-δ)Vh and L = (1-δ)Vh - B. We can, therefore, use this fact to rewrite equation (4) above as:

$$SAVh_t= \mu(1-\theta)\pi Y + [ib_{t-1} - (1-\mu)\,il_{t-1}]\,B_{t-1} + [(1-\delta)(1-\mu)il_{t-1} - a]Vh_{t-1} \quad \text{(equation 5)}$$

Before we go on to discuss equation (5) in more detail, we note that the intuition underlying the requirement that L+B≡D has everything to do with what Minsky (e.g 1986, p.33) called the "balance sheet implications" (of "Big Government"). Discussing the reasons why the 1975 U.S recession was mild when compared to the "deep depressions of the past", Minsky (ibid) argued that:

> (…) whenever Big Government generates a huge deficit during a recession, other sectors, including financial organizations such as banks (…) acquire the government debt issued to finance the deficit.

> We live in an economy with a complex financial system. In this system the surplus sectors – in 1975 it was households – are not required to acquire directly the liabilities of deficit units. Instead, they can finance these deficits indirectly by acquiring the liabilities of financial institutions. In our economy, banks (…) are likely to be the immediate owners of the debts of business, government (…). Households acquire the liabilities of financial institutions such as (…) deposits. Consequently, much of the direct impact of swings in deficits and surpluses among sectors will be on the assets acquired and sold by financial institutions.
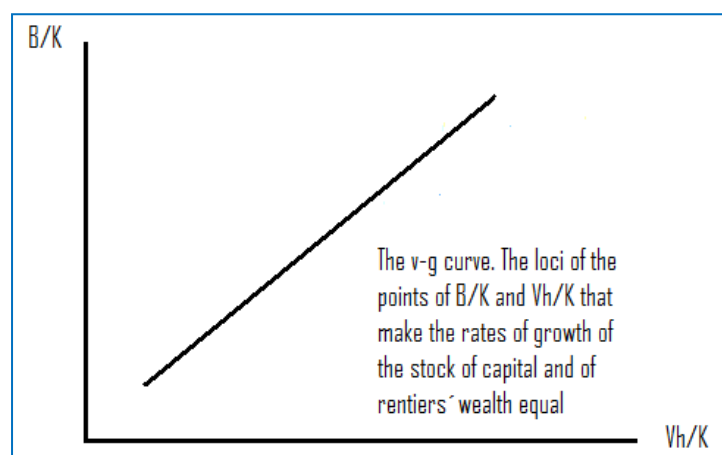
So, it is pretty clear that our way of modeling the banking sector is Minskyan in making explicit the fact that increases (in the government deficit and therefore) in B increase D and/or reduce L – and therefore are associated with increases in private saving.[36] So it is perhaps intuitive to state that the higher is the value of Vh, the higher will be the value of B (given its positive impact on rentiers' saving) required to make the rate of growth of rentiers' wealth equal to the rate of growth of capital. As we noted before, higher values of Vh (given the stock of capital) are associated with higher levels of capacity utilization and investment and therefore higher rates of growth of capital. Moreover, higher values of Vh imply that higher levels of rentiers' saving are required to prevent the rate of growth of rentiers' wealth (given by SAVh/Vh) from decreasing. So the only way one can have both the stocks of capital

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(36) The same point is made (rather differently) in Minsky's "sketch of a model" (of the effects of "Big Government") published originally in 1963 and republished as the first chapter of Minsky (1982).

and of rentiers' wealth growing at the same rate with Vh increasing (relative to the stock of capital) is if B is also increasing (relative to the stock of capital). This point is perhaps more easily understood with the help of a numerical example. Assume, for instance, that rentiers' wealth is 100 and that the rate of growth of the capital stock (gk) is 3%. It is then clear that the economy can only be in the steady-state if rentiers' saving is $3 – for this would imply a rate of growth of the stock of rentiers' wealth equal to gk. If, however, Vh increases, say, to 150 so that gk increases to 5%, the new steady-state requires that rentiers' saving increases to $7.50 (so as to make SAVh/Vh equal to 0.05). And if increases in B are associated with higher rentiers' saving this will require higher values of B.

The reasoning above allows us to state that one necessary condition for the steady-state of the DSZ model is that the economy is in the curve v-g in Figure 2.[37]

Figure 2

The v-g curve. The loci of the points of B/K and Vh/K that make the rates of growth of the stock of capital and of rentiers' wealth equal

There is one last point we need to make – regarding equation (5) – before we can finish this section. The point is that it is not actually necessary that (for any given stock of capital) increases in government debt will increase **rentiers'** saving. It is, of course, true in Neo-Kaleckian models that increases in government debt will necessarily increase **private** saving. Indeed, it is well known that in any closed economy with a government we have that:

$$Y \equiv C + I + G,$$

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(37) In DSZ the v-g curve is actually a parabola. Rigorously speaking, Figure 2 should be interpreted as depicting a linear approximation of the actual v-g curve

so that, subtracting government income after transfers and interest payments (T) in both sides and rearranging, we get

Y – T – C – I ≡ G – T, or SAVp – I ≡ G – T ≡ - SAVg

were SAVp stands for private saving. It is therefore clear that – providing no assumption of crowding-out of private investment is made[38] – higher government deficits (and therefore debt) are associated with higher values of SAVp.

But private saving is not the same thing as rentiers' saving[39] and this is reflected in the algebra of equation (5). Indeed, the sign of B is not unambiguously positive in equation (5), depending on the relative sizes of the interest rates on government debt and bank loans (*ib* and *il)* and on the precise fraction of firms profits (after taxes and interest payments) that is distributed to rentier households (μ). The point here is that if the fraction of firms' distributed profits to rentiers is low enough and/or the interest on bank loans is high enough (related to the interest the government pays to banks on its debt) then the reduction in L caused by the increase in B may decrease banks' profits (which are entirely distributed to rentiers) more than increase the amount of firms' profits which is distributed to rentiers, therefore reducing – as opposed to increasing – rentiers' saving. In this case, the slope of the v-g curve would be negative as opposed to positive as depicted in Figure 2.

2.4 The full steady-state of the DSZ model (III): the long-period equilibrium of the model understood as the intersection of the v-g and b-g curves

The full growth steady-state of the model happens when both equilibrium conditions are satisfied, i.e. in the intersection of the v-g and b-g curves in Figure 3.

This does not happen by chance, of course. Note that the previous sections discussed only *necessary* conditions for a steady-state – no claims about *sufficiency* were made. It turns out, however, that the specific behavioral hypotheses and functional forms assumed by DSZ make sure that the steady-state of the system is, indeed, given by the intersection of the two curves above. The remaining of this section explains the main points involved.

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(38) Note that in neo-Kaleckian models increases in the government deficit are expansionary and therefore *increase* investment.

(39) For private saving is the sum of households', firms', and banks' saving. In the context of the DSZ model - given the hypotheses that workers and banks do not save - private saving equals firms' retained profits plus rentiers' saving.

Figure 3
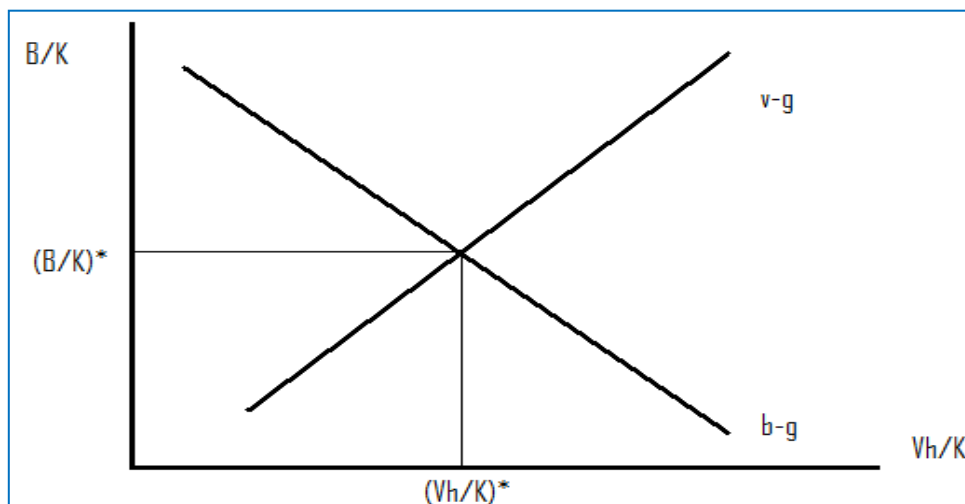
Beginning with the first point, we note that, in the model, capacity utilization is a linear (and positive) function of the rentiers' wealth to capital ratio (for the higher is rentiers' wealth the higher is rentiers' consumption and, therefore, the level of effective demand relative to the stock of capital). This point can be described in Figure 4:

Figure 4
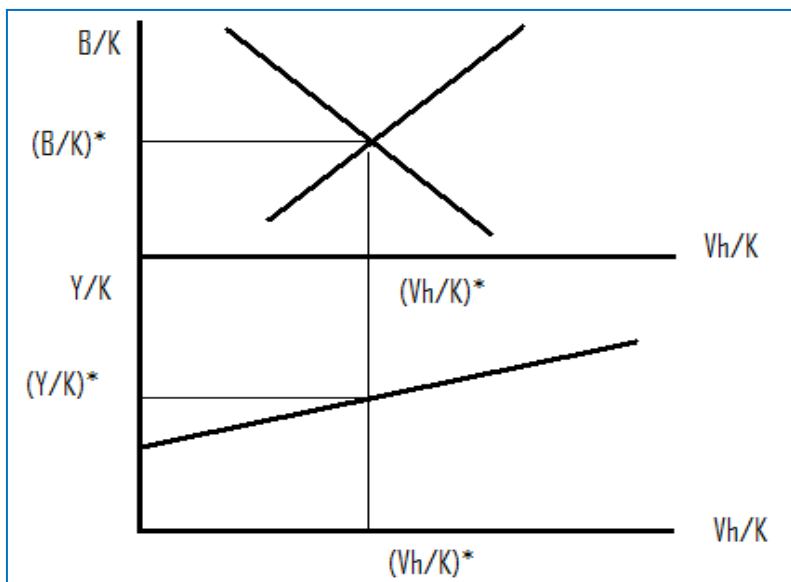
On the other hand, the rate of growth of the capital stock is given by a neo-Kaleckian investment function, so the higher is the level of capacity utilization, the higher will be the rate of growth of capital. And, again, the point can be made graphically.

Figure 5
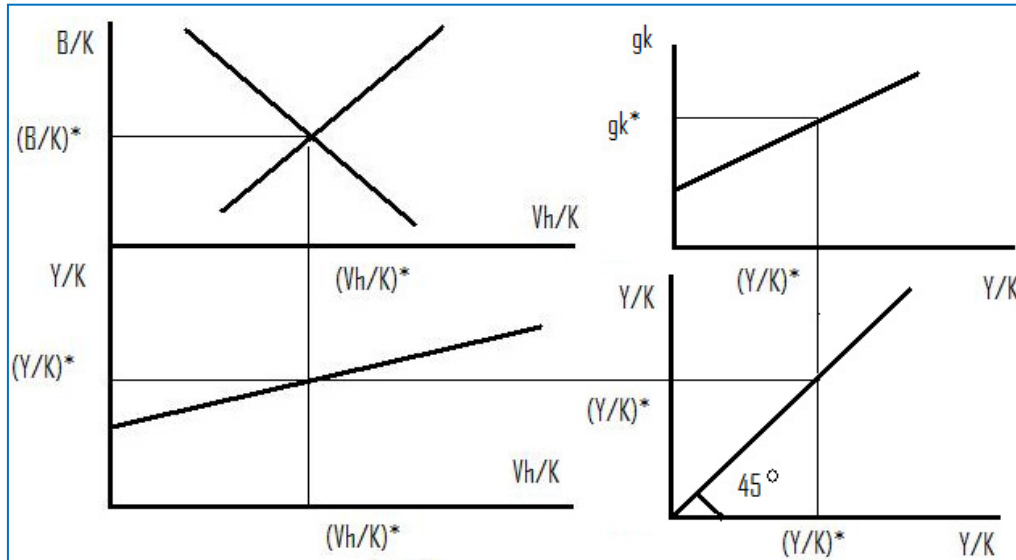
It so happens that all other stocks and flows of the model can be easily calculated given B/K, Y/K and Vh/K. Consumption, for instance, is assumed to depend positively on the levels of product and rentiers' wealth, so C/K is given by Y/K and Vh/K. Similarly, government taxes are assumed to be a constant fraction of Y, while government expenditures and the stock of firms' equities are assumed to be a constant fraction of K. As for the stocks, the system-wide constraints implied by table 1 above do most of the job. For instance, households deposits are assumed to be a (fixed, in the steady-state) fraction of Vh – that is to say, $D = (1 - \delta)Vh$. Moreover, we know that $L+B \equiv D$, so that L/K is entirely determined by B/K and Vh/K – for $L/K = (1 - \delta)Vh/K – B/K$.

In other words, the long period steady-state equilibrium of the DSZ model has a reasonably intuitive graphical representation which allows (long-period) comparative statics exercises to be performed without recourse to complex and time consuming

computer simulations.[40] Moreover, and even though the specific curves above were derived from admittedly simplistic structural hypotheses and behavioral hypotheses, it appears clear to us that the equilibrium conditions stated above remain valid for a much broader class of SFC models and behavioral assumptions.[41]

3 Looking at Minsky and at Marglin-Bhaduri from an explicitly dynamic SFC perspective: a graphical analysis of DSZ's system dynamics and the possibility of Minskyan structural breaks

We have said nothing so far about the dynamics of the system above. Or about why we believe it illuminates considerably the findings of the literatures we discussed in the first section. In this section we attempt to do these things. We begin by discussing how "Minskyan crises" can be conceptualized in the framework above. We finishing saying a few words on what we believe can be said about the "economic basis for contesting political ideologies".

Much has been written about Minsky's financial instability hypothesis. Although it certainly has an important microeconomic content,[42] Minsky himself phrased it in macroeconomic terms in various occasions (see, for example, the first chapters of Minsky, 1982). Here we will say that the economy is getting financially more fragile whenever L/K (a proxy of the financial fragility of firms) and/or L/D (a proxy of the financial fragility of banks) are increasing. At this level of abstraction, a Minskyan "boom" can be conceptualized as a situation in which capacity utilization is increasing (or is kept at a high level) and L/K and/or L/D are also increasing. It is therefore useful to notice that we can plot our proxy variables for the economy's "financial fragility" in the same graph as our v-g and b-g curves.

Indeed, the facts that L = D – B and that D = (1-δ)Vh coupled with the hypothesis that these ratios are bounded (say, because market participants get too anxious when they surpass given thresholds) limit the range of feasible long period equilibria. Assume, for example, that λ1 and λ2 are these thresholds. Then it is easy to see that (i) L/K < λ1 implies that (1-δ)Vh/K – B/K < λ1 and therefore B/K > [(1-

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(40) Interestingly enough, the graphical representation above differs considerably from the one presented in the original article. Needless to say, we now believe the graphs above are more intuitive than the original ones.

(41) Assuming, say, a Harrodian investment function – as opposed to a neo-Kaleckian one – would not, of course, change the fact that the steady-state of the system requires that the net wealth of all sectors grows at the same rate as the stock of capital (even though it might change the precise shape of the equilibrium curves).

(42) For example, the composition of Ponzi, hedge, and speculative finance units in any given sector can fluctuate without any changes in the aggregate balance sheet of the sector, provided that the increase in Ponzi finance is counterbalanced by improvements in the balance sheets of the remaining hedge and speculative units.

δ)Vh/K] - λ1; and (ii) L/D < λ2 implies that 1 – [B/(1-δ)Vh] < λ2, so that B/K > (1 - λ2) (1-δ)Vh/K. In graphical terms, these conditions mean that the economy must always be "above" thresholds T1 and T2.

On the other hand, a meaningful steady-state equilibrium requires also that L > 0 and that capacity utilization is below its technical maximum and above a given "satisfactory" minimum. Again these restrictions can be easily incorporated in the b-g v-g diagram. Indeed, L>0 implies that (1-δ)Vh/K – B/K> 0, which then implies that B/K < (1-δ)Vh/K – so that the economy must be always below threshold T3. Moreover, the fact that capacity utilization is a positive function of Vh/K allows us to draw thresholds T4 and T5.

Figure 6
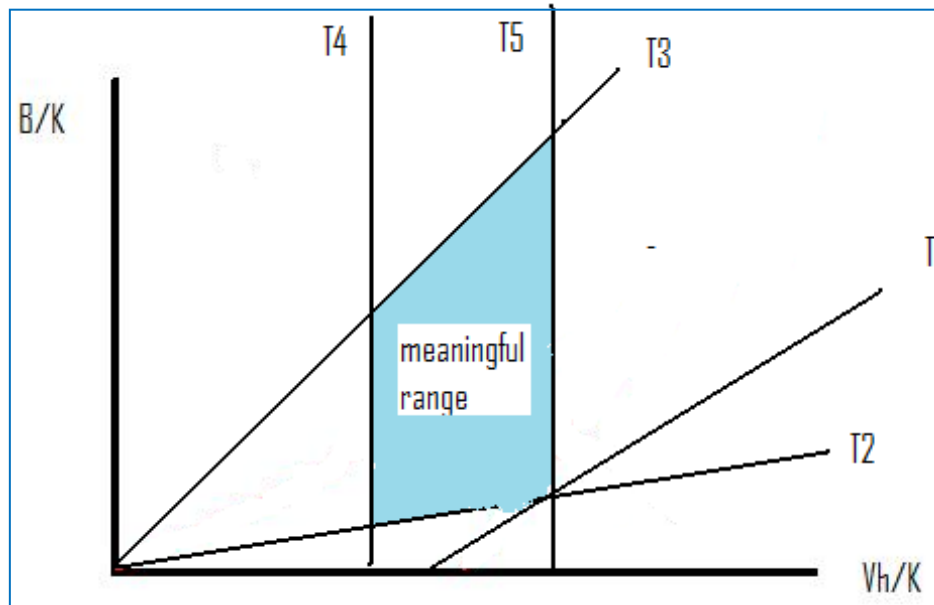
But what about the dynamics? Well, the keys to dynamic analyses in the framework above are the facts that (i) B/K is falling (increasing) whenever the economy is above (below) the b-g curve; and that Vh/K is falling (increasing) whenever the economy is below (above) the v-g curve. Remember that the reason why the b-g curve was supposed to have a negative slope was that, for any level of the capital stock, increases in Vh decreases the public deficit and increases the rate of growth of capital, so that the equilibrium level of B has to decrease (because this is the

only way its rate of growth can increase even with a smaller deficit). So it can be said that below (above) the b-g curve the stock of public debt is small (large) vis-à-vis the public deficit, so B must be increasing (decreasing) faster than the stock of capital – i.e. B/K must be rising (falling). Remember now that the reason why the v-g curve was supposed to have a positive slope was that, for any level of the capital stock, increases in B were supposed to increase rentiers' saving. So it can be said that below (above) the v-g curve the stock of rentiers' wealth is small (large) vis-à-vis the level of rentiers' saving, so Vh must be falling (rising) faster than the stock of capital – i.e. Vh/K must be falling (rising).

The considerations above allow us to draw the following phase diagram, which divides the b-g v-g diagram in four areas (I, II, III, and IV) – as shown in Figure 7.

Figure 7
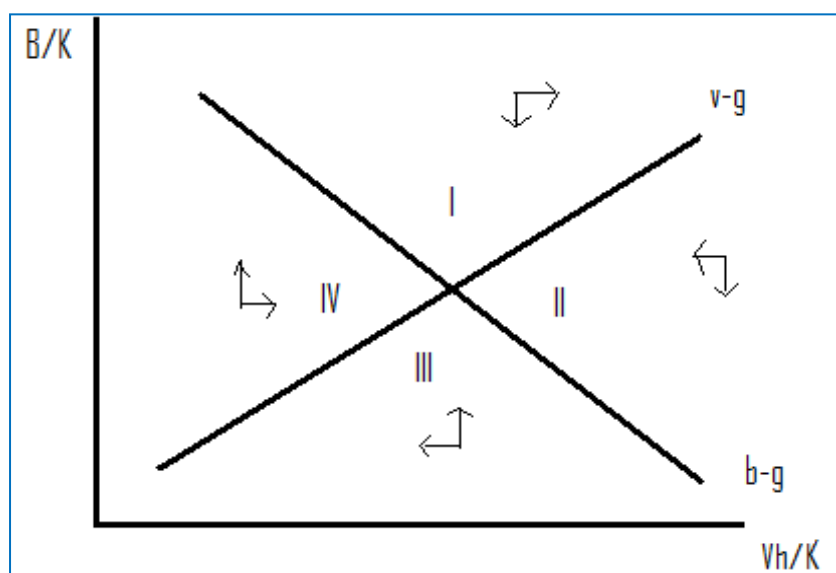
For the purposes of this paper, the two graphs above are interesting because they make clear that a typical Minskyan crisis associated with firms' increasing financial fragility can only happen in quadrant I – in which rentiers' wealth and, given the liquidity preference parameter, firms' loans , are growing faster than capital (so capacity utilization is getting higher) and the government debt is growing slower than capital. A typical example is shown in Figure 8:

Figure 8
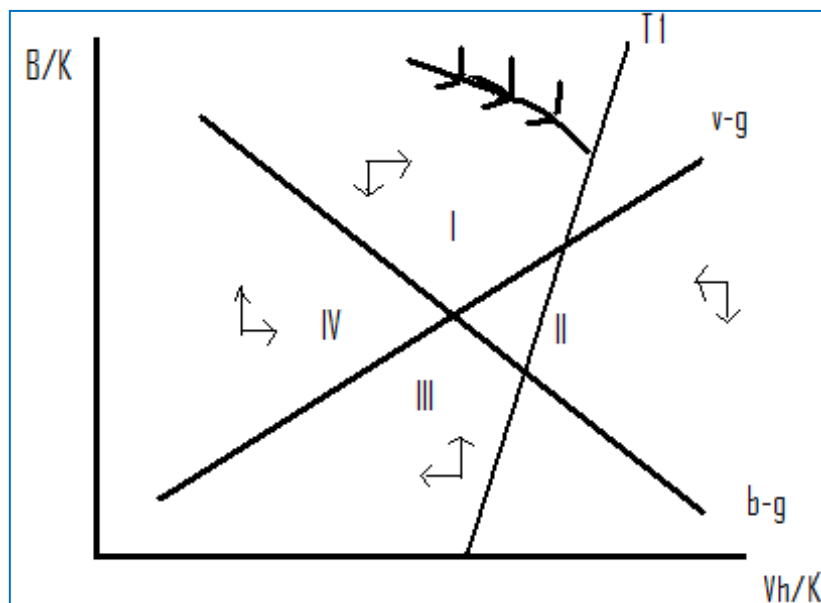
The aforementioned graphs also make clear that "Minskyan crises" can arise even if no particularly controversial non-linear hypotheses are made about the economy's investment function – note that the equilibrium curves above were derived from a typical neo-Kaleckian investment function.

We finish noting that the aforementioned graphs and analysis heavily qualify the conclusions of Bhaduri and Marglin (1990). More concretely they make clear that long period comparative statics exercises are considerably more complex than short period ones – in particular, changes in the profit share of the economy imply non-trivial changes in both b-g and v-g curves above.

In order to understand what happens in the long period when there is a change in the functional distributional of income it is important to notice first that the combination of the neo-Kaleckian investment function and Kaleckian-Godleyan consumption function assumed by DSZ implies that short-period capacity utilization falls whenever the profit share rises – so the model is unambiguously "stagnationist" in the short period (for the fall in the economy's "multiplier" more than compensates the

increase in its "accelerator").[43] Note, however, that the fact that short-period capacity utilization invariably falls in response to increases in the profit share does not necessarily mean that investment (and therefore *gk*) will also fall. Whether or not this is the case will depend on the specific parameters of the system,[44] though the fact that workers pay taxes in DSZ makes more likely the scenario in which a rise in the profit share will increase the rate of growth of the stock of capital.[45] In other words, the economy's short-period response to a rise in the economy's profit share will probably combine a decrease in capacity utilization and an increase in investment (and *gk*).

Both these facts are crucial to understand how the long-period equilibrium curves react to a once and for all rise in the economy's profit share. Beginning with the b-g curve, we note that it was derived on the assumption that, for any given level of the stock of capital, higher values of rentiers' wealth implied (i) higher values of capacity utilization and therefore *gk*; and (ii) lower values of the government deficit (assumed positive). In such a situation, we argued that the only way the growth rate of the government debt could still be equal to *gk* was if government debt was lower. This is, of course, the reason why the b-g curve has a negative slope. Now note that an increase in the profit share will reduce the economy's (short-period) multiplier, so for any given level of rentiers' wealth output will be lower and the government deficit will be higher; moreover, *gk* is likely to be higher (because the likely scenario is such that the mass of profits increases in such a way as to compensate the reduction in capacity utilization). This, in turn, implies that the new b-g curve will probably cross the old one (see Figure 9).

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(43) Note that DSZ assume that rentiers' consumption in any given short period is entirely determined by their (beginning of the period) stock of wealth – so it does not respond to increases in their income. Therefore, increases in the profit-share causes the short-period multiplier to fall relatively more in DSZ than in traditional Kaleckian models with a positive value for capitalists' propensity to consume out of their income.

(44) More concretely, DSZ assumes that *gk* depends positively on both the mass of profits and capacity utilization. It may very well be the case that *gk* increases when the profit-share of the economy increases – for the effect of the reduction in capacity utilization can be relatively smaller than the effect of the increase in the mass of profits (caused by the larger profit-share). Note that the assumption of given prices can only be reconciled with a rise in the mark up and the profit share if either the nominal wage or labor productivity rises. In both cases, there will be a fall in taxes which, given government expenditure, will increase the government deficit and the mass of profits.

(45) For taxation decreases the negative impact of increases in the profit-share on consumption, the more so the higher is the income tax rate.
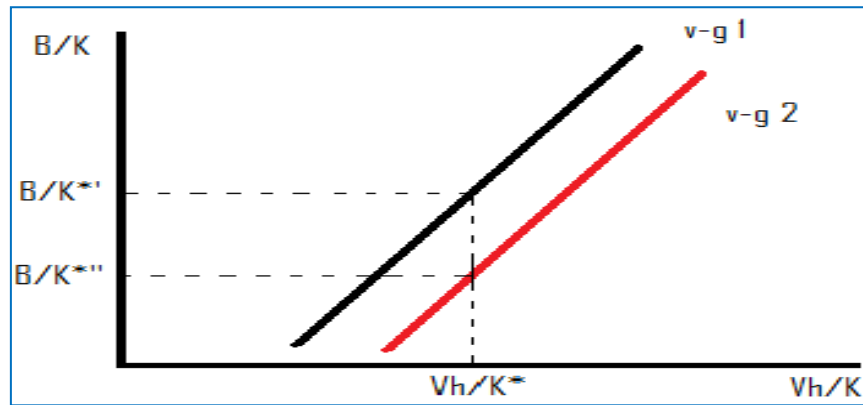
Figure 9
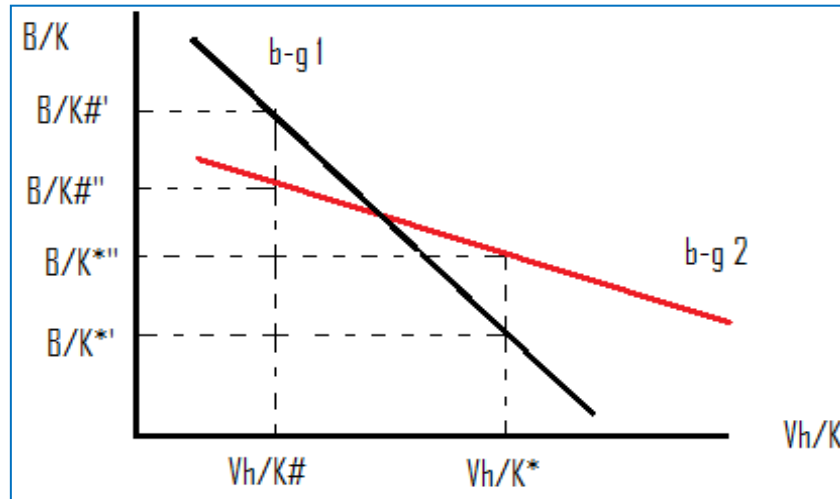
The intuition behind this result goes as follows: for lower values of B/K the "increased government deficit" effect (due to the lower short-period income multiplier and the lower capacity utilization) will more than compensate the "higher gk" effect; whereas for higher values of B/K the contrary is true. Let us say that for a profit-share of, say, 25%, the point Vh/K* is associated with a gk of, say, 3% and with a (normalized) deficit of, say, 1,50 – so that the equilibrium level of B/K* is 50 (for 1,50/50 = 0.03). Now suppose that the profit-share goes to 30%, so Vh/K* is now associated with a gk of, say, 3,5% and with a (normalized) deficit of, say, 2. In this case the new equilibrium value of B/K is 57.15 (for 2 is 3.5% of 57.15), which is higher than the previous value of 50 (and hence the fact that B/K*'' > B/K*' in the graph above). For higher values of B/K the contrary would be true, of course, and hence the fact the new b-g curve crosses the old one.

Now what about the v-g curve? How does it change in response to a once and for all increase in the economy's profit-share? The answer, again, depends on the parameters – in particular on what happens to rentiers' saving. It so happens that this latter variable can well increase considerably in response to an increase in the profit share (remember that rentiers receive dividends from firms and banks). Figure 10 depicts the likely scenario that this increase will more than compensate the "higher gk" effect, so that the v-g curve shifts to the right (i.e. rentiers will need less "help" from the government for their wealth to grow at the same pace).

Figure 10

As one would expect the new equilibrium happens in the intersection of the new curves. In the case shown in Figure 11, a higher profit share increases the steady-state (normalized) value of rentiers' wealth even in a model that is clearly stagnationist in the short period.

Figure 11
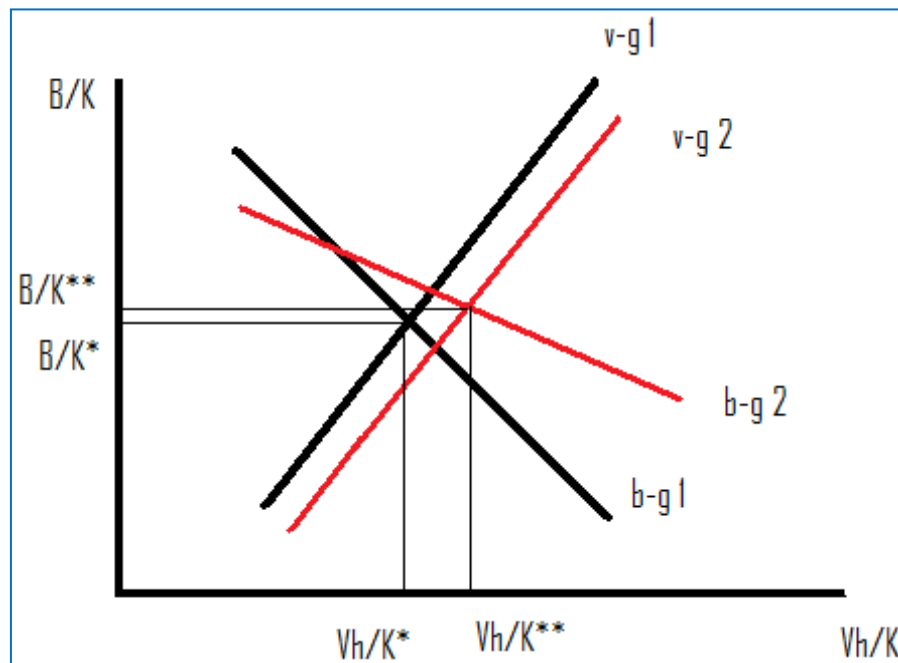
It is fair to admit at this point that the literatures discussed in the first section of this paper are not terribly concerned with the variables above. We believe they should, though, for these variables have a clear relationship with (and help to determine) the variables which happen to interest most macroeconomists, i.e. capacity utilization and the rate of growth of the stock of capital. In DSZ this relationship is assumed to depend crucially on the profit share of the economy. Indeed, the fact that increases in this latter variable reduce the multiplier of the economy means that (i) the level of output generated by any given value of rentiers' wealth will be smaller; and that (ii) the level of output generated by all other components of aggregate demand which are exogenous to income will also be smaller. So both the intercept and the slope of the capacity utilization curve will be smaller and probably also the new steady-state value of Y/K (see Figure 12).

Figure 12
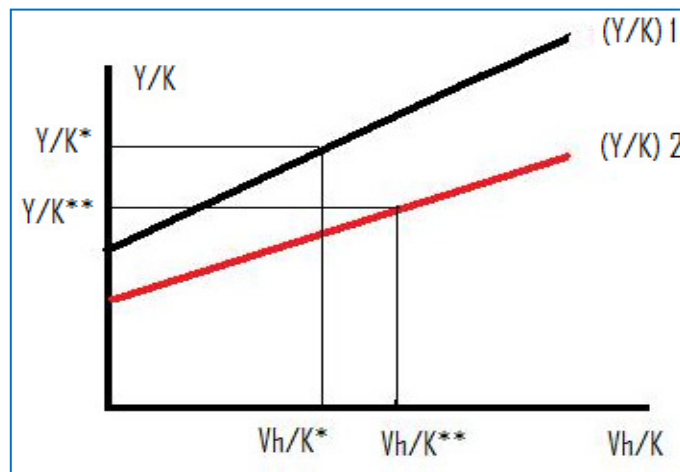
Nevertheless, the mere fact that capacity utilization is smaller in the new steady-state does not mean that the rate of growth of the capital stock (and therefore of all stocks and flows of the economy, including income and wealth) will be smaller. The contrary can very well be true, considering that the slope of the *gk* curve is increased by the increase in the profit share of the economy (since it affects positively the accelerator effect).

Figure 13
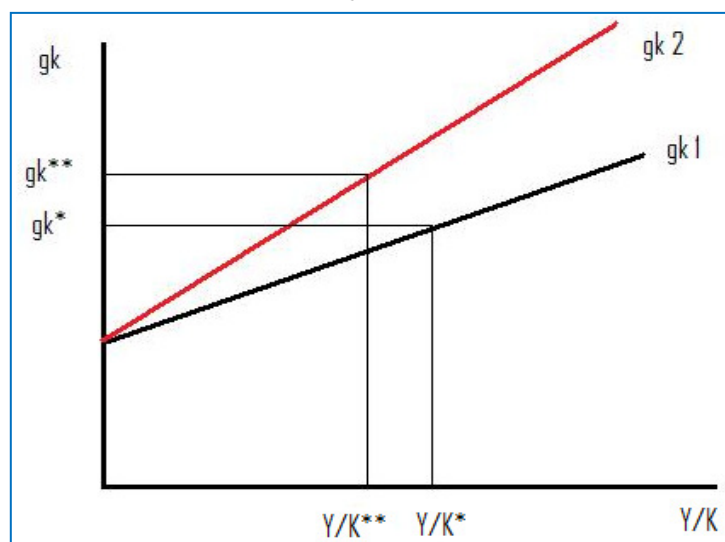
In sum, whether or not capacity utilization rises or falls in any given short period is only one of the relevant questions that can be asked by macroeconomists interested in the relation between the functional distribution of income and the level of output. Also important is whether the new steady-state rate of growth of the economy (which happens to be equal to the rate of growth of the stock of capital) will be higher or not. And it can well be – even in the openly "stagnationist" (short period) economy presented by DSZ – that increases in the profit-share can increase the steady-state rate of growth of the economy.

Final remarks

We began this paper by presenting some critical comments on three strands of heterodox macroeconomic literature. Our dissatisfaction with them arises from the fact that they restrict themselves to short-period models (often using them to shed light on long period phenomena).

However, we do not want to overstate our differences with those approaches. In fact, we share most of their concerns and agree with most of what they imply. This is not surprising, by the way. As correctly pointed out by Lavoie et al. (2004), there is considerable agreement among heterodox economists about short-run models. But we hope to have convinced readers in these traditions that it is possible (at least) that those models are missing important aspects of the phenomena they are studying – and that

the stock-flow consistent approach can help to uncover some of these yet unknown (longer period or dynamic) phenomena.

It is important to point out that the kind of modeling we are proposing here is considerably different in nature from conventional ones. In particular, in spite of the hints we can find in authors such as Minsky, no one has ever stated clearly that the key to post-Keynesian/structuralist/heterodox dynamic analyses might be to take a close look at the dynamics of both the size and composition of the sectoral balance sheets (and to analyze it in political economy terms). This simple point is perhaps lost amidst the complex SFC algebra and dynamic simulations, but this does not make it any less true.

We noted also that we believed that it was possible to phrase the main insights of the SFC literature in relatively simple and intuitive terms, without having to impose on readers many pages of algebra and/or the burden of understanding complex computer simulations. Whether or not we were able to do that is up to the reader to decide. We do hope, however, to have, at least, unveiled some general truths about stock-flow consistent models which do not appear particularly clear in the papers of this literature. It seems to us, in particular, that the way we phrased the equilibrium conditions above can be useful in many other contexts, no matter which specific hypotheses are assumed about, say, any given macroeconomic flow variable and/or sectors' portfolio decisions.

We acknowledge that SFC dynamic analyses are *artificial* – in the sense that they are simplified (though consistent) constructs that, in most cases, can be said to evolve in logical time. More concretely, they are often built on the assumption that all short period parameters – say, firms' animal spirits, dividend policy, rentiers' liquidity preference, the interest rates on government bills and bank loans, and so on – are fixed. As mentioned before, there is no good reason to assume that this will be true in any given "actual" economy in any length of historical time. The "Minskyan" dynamics depicted above, for example, is at best a preliminary approximation of a Minskyan "boom" (for it is fair to assume, for example, that in a boom firms' animal spirits would go up and rentiers' liquidity preference would go down).

But saying that SFC dynamic analyses are artificial does not mean to say that they are not useful. For the purposes of this paper it probably suffices to say that they can be useful if (i) they imply that the economy is approaching one of the thresholds (for then it will be clear that something will have to change in the near future); (ii) they imply that the economy is approaching a sustainable (an economically meaningful) steady-state (for then it will be clear that things can pretty much stay as they are); or

(iii) there is no reason to believe that the parameters of the system will change dramatically in the medium run of, say, 4-8 years.

Nothing we said so far precludes one, when doing empirical studies, from re-estimating parameters as soon as the next data point becomes available – so as to build a "truly dynamic" story as a "collage" of the different "pictures" one obtains in each different "short period". This approach – which we might as well call "Godleyan", honoring the work done by Wynne Godley at the Department of Applied Economics of the University of Cambridge and the Levy Economics Institute of Bard College – appears to us the best way to do post-Keynesian dynamic analyses

Moreover, historical and theoretical knowledge can both be used so as to enrich models within the SFC framework, dispensing with too simplified assumptions about the behavior of agents and their evolution and making more parameters endogenous to the model. We cannot imagine a better strategy for those who long to develop a post Keynesian analysis that will really happen in historical time and will be really able to cope with the problem of "shifting equilibrium" (Kregel, 1976).

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