THE SRAFFIAN SUPERMULTIPLIER

by

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November 1995

A Dissertation Submitted to the Faculty of Economics and Politics at the University of Cambridge, England in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy.

SUMMARY

This is a study in the notion of long-period effective demand, viewed from a Sraffian standpoint. First, we examine the conditions under which both the level and the rate of growth of the productive capacity of the economy can be said to be demand-led rather than resource constrained. We then show how, for a given aggregate marginal propensity to save, the economy's average propensity to save adjusts itself automatically to the required share of induced investment via the operation of the supermultiplier. Finally, we demonstrate how the operation of the supermultiplier guarantees that under conditions of exogenous distribution and a 'planned' degree of capacity utilization, conditions which imply that there is an inverse relation between the normal rate of profits and the wage share, there is no direct connection between the rate of accumulation and the distribution of income. Thus there is also no long period trade-off between the levels of investment and consumption.

STATEMENT

I hereby declare that this dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration and that it contains less than 60000 words.

Franklin Serrano

...Al sorriso di Paola

ACKNOWLEDGEMENTS

During the long gestation period of this work (its main ideas began to take shape in late 1989) I have been fortunate to have the help and support of a number of colleagues and friends.
I would like to start by thanking Dr. G. C. Harcourt for his friendly and liberal supervision (and his detailed comments on a first draft of this work) and Mr. K. Coutts who was my Faculty advisor at Cambridge. I have benefitted from many stimulating discussions with Prof. P. Garegnani first in Cambridge and then later in Rome, where I also had very useful discussions with Prof. R. Ciccone. I owe a lot to the members of the St. Edmund's College "secret" Sraffa Workshop at Cambridge, namely, Drs. S. Cesaratto, A. Palumbo, A. Stirati and A. Trezzini for excellent discussions and great pasta. I have also benefitted from discussions with Lord Eatwell, Prof. M. Milgate , Dr. S. Pashkoff and Mr. V. Inal in England and with Profs. M. Caminati and F. Petri in Siena. I would also like to thank the other participants in the seminars that I gave in Cambridge, Rome and Siena. I am extremely grateful to a number of friends for their support over all these years: my "brothers" Catapulta and Luiz Eduardo; Alessandra, Marc, Volney, Susan, Paola, Sergio and Antonella S.; and last but not least my parents and my sister Bia. Three of these friends deserve another special mention for making it possible for me to spend two extremely productive "writing up sabbaticals" first at the NewSchool in New York in july 1994 (thanks to Catapulta) and also in february 1995 at the University of Roma-La Sapienza (Thanks to Sergio and Antonella S.). Financial support from CNPq/Brazil and Universidade Federal do Rio de Janeiro is also gratefully acknowledged. Needless to say, none of the above named persons and institutions bears any responsibility for the ideas contained in this work. All errors and omissions are mine.

F. S.
Rio, November 1995

CHAPTER ONE

FROM EFFECTUAL TO EFFECTIVE DEMAND

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I.INTRODUCTION

The purpose of this chapter is to introduce the concept of the Sraffian (i.e., long-period and with exogenous distribution) supermultiplier , a scheme in which: (i) long period effective demand determines normal productive capacity; and (ii) the autonomous components of final demand (those expenditures that are neither financed by contractual wage income nor can create capacity) generate induced consumption via the multiplier and induced (capacity-creating) investment through the accelerator.

After putting the problem under study into perspective (section II) , in the three subsequent sections I shall present an extremely simplified formal model of the Sraffian supermultiplier and use it to illustrate some features (and possible limitations) of this notion of long-period effective demand. Thus, Section III discusses the notion of induced consumption and the multiplier. Section IV discusses the concept of induced investment and the accelerator. Finally, section V brings the multiplier and the accelerator together producing a Sraffian supermultiplier.

II.LONG-PERIOD EFFECTIVE DEMAND

1. A Stylized Fact

Theories of effective demand are usually meant to explain short-run fluctuations of the level of output. The one I want to discuss has a completely different purpose. First of all, the theory is concerned exclusively with explaining long-run trends instead of short-run cycles (and in fact abstracts entirely from these fluctuations). In addition, the theory is chiefly meant to explain the evolution of the productive capacity[1] of the economy instead of just its level of output. There is one important 'stylized fact' that this theory ought be able to provide an explanation for. The stylized fact is that, in most capitalist economies, notwithstanding the recurrent cycles, crises , slumps and booms, taking the long view we seem to observe, on the average, a remarkable balance between the long-run trends of productive capacity and aggregate demand.

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[1] Throughout this work productive capacity refers to the levels of output that can obtained by operating the economy's stock of (circulating and fixed) capital at its normal or 'planned' degree of utilization. Note that according to this definition , if the economy is operating at its normal capacity output that does not mean it has reached either 'full capacity' (since normally there will be some planned margin of spare capacity) nor 'full employment' (since capacity output refers only to capital equipment and there is no reason to assume that the size and form of such a stock will be large enough to employ the whole of the available work force).

For neoclassical authors this particular stylized fact is seen as confirming their view that in the long run aggregate demand tends to adjust itself to the available productive capacity (or more generally to the endowments of 'factors of production'). As K. Arrow argued in his 1972 Nobel Prize lecture:

"The balancing of supply and demand is far from perfect."..." the system has been marked by recurring periods in which the supply of available labor and of productive equipment for the production of goods has been in excess of their utilization"... Nevertheless, when due allowances are made, the coherence"... "is remarkable." (reprinted in Arrow, 1983,p.200) [2]

[2] Some years later, in an interview given to G. Feiwel, Arrow gave a more concrete example of what he had in mind : "The US... "created many more jobs in the last ten or fifteen years than Europe has. ... "the US labor force has during these years grown a lot more than the European has. And that is not a coincidence! If the Europeans had a lot more people looking for jobs , there would be more jobs". (Arrow , 1989, p. 175-176). Notice that Arrow is talking about two distinct 'stylized facts' (and their common neoclassical explanation). The first relates to the balance between the demand for products to the productive capacity . The second is the idea that there is also a rough long-run balance between employment opportunities and the size of the labour force. There is, however, a much more plausible non neoclassical explanation for this second 'stylized fact' about the labour market. As Garegnani (1990,p. 116) pointed out such a "long-run rough coincidence between labour employment and labour seeking employment"..."is only to be expected, to the extent that workers cannot live on air. That rough coincidence may in fact result from employment seeking labour adjusting to employment opportunities rather than the reverse" (Garegnani, 1990, p. 116) through migration, changes in participation rates and 'disguised unemployment' in the informal sector(Bhaduri,1987). Here I am

Here I want to explore a completely different explanation for this same stylized fact : I want to argue that perhaps what we are observing is a general long-run tendency of productive capacity to adjust itself to effective demand. Indeed, that would be the case if the long-run evolution of productive capacity of a capitalist economy is seen as being usually demand-led rather than resource-constrained.[3]

This work thus aims to offer a preliminary theoretical study of the main properties and implications of a demand-led regime of accumulation, viewed from a Sraffian perspective.[4]

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concerned exclusively with providing an alternative explanation for the first 'stylized fact' relating to the rough long-run tendency (which of course works slowly and imperfectly in reality) towards a normal utilization of capital equipment. We shall thus realistically assume that the size of the available labour force does not constitute a binding constraint on the process of capital accumulation.

[3] "Now, the size of the capital endowment seems, if anything, even more susceptible of adaptation to its employment than the size of the labour force is.... "it is the level of aggregate demand and output that determines the level of the capital stock."(Garegnani (1990), p. 116-117).

[4] In interpreting Sraffa's theory I follow closely the views of the three 'core' Sraffians, namely : P. Garegnani, B. Schefold and the late K. Bharadwaj (Bharadwaj & Schefold (1990)). As it is well know, these authors see Sraffa's theory as belonging to a broader tradition which they call the Classical Surplus Approach to economics. This approach is characterized by two main features: first, the view that the distribution of income between wages and profits is strongly influenced by institutional and sociopolitical forces; second, the idea that competitive process is based on the mobility of capital (instead of the 'number of

2.From Effectual to Effective Demand

The central analytical problem faced in the development of such a long period theory of effective demand can be put as follows: is it possible to generalize to the operation of the economic system as whole, the Sraffian 'standpoint' according to which in each isolated sector the long period level of effective (or 'effectual') demand is the independent variable whilst output and capacity are the dependent ones[5] ? Can the Sraffian theory of value and distribution ('micro') lead to a theory of normal capacity output with Keynesian (or Kaleckian) features ('macro')? In other words are we allowed to think that aggregate effective demand is just the summation of the sectoral effective demands[6] (Eatwell (1979, 1983)) ?

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agents'). There are , of course, a number of other possible interpretations of Sraffa's theory and also of the Classical approach, but I am not concerned with them here.

[5] For evidence that effective (or 'effectual') demand, i.e. the quantity demanded at the normal (or 'natural') price was the determinant of sectoral levels of output and capacity in the work of the Classical economists see Ciccone(1992) and Vianello(1989). For a discussion of the analogous role of those sectoral 'effectual demands' in the Sraffian framework see Schefold(1990a).

[6] Of course what matters to us is the aggregate level of effective demand in real (not nominal) terms. Therefore, even if we know the prices of production of all commodities we can only convert the corresponding vector of sectoral effectual demands into the scalar aggregate effective demand after we specify a numeraire . The latter can be either the money wage or the price of a particular commodity (or bundle of commodities).

We evidently cannot be sure to obtain system-wide or macroeconomic propositions by merely looking at what happens at the sectoral or 'micro' level. A satisfactory 'macro' theory will require the consideration of certain fundamental structural relationships that emerge only when the economy is considered as a whole (as a system).[7]

Given the questions we are concerned with , there are two such structural relations that we must take into account. The first concerns the circular flow of income, i. e. , the reciprocal relations between (consumption) expenditures , the income generation process and firms' decisions to produce. The second concerns the dual character of investment (as a source of both

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[7] Pasinetti (1981, p. 35, n.6) calls such relationships "truly macro-economic" relations. These relations express essential structural features of the economic system, viewed in its totality, and are not simply the result of aggregation.
Godley and Cripps also consider those relationships crucial to macroeconomics:"The evolution of whole economies, ... is a highly contingent historical process. We do not believe that it is possible to establish precise behavioral relationships ... comparable to natural laws"..."On the other hand we must exploit logic so far as we can. Every purchase implies a sale : every money flow comes from somewhere and goes somewhere : only certain configurations of transactions are mutually compatible. The aim here is to show how logic can help to organize information in a way that enables us to learn as much from it as possible. This is what we mean by macroeconomic theory" (Godley & Cripps , 1983, p. 44).

demand and capacity) , the technological relation that connects investment expenditures and the creation of productive capacity.[8] Our problem is to show in what sense and under which conditions it is possible to say that the economic system as a whole is demand-led (and hence causation still runs from effective demand to output and capacity) even taking into consideration the unavoidable degree of interdependence and the feedback effects that arise from both the dual character of investment and the circular flow of income.

The study of these relations has led us to divide long-period aggregate demand into three components, namely, induced consumption, induced investment and autonomous expenditures.

From the study of the circular flow of income we obtain induced consumption, which in our framework consists of the proportion of

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[8] Loosely speaking in macroeconomic theories assumptions (which are often implicit) about the first of these two relations are reflected in the way the 'multiplier' mechanism is treated, whilst the assumptions about the second relation (concerning the circular flow of income) appear in the way the 'accelerator' relation is treated (and interpreted).Since Harrod and Domar the Post-Keynesian literature on formal growth models has concentrated on the dual character of investment usually neglecting the question of finance . On the other hand, the literature that examines more carefully the circular flow of income and the way expenditures are financed often tends to completely ignore the capacity effects of certain expenditures. Examples of the latter can be found in the New Cambridge stock-flow literature (Godley and Cripps, 1983), and the Franco-Italian monetary circuit school (Graziani, 1989).

the wage and salary bill that is spent. This is the only component of aggregate demand that comes as a direct consequence of the contractual incomes that are paid when firms decide to undertake production.

Consideration of the dual character of investment has brought with it the concept of induced investment which, in our case, consists of the current level of gross capacity-generating investment (i.e. purchases of produced means of production in both fixed and circulating capital) that is required to endow the economy with sufficient productive capacity to meet the level of effective demand which is expected to rule in the immediately subsequent period.

Finally, autonomous expenditures are all those expenditures (whether formally classified as consumption or as 'investment') that are neither financed by the contractual (wage and salary) incomes generated by production decisions nor are capable of affecting the productive capacity of the capitalist sector of the economy.[9] Autonomous expenditures thus constitutes the part of

[9] The types of expenditure that should be considered autonomous according to our criterion include: the consumption of capitalists; the discretionary consumption of richer workers that have some accumulated wealth and access to credit; residential 'investment' by households ; firms's discretionary expenditures (that are sometimes classified as 'investment' and sometimes as 'intermediate consumption' in official statistics) that do not include the purchase of produced means of production such as

long-period aggregate demand which is completely independent of the 'supply' side (i.e., output and capacity) of the economy. As we shall presently see, we can characterize the economic system as being demand-led provided that two conditions are met, namely:

> (i) the combined share of induced consumption and induced investment in normal output and capacity adds up to less than one, or, in other words, the economy's long-period overall marginal propensity to spend is lower than one;
>
> (ii) there is a positive level of autonomous expenditures in long-period aggregate demand.

If these two conditions are met we obtain the long-period Sraffian supermultiplier (Sraffian mainly because income distribution is an exogenous parameter and normal prices and 'planned' degree of capacity utilization prevail) in which the long period **level** of output and normal productive capacity are equal to and determined by long period effective demand. That level of effective demand in its turn will be a multiple of the level of autonomous expenditures, a multiple that will be greater the larger is the economy's marginal propensity to

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consultancy services, research & development, publicity, executive jets, etc. (on the growing importance of this type of "unproductive" expenditure in modern capitalism see Cowling(1981)); government expenditures (both consumption and investment); and total exports (both of consumption and of capital goods since the latter do not create capacity within the domestic economy).

consume and the higher is the share of induced investment in capacity output.[10]

However, given that (because of the technical relation expressed by the accelerator) the share of induced investment is an increasing function of the desired rate of growth of capacity, we have that system can only be considered fully demand-led for rates of growth of capacity that lie below a well-defined maximum. This maximum growth rate will depend on the economy's overall marginal propensity to save and capital-output ratio. Below that limit the Sraffian supermultiplier operates fully and both the **level** and the **rate of growth** of productive capacity is unambiguously demand-led.

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[10]According to Garegnani(1983,p.75,emphasis in the original) "a satisfactory long-period theory of output does not require much more than (a) an analysis of how investment determines savings through changes in the level of **productive capacity** (and not only through changes in the level of **utilization** of productive capacity); (b) a study of the factors affecting the long run levels of investment; and (c) a study of the relation of consumption expenditures and aggregate income." Accordingly, our Sraffian supermultiplier is based on a particular view of: the accelerator relation and the nature of induced investment (related to Garegnani's item (b)); the notion of induced consumption and the multiplier; and the role of the autonomous components of aggregate demand (the latter two refer to Garegnani's item (c)). These hypotheses give us the Sraffian supermultiplier
(which is meant to take care of Garegnani's item (a)).

III.THE CIRCULAR FLOW OF INCOME

3.A Simple Model

In order to keep the analysis as simple as possible and yet sufficiently precise I shall make use of an exceedingly simple formal model. [11]

We assume that the technical conditions of production and the real wage (or perhaps the rate of profits) are exogenously given in a way that is consistent with the Sraffian theory of prices of production. There is free competition (free entry and exit) and this leads to an uniform rate of profit for all producers. The model depicts a single product circulating capital economy with

[11] Before we start we must make two important preliminary remarks. First of all, since we are concerned only with a long-period theory of output and productive capacity, in order to avoid the recurrent repetition of the same adjectives from now on all relevant variables (such as consumption, investment, income, capacity, marginal propensity to consume, distribution of income, technology, etc.) will be considered as being at their 'normal' or 'long-period' values, and in real instead of nominal terms (unless it is explicitly stated otherwise). Second, all variables that can either be taken in gross or net terms will be reckoned exclusively in gross terms. Therefore, from now on whenever I use a term such as 'investment', for instance, what I really mean to say is 'the real long period level of (capacity generating) investment expenditures reckoned in gross terms'.

no scarce non-reproducible inputs, where a single commodity is produced by means of itself and of homogeneous labour, under constant returns to scale. We shall abstract entirely from government spending and taxation and foreign trade.

4.Induced Consumption

Let us look first at the circular flow of income. Here the key to establish that it is effective demand that determines output, in spite of the 'circularity' of the income flow lies, of course, in the multiplier mechanism.

As Kaldor once put it , in the aggregate " demand is the sum of two components , an endogenous component that varies in proportion to the costs incurred by entrepreneurs (which constitute the income of wage and salary earners) and an exogenous component which is financed out of capital- by borrowing or by the sale of financial assets, which comes to the same thing..." (Kaldor(1989), p. 90, emphasis in the original). The same view is behind Kalecki's famous aphorism "capitalists get what they spend, workers spend what they get".[12]

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[12] As it is well known, Kalecki's aphorism is based on the assumptions of a closed economy and abstracting from government activity. Perhaps it should be restated as "Capitalist get what they spend when workers spend what they get" to stress the fact that if the workers save capitalists will get less than what they spend (i.e. realized profits equal capitalist expenditure minus workers' savings).

For both Kalecki and Kaldor the central idea behind the principle of effective demand is that it is current aggregate demand (expenditures) that uniquely determines the flow of realized current aggregate income, in other words in a capitalist economy profits are only realized (and hence only properly can be said to exist) when and if the product is actually sold. This means that in a capitalist economy, firms' decisions to produce can only automatically [13] generate or induce the contractual incomes that constitute their wage and salary costs. Therefore only the expenditures of wage and salary earners out of their current income can legitimately be considered as being financed by the income generated by current production. All other expenditures are thus necessarily financed by changes in the net financial asset position of the agents (spending previously held money or new credit creation) and **not** by current income. All those expenditures are not (and logically cannot) be financed by the income generated by current production decisions. As Kalecki

[13] A circuit theorist might object that I am neglecting the problem of production finance, in other words of how firms get hold of the cash to pay their wage bill. I do not deny that this might be an important problem for particular firms but here I am concerned only with the consequences of production decisions and the firms that happen to be unable to get the cash to pay wages are not going to be able to undertake production anyway.

(1971, p.78-79) put it " capitalists may decide to consume and to invest more"..."but they cannot decide to earn more."[14]

5.The Multiplier

Kaldor also noted that " Keynes identified exogenous demand with investment (I) and endogenous demand with consumption (C)"

[14] Another objection could be raised here as to the fact that labour is not the only input and the decision to produce could be seen as inducing also the demand for circulating capital goods.Kalecki gets around that question by working with vertically integrated sectors (which he calls departments) and hence in his theory the proposition that the only source of demand automatically induced by current production is the consumption of the workers out their current wage income has to be taken to mean the only source of final demand (gross investment plus final consumption minus intermediate transactions) that is generated...etc.'. This approach (that is implicitly used in most if not all Keynesian macroeconomic models) has the clear disadvantage of assuming that the replacement of any used up circulating capital goods is certainly going to happen, while no such assumption is made about the replacement of used up fixed capital goods, as investment in fixed capital is usually considered as given in gross terms). Production decisions will only imply that the replacement actually happens if the economy is stationary since current gross investment depends on the next year's rather than on the current year's level of output. In our own framework production means **buying** labour and using (**not** buying) capital goods. Buying inputs is seen not as part of production decisions but as gross investment (expenditure decisions), whether that refers to fixed or circulating capital, whether motivated by replacement or for increases (or decreases) in future production. Hence in general the only source of aggregate demand (including gross investment) that should be seen as being generated automatically by the **production** decisions of the firms are the workers' consumption out of their current wage income.

(Kaldor, 1989, p. 90) and explained that actually "exogenous demand can be one of a number of things , of which capital expenditure 'investment '- is only one)." (Kaldor (1983), p.8).

In our simple model the components of "exogenous demand" will consist of two "things" , namely, gross capacity generating investment and the autonomous expenditures of the capitalists. The determinants of the level of investment will be discussed in the next section. At the moment all that matters is that gross investment should be seen as being completely exogenous from the point of view of the circular flow of income (but certainly not exogenous to the system as a whole as we shall presently see when we introduce the accelerator relation). Capitalist's autonomous expenditures will, in accordance with our previous argument, also be completely exogenous.

I am also going to assume that the wage earners have no access to credit or accumulated wealth. Furthermore, the wage earners' marginal propensity to consume,i.e., the proportion of the wage that is spent will be assumed to be equal to one. Hence workers 'spend what they get'.

Under these simplifying assumptions there are only three sources of demand, namely, the exogenous levels of investment and autonomous expenditures of the capitalists and the induced consumption of the workers . The latter is equal to the wage bill

v.l.X, where v stands for the (given) real wage (which, by the way, is assumed to be paid "post factum"), l is the labour input coefficient and X stands for gross output/income (note that v.l is the share of wages in gross output/income).Aggregate demand (D) will then be equal to:

[1] $D = Z + I + v.l.X$

where Z represents the autonomous components of aggregate demand (lumping together both capitalists' consumption and the part of 'investment' that does not have any capacity generating effects) , and I stands for the current level of gross capacity-generating investment.

The above equation shows that the total level of effective demand will be an increasing function of the level of output that firms decide to produce, due to the fact that in order to produce more firms must hire more workers and pay their wages (which will all be spent on consumption).

From the principle of effective demand, we know that the level of output the firms as a whole will want to produce must be equal to the level of aggregate effective demand. Therefore, on the further assumption that firms as whole in the long run manage to adapt their production decisions to the level of effective demand, i.e., if:

[2] $X = D$

Then replacing [2] in [1] :

$$[3] \quad X = \frac{Z + I}{(1 - v.l)}$$

We have then that the level of output firms wish to produce is a multiple of the level of autonomous expenditures plus capacity generating investment, and that the multiplier is greater the higher is the marginal propensity to consume (which in this case equal to the share of wages in gross income).

Therefore, in spite of the feedback effect of induced consumption, the level of output is clearly demand-determined in the sense that autonomous expenditures (capitalist consumption plus non capacity creating investment) plus capacity creating investment and the marginal propensity to consume (gross wage share) are the independent variables, while output is the dependent one.

6. The Marginal Propensity to Consume

Note that economically meaningful solutions for equation [4] above require that two formal conditions are met, namely:

$$[4] \quad v.l < 1$$

$$[5] \quad (Z+I) > 0$$

Condition [5] states that the aggregate marginal propensity to consume (in this case equal to the gross wage share) must be lower than one. Given that the aggregate marginal propensity to

consume measures precisely how much consumer demand is induced by the firms' decision to produce, it is clear that if that propensity were to be equal to one then Say's Law would hold and supply would be automatically creating its own demand.

Keynes(1936) justified his assumption that the marginal propensity to consume of "the community" was lower than one by reference to a fundamental psychological law according to which increases in income lead to increases in consumption but not of the same magnitude as the increase in income . [15]

Fortunately, in the Kalecki-Kaldor interpretation of the principle of effective demand and the multiplier that we are using here there is no need to rely on Keynes fundamental psychological law to make sure condition [4] is met.

In this Kalecki-Kaldor view of the income-generating process the only part of demand that can be considered as being directly induced by the firms' decisions to produce are the consumption expenditures of wage and salary earners out of their labour income. This being the case , provided the share of wages and

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[15] "The fundamental psychological law , upon which we are entitle to depend with great confidence both a priori from our knowledge of human nature and from the detailed facts of experience , is that men are disposed, as a rule and on the average, to increase their consumption as their income increases but not by as much as the increase in their income." (Keynes 1936, p.96).

salaries in gross income is less than one, which seems to be a reasonable assumption to make when dealing with a capitalist economy , the aggregate marginal propensity to consume will always be lower than one , even in the case when each worker's individual marginal propensity to consume is equal to one (and thereby they all violate Keynes "fundamental law").

Therefore the Kalecki-Kaldor version the principle of effective demand that we are using here is not based on a psychological law but on two fundamental features of any capitalist economy, namely, i) that profits are generated by selling the product and not by merely producing it and ii) wages and salaries do not take up the whole of the gross product, i.e., there is always a positive share of gross profits.

The other formal condition (condition [5]) states that there must be a positive level of autonomous expenditures plus capacity-creating investment , i.e., expenditures that are both decided and financed independently from the current level of output(income). There are two reasons why that condition is required. The first (obvious) reason for that is that we can only say that demand determines output if at least a part of demand is independent from output (income).

The second reason is perhaps less obvious. The point is that since we are assuming that the marginal propensity to consume is

less than one then equality between aggregate demand and aggregate supply (output) necessarily requires that some 'autonomous' injection of demand (and purchasing power) enters the circular flow otherwise, at all levels of output, aggregate supply will be greater than aggregate demand and no positive level of production would be profitable.

IV. THE DUAL CHARACTER OF INVESTMENT

7. Investment and Capacity

We must now turn to the dual character of investment, i. e., to take into explicit consideration the fact that investment expenditures not only are part of aggregate demand but also can have capacity generating effects. This is the reason why we have divided gross investment expenditures into two distinct categories: capacity generating and non-capacity generating, where the former (I) can be defined as those expenditures whose purpose is to affect the potential supply of marketable output in a particular economy .[16]

[16] That is how Garegnani (1962, p. 92) has defined investment. He seems either to have left out (or implicitly included in final consumption) the other expenditures by firms which cannot add directly to their productive capacities.

That is also the reason why we have lumped together the non --- capacity generating part of investment and capitalist consumption as the autonomous components of aggregate demand (Z).

Certain necessary technical relations must hold for the capacity generating part of investment expenditures. Because of the fact that type of expenditure creates capacity and of the unavoidable technological fact that inputs must precede outputs we have that a given level of gross capacity generating investment in the current period t will have the effect of creating a certain level of gross capacity output in the subsequent period, t+1.

The amount of capacity output thus generated will, of course, depend on the current technical conditions of production , which for the sake of our simple model , we will take as being adequately described by 'the' current period's (gross) capital-output ratio (a) . This ratio tells us how much gross investment is required to generate one unit of gross capacity output one period hence.[17]

8. Induced Investment

Investment (whether of the capacity generating type or not) is always exogenous or autonomous from the point of view of the circular flow of income and the multiplier mechanism.

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[17] the labour coefficient (l) completes the specification of this simple technology.

On the other hand, with regard to the dual character of investment, gross capacity generating investment can in principle be considered as being either induced or autonomous, in its connection to the process of creating capacity. Gross capacity generating investment is considered induced when its function is to adjust productive capacity to effective demand. Any other capacity generating investment expenditures that are determined independently from the adjustment of capacity to demand should be considered (in this sense) as being autonomous.

Note that from our definition of capacity generating investment expenditures, it follows that, when this type of investment is induced, productive capacity is seen necessarily as a consequence of the evolution of effective demand. However when capacity-generating investment is autonomous it is productive capacity that emerges as a necessary consequence of (autonomous) investment.

Now, the Sraffian vision of the normal operation of the market mechanism, with each market being characterized by its 'point' of effective (or 'effectual') demand and its corresponding price of production already seems to contain an implicit long-period theory of capacity-generating investment.

The nature of such implicit theory becomes clear once we notice that in the Sraffian characterization of the market mechanism,

competition forces firms to strive to adjust productive capacity to demand. Indeed, the view that capacity of each sector is adjusted to normal level of effectual demand in every long-period position, necessary implies treating the long-period level of capacity generating investment as a derived magnitude.

The level of gross capacity-generating investment present in a long period-position is thus uniquely determined once the current technical conditions of production and the (expected) levels of effectual demand in the subsequent period are known. Anything else can affect long-period investment only indirectly, i.e. , by affecting either technical conditions of production (capital-output ratios) or the future levels of effectual demand.[18]

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[18] Most Sraffians would readily agree that aggregate net investment depends on the growth of aggregate demand following the old 'acceleration principle' and that this constitutes one of the main determinants of investment (the other being technical change). The earliest statement of that view comes from Garegnani who argued that the factors that explain aggregate investment in the long run "... can be reduced to two: the expansion of final demand and technical innovations" (Garegnani(1962, p. 91, my translation). However , what has gone relatively unnoticed (a partial exception being Caminati,1987) is the fact that the Sraffian characterization of the market mechanism in terms of long-period positions implies much more than this loose connection between the **growth** of aggregate demand and total **net** investment. Consistency with the Sraffian vision implies a very precise connection between the **levels** of **gross** capacity generating investment in each and every sector in one period and the **levels** of effectual demand and **gross output** in the subsequent one.

Note that although nothing prevents individual firms from making autonomous capacity-generating investment decisions, if those decisions reach any substantial magnitude they would inevitably lead to the creation of undesired excess capacity and hence lead to offsetting reductions in the induced capacity-generating investment of other firms. In other words, given the competitive pressure to adjust capacity to demand, in the long run autonomous capacity generating investment tends to "crowd out" the induced. As Harrod once put it, "in the long run all [capacity-generating-F.S.] capital outlay is justified by the use to which is put" (Harrod 1948, p. 79).[19]

If we apply these ideas in the context of this simple model we see that this type of investment will depend on only two elements, namely, the future expected level of effective demand (D_{+1}), which tells us how much capacity firms will need, and on the current technical conditions of production (represented in this simple model by 'the' normal capital-output ratio) which

[19] Note that we are not speaking of a short period theory of investment **decisions** for individual firms but of a theory of the long period investment **opportunities** that are available in the sector or market as a whole.

tells how much capacity generating investment is required to obtain each unit of productive capacity.[20] Thus:

[6] $$I = a \cdot D_{+1}$$

9. The Ratio of Investment to Capacity

There is another important relationship that is also a necessary consequence of the technical relation between the level of gross capacity generating investment and the amount of capacity created by it. This relation shows the necessary link (under given technical conditions of production) between the current **share of capacity-generating investment in capacity output** on one side and **the rate of growth of capacity** (between the current period and the subsequent one) on the other .

Indeed, given the capital-output ratio , a higher rate of growth of capacity will necessarily require that a higher share of the current level of capacity output be dedicated to capacity-generating investment .

In order to see why this is the case , all we need to do is to go back to our initial relation between the level of capacity-creating investment and the level of capacity output generated by it . Now, if it is true that a certain absolute level of gross

[20] Note that since we are dealing with a circulating capital system the whole of the capital stock is used up in each period. Therefore gross capacity generating investment at t is equal to the stock of capital that will be available for production in t+1.

investment creates a particular level of capacity output in the following period, then it also has to be true that a certain level of investment, relative to the current level of capacity output, must create a specific level of capacity output next period , also relative to current capacity output. But 'investment relative to current capacity' is exactly the current ratio of investment to capacity (I / X^*). And the 'future level of capacity output, relative to the present level' is the same thing as (one plus) the future rate of growth of capacity.This being so, then the positive relation between the current level of gross capacity generating investment and the future level of capacity implies also a positive relation between the share of this type of investment in capacity and its future rate of growth. The desired rate of growth of capacity between two long period positions (starting from one in which the degree of capacity utilization is at its normal or 'planned' level) will naturally be given by the expected rate of growth of effective demand (g_{+1}) between these two periods. Thus:

[7] $$I / X^* = a \, . \, (1 + g_{+1})$$

where the current share of capacity-creating investment in capacity is a direct function of both the expected rate of growth of demand and the capital-output ratio.

V.THE SUPERMULTIPLIER AND THE PROPENSITY TO SPEND

10. The Supermultiplier

We now have all the elements that we need to derive the supermultiplier. Replacing [7] in [3] and making normal capacity (X^*) equal to long-period output ($X^*=X$) we get:

$$[8] \quad X^* = \frac{Z}{[1 - v.l - a.(1 + g_{+1})]}$$

where the reciprocal of the denominator is now the Sraffian supermultiplier which shows that the long-period level of capacity output is a multiple of the level of the autonomous components of final demand. The supermultiplier will be, like the standard multiplier, an increasing function of the aggregate marginal propensity to consume (equal to the gross share of wages in this simple model)[21]. On the other hand, unlike the standard

[21] Note that this simple version of the Sraffian supermultiplier can easily be extended and generalized. For instance, to take into account the possibility of workers' savings all we have to do is : a) to replace in equation [8] above v.l by $c_w.v.l$, where $c_w < 1$ is the marginal propensity to consume out of wages; and b) include the possible discretionary autonomous expenditures of workers in Z . Fixed capital can also be easily accommodated by simply rewriting the 'propensity to invest' as $a.(d+ g_{+1})$ where $d < 1$ is the depreciation rate (itself known once the technical conditions of production and the distribution of income are given). Multisectoral extensions can also be easily done by turning the scalars into vectors and matrices where appropriate.

multiplier the supermultiplier depends on the expected rate of growth of demand, which affects the amount of induced capacity-generating investment undertaken. The supermultiplier will also depend directly on the capital-output ratio; the higher is this ratio, the higher is the level of capacity-generating investment induced by a given expected rate of growth of aggregate demand.

Note how the dual character of investment appears in the supermultiplier : current capacity-generating investment (at period t) is both a component of demand now and will provide productive capacity in the following period (t+1).[22] On the other hand, current productive capacity is necessarily the result of capacity-generating investment in the previous period (t-1). Therefore the Sraffian supermultiplier (in exactly the same way as the standard Keynesian or Kaleckian multiplier) implicitly assumes that expectations at t-1 about current demand at t were shown to be correct.

This two-sided nature of capacity generating investment is often considered as creating a serious difficulty for the development of a long-period theory of effective demand. As Eatwell (1983, p. 282) remarked "the problem is that on the one hand investment is

[22] The non capacity generating type of investment obviously is only a source of demand. That is why we have put it together with capitalists' consumption as an autonomous component of aggregate demand.

assumed to be the independent variable, whilst on the other hand ... variation ..."in investment is the mechanism by which capacity is adjusted to demand." The apparent difficulty is resolved when we observe that capacity- generating investment is an independent variable only in the multiplier mechanism but it is completely induced as far as the accelerator relation is concerned.

More importantly , while it is true that this type of investment generates both capacity and demand , it does not and cannot do both things at the same time. When capacity generating investment expenditures are made they only generate demand. They logically can only generate capacity one period later. Indeed, according to Eatwell(1983, p. 282) "The solution may be found in Keynes's own analysis ..."it is not investment which is the independent variable, it is the 'state of long-term expectations'". Here Eatwell seems to be arguing that in the long run investment that can create capacity is induced by the expected rate of growth of effective demand.[23]

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[23] While I fully agree that the 'problem' can be solved in this way (provided that conditions [9] and [10] below are met), it is not clear that Keynes himself would have consistently held this view. Keynes's "long-term expectations" seem to refer to expectations of profitability whilst induced investment depends on the expectation of the level of effective demand.The two, in general, are not the same thing.

11. The Long-Period Marginal Propensity to Spend

Note that economically meaningful solutions for equation [8] above require that two formal conditions are met, namely:

[9] $v.l + a.(1 + g_{+1}) < 1$

[10] $Z > 0$

If we look at condition [9] we see that the first term in the left hand side is the share of induced consumption in income or marginal propensity to consume (equal to the gross wage share in our simple model). By analogy we could call the second term in the left hand side , i.e., the ratio of capacity-generating investment to capacity, as the (long- period) marginal propensity to invest. If we do that it would be natural to see condition [9] as saying that for the system to be demand-led the overall long-period marginal propensity to spend (induced consumption plus induced investment) out of capacity output must be strictly lower than one.

This is perhaps the best way of looking at the economic meaning of what initially might strike us as a purely formal condition. In particular this gives us the reason why condition [9] appears as a strict inequality . The problem, is that if expression [9] was satisfied as an equality that would mean that the long-period marginal propensity to spend would be equal to one. But that of course is exactly what we mean by Say's Law ,

i.e., any increase in capacity output would automatically generate an equivalent demand (counting both induced investment and induced consumption) for it.

We may now turn to other condition (condition [10]) which states that there must be a positive level of autonomous expenditures i.e. expenditures that are (decided and financed) independently from the current level of output(income) and that do not generate capacity. In our simple model that means capitalist consumption plus non-capacity-generating investment must be positive.

Continuing the analogy with our previous discussion of the multiplier we see that the first reason behind this requirement is that we can only say that it is aggregate demand that determines output and productive capacity if at least part of aggregate demand is independent from output and capacity.

The second reason why autonomous expenditures must be strictly positive is that if we are assuming that the system has a long-period marginal propensity to spend lower than one, then we must have autonomous components in final demand or else no positive level of capacity output could be profitably used. This shows how essential the hypotheses that guarantee the presence of an exogenous level of autonomous expenditures are for any theory that postulates a long-period marginal propensity to spend below

unity or, in other words, for a long-period theory of effective demand.

12. The Limits of Demand Led Capacity Growth

Condition [9] above (viz. the sum of shares of induced consumption and investment must be less than one) also tells us something important about the limits of demand-led capacity growth . The problem was raised by Steindl his comment on a paper by Kurz(1990): "Kurz darkly alludes to the theory that the problem of increasing the rate of accumulation would solve itself by means of the increased output capacity that it would bring in due course (pp. 409-410), he seems to forget that the increased output capacity would materialize only **after** the investment has ben completed , that is, with a considerable time lag , and that savings are necessary precisely to bridge this gap. If additional capacity could be created **simultaneously** with the spending on investment goods there would be no limit to accumulation at all , and we could turn the whole third world into an enormous Manhattan or Hong Kong in no time!" (Steindl(1990), p. 416, emphasis in the original).

Indeed, given that in our model the 'marginal propensity to invest' (ratio of capacity-creating investment to capacity) is an increasing function of the future rate of growth of demand then it is easy to see that if we keep increasing the rate of

growth of demand there must come a point beyond which the required investment ratio increases so much to make the overall marginal propensity to spend reach one. At that point we have reached the upper limit of feasible rates of demand-led capacity growth.

Any rate of growth equal to or above that limit is, ceteris paribus, incompatible with a positive finite level of capacity output. That limit is only respected if the ratio of capacity generating investment to capacity output is strictly smaller than the aggregate marginal propensity to save. Since, given the capital-output ratio, the share of induced investment is a function of the desired growth rate, this means that the model produces feasible solutions only if the growth rate is not 'too high.'

We must therefore assume that the (expected and realized) growth rate of demand satisfies the following inequality:

$$[11] \qquad (1 + g_{+1}) < \frac{(1 - v.l)}{a}$$

where the ratio of the marginal propensity to save to the capital-output ratio will determine the upper bound of feasible demand-led rates of capacity growth.

Note that the supply-side or capital resource constraint represented by this maximum rate of growth of capacity is not

purely technological, since this maximum rate is defined only for a given aggregate marginal propensity to save (the gross profit share in our case).[24] The reason for this is that a given marginal propensity to save implies that a given proportion of current capacity output, equal to the marginal propensity to consume, will necessarily and automatically be allocated to induced consumption. It will therefore not be available for the production of capital goods and so provides an upper bound to the possible rates of growth of capacity.[25]

[24] In strictly technological terms, the upper limit for the normal rate of capacity growth would be given by $(1+ g_{+1}) < (1/a)$, the reciprocal of the capital-output ratio. This would occur only if the whole of current capacity output were to be devoted to capacity-creating investment. Note that what this is just the familiar condition of linear models that states that the rate of growth cannot be higher than the system's maximum rate of profits.

[25] It is the presence of a positive level of autonomous expenditures that explains why the share of capacity generating investment has always to be strictly below (and can never reach) its upper bound given by the marginal propensity to save, since some part of productive capacity has also to be devoted to the production of the consumer goods that comprise the autonomous demand for consumption and the goods and services that comprise the demand for non capacity generating investment. That is why the constraint appears as a strict inequality.

The system's maximum rate of capacity growth will for these reasons depend positively on the marginal propensity to save (gross profit share) and negatively on the capital-output ratio.[26] This concept of the maximum rate of growth allows us to understand better the roles of both the supply (or saving) and demand constraints on the process of capital accumulation.

In order to make the productive capacity grow at a certain rate, we have to guarantee that a sufficient share of the existing capacity is allocated to the production of capital goods.

This means that given the capital-output ratio, Steindl is correct insofar as that a high aggregate **marginal** propensity to save is a necessary (but not a sufficient) condition for high rates of capacity growth in the long run. This potentially high rate of growth of capacity, however, will only materialize if the required investment actually occurs . But in a capitalist economy the growth of investment by its turn will only be sustainable if aggregate demand actually grows fast enough to ensure that the capacity that is being created is utilized. Therefore, in our

[26]Note also that in the simple model presented here, where it is the capitalists that do all the saving, condition [9] is merely saying that in this case the rate of growth of capacity must be strictly lower than the rate of profits. That also shows that usually such condition is easily met in a capitalist economy.

model it may be possible but certainly not profitable to expand the economy faster than the rate at aggregate demand is growing. Hence , assuming that actual and expected rates of growth of demand roughly coincide, the sufficient condition for a high rate of capacity growth in a capitalist economy is that aggregate demand grows at an equally high rate.

Therefore, by characterizing the system as being demand-led we are necessarily assuming that the effective demand constraint, rather than the supply-side (saving) constraint, is the binding one. Or, in terms of our model, that the trend growth rate of effective demand is strictly lower than the system's maximum rate of growth.

We have then the answer to Steindl's objection. The Sraffian supermultiplier is clearly, in a certain sense , inverting Say's Law . In the long run, it is (effective) demand that creates or induces supply (capacity). However, this proposition – which is certainly true when we are thinking in terms of long-period **levels** of demand, output and capacity – must be qualified when we think in terms of **rates of growth**. In the latter case, the rate of growth of demand should also be determining the rate of growth of capacity, but only in a situation in which demand is growing by less than the maximum rate of growth allowed by the

technology and the aggregate marginal propensity to save (equal to the gross profit share in our simple model).

This seems to be an interesting way of demonstrating analytically the plausible intuitive idea that, given enough time, capacity can adjust to any particular level of effective demand[27], while at the same time recognizing the constraints that the current availability of capital resources (the proportion of productive capacity that can be allotted to capacity-generating investment) and the technology must necessarily impose on the speed at which the economy can respond to demand.[28]

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[27] Cf. Kaldor (1989, p. 155) "Keynes was undoubtedly right in thinking that, given enough time the production of pretty well everything responds to demand- on account of the fact that the growth of effective demand induces a higher rate of investment in increasing capacity".In the same vein Godley (1983, p. 157) argued that "such constraints (whether coming from the side of labour supply or physical capacity) are essentially of a frictional or short-term character"... the sustained expansion of effective demand is the necessary and sufficient condition for expansion of real output on any scale whatever in the long run". The concept of the maximum rate of growth allows us to accept these propositions as far as the levels are concerned while at the same time showing their limits of validity with regard to rates of growth.

[28]Note, however, that what the maximum rate of growth says is that capacity output cannot grow faster than that rate if the degree of utilization is to be kept at its 'planned' or normal level. That means that both actual output and also capacity can grow a bit faster at least for a while, to the extent that there are always planned margins of spare capacity. For very high rates of growth of demand such that neither capacity nor output can respond fast enough the result will be demand inflation and "forced saving" in a way similar to the Cambridge theory of distribution. That means that excessively high rates of growth of

13. The Role of Autonomous Demand

Note that the autonomous components of demand constitute precisely the part of aggregate demand that cannot be explained as the result of either the multiplier or the accelerator mechanism.

Indeed, the evolution over time of such autonomous components necessarily depends on a variety of economic, institutional and technological forces that cannot possibly be reduced to a simple and general formal relation amongst a few 'macro' variables.

The levels and growth rates of the autonomous expenditures depend crucially on factors as diverse as : the nature of the financial system and the conditions of consumer credit, the pace of technical change and the process of competition with regard to product innovation and product differentiation strategies of firms, the relation between managers and owners, Government expenditure (and taxation) policy and, in the case of the open economy, the international competitiveness of the domestic firms (and the country's exchange rate policy).

The virtual impossibility of deriving formally a general 'endogenous' trend for the autonomous components of demand seems

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aggregate demand are not compatible with taking distribution as an exogenous parameter (in the case of our simple model by "excessively high" we man a rate of growth of demand higher than the rate of profits).

to have led the vast majority of multiplier-accelerator theorists to ignore the role of this component of aggregate demand in the explanation of the long-run trends of capital accumulation.

Indeed in this literature, 'unproductive' investment expenditures that cannot affect capacity are usually ignored. Autonomous consumption, on the other hand, is usually admitted only in the short run (sometimes some autonomous consumption is formally required to provide 'a floor' or turning point for the cyclical 'downswing') but in the analysis of long-run growth the autonomous components are simply assumed to grow in line with either the capital stock or the level of income of the economy, usually with the argument that such expenditures must bear some proportion to the size of the economy.

From our point view, this is not a satisfactory justification. What our Sraffian supermultiplier shows is that in the long run the exact opposite is closer to the truth: it seems that it is rather the size of the economy itself that depends partially on the magnitude (and rates of growth) of these autonomous components of final demand.

The Sraffian Supermultiplier thus provides us with a simple framework for the analysis of accumulation in which effective demand and in particular the evolution of the autonomous

components of aggregate demand play a crucial role in explaining long run growth. It is a theoretical scheme in which in the long run:

"... an increase in resources ... or in their efficiency...will not serve to increase actual production unless the exogenous component of demand is increased at the same time. In many cases the same factor may operate on both but this is not necessarily so , nor there is any presumption that the rate of growth of the one will be closely geared to the rate of growth of the other ... an increase in potential output will automatically induce a corresponding growth of actual output ... only ... if exogenous demand expands at the same time to the required degree; and ... this cannot be taken for granted" (Kaldor, 1983, p. 9)

Our Sraffian Supermultiplier consists precisely in an attempt to study a system in which a particular evolution of the autonomous components of aggregate demand is not "taken for granted".

CHAPTER TWO

THE TROUBLE WITH HARROD

Table of Contents

I.INTRODUCTION

The purpose of the present chapter is to demonstrate how, in the context of our Sraffian supermultiplier, the presence of autonomous components in aggregate demand makes the economy's average propensity to save adjust itself automatically to the required investment share thereby allowing capacity to grow in line with demand without requiring any permanent changes in the degree of capacity utilization.

This endogenous adjustment of the average propensity to save under conditions where the aggregate marginal propensity to save is exogenously given is explained in section II.

In section III we show how , in the context of a stationary economy, the presence of autonomous expenditures allows capacity to adjust to demand (our results are then compared to analogous results obtained in the analysis of the stationary state by Kalecki, Keynes and Joan Robinson).

We then proceed to show (in section IV) that by contrast, in the context of a growing economy, the absence of autonomous components in demand makes the adjustment of capacity to demand logically impossible (a result that is behind Harrod's celebrated notion of a unique "warranted rate" determined by the marginal propensity to save and the normal capital-output ratio). Section V then shows how the presence of autonomous expenditures allows capacity to adjust to demand through the operation of the

Sraffian supermultiplier also in a growing economy (in that section a brief comparison with Hicks's and Kaldor's pioneering versions of the supermultiplier is also made). We conclude the chapter with section VI, where the role of changes in the degree of capacity utilization is reassessed in the light of our previous findings.

II.AUTONOMOUS EXPENDITURES AND THE PROPENSITY TO SAVE

1.The Ratio of Saving to Capacity Output

Ever since the work of Harrod(1939,1948) it has become widely believed that the full adjustment of (normal) capacity to (normal) demand is logically impossible and thus the operation of the principle of effective demand in the long run necessarily involves changes in the average actual degree of capacity utilization that make the latter deviate from its 'planned' or desired level. Moreover this result is said to hold even if we assume that firms on the average and on the whole are approximately right in their forecasts of the evolution of effective demand since, it is argued, it comes from a basic contradiction between the demand-generating (multiplier) and capacity-generating (accelerator) effects of investment.[29]

[29]A survey of the large literature on this particular proposition would be out of place here. What matters to us is to

In order to discuss the validity of this argument we are going to use a convenient scheme which starts from the macroeconomic equilibrium condition in the goods market, in which aggregate supply (output) and demand (expenditures) are balanced (X=D). Then we subtract consumption from both sides, getting the saving equals investment (S=I) relation and proceed to divide both sides by the level of capacity output (X*). That will give us the saving equals investment relation with both magnitudes expressed as shares of current normal capacity output:

[1] $S/X^* = I/X^*$

the left hand side of [1] , the ratio of actual saving to capacity output can always be tautologically rewritten as the product of the actual degree of capacity utilization($u = X/X^*$) times the average propensity to save (S/X):

[2] $u.\ S/X = I/X^*$

Equipped with equation [2] we now demonstrate that Harrodian proposition by modifying the assumptions of the simple model presented in chapter ONE above. Let us assume that there are no autonomous expenditures (Z=0) (i.e., capitalists only invest,

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point out that this idea has also played an important role in the recent literature that discusses how to incorporate the principle of effective demand into a Classical-Surplus (or Sraffian) theory of accumulation (for statements of this proposition see for instance Garegnani(1962, 1982), Vianello(1985), Kurz(1990), and Commiteri(1986)).

workers only consume). That means that now not only all (capacity-generating) investment is induced via the accelerator but also that all consumption is induced via the multiplier. The assumption that there are no autonomous components in aggregate demand implies that now the aggregate marginal propensity to save s (itself equal to the exogenously given gross profit share: s = 1 - v.l) is equal to and uniquely determines the average propensity to save S/X.

Replacing the relations of our modified model in [2] we then get:

[3] $$u.s = a.(1+g_{+1})$$

which shows us where the problem lies. On one hand the accelerator relation uniquely determines the required share of investment in capacity for any given expected rate of growth or , to put it more generally, the principle of effective demand tell us that investment is independent from saving so the right-hand side of [3] must be seem as being independently given [30]. On the other hand, completely different factors such as the distribution

[30] Notice how it is immaterial if these expectations later (in period t+1) turn out to have been right or wrong. What really matters here is how the left-hand side of [3] adapts to a given right-hand side and not how the share of investment in capacity as such is determined. For instance, if all capacity- generating investment were assumed to be autonomous in the sense of being exogenously given that would not change the terms of the problem.

of income (and in a more general framework thrift habits) uniquely determine the average propensity to save on the left-hand side of equation [3].

Then we clearly see why the actual degree of utilization must be the adjusting variable. Only by a complete fluke will the marginal propensity to save exactly coincide with the required share of investment.

Moreover, there is no economic mechanism that could bring these variables into equality while at the same time remaining consistent both with the principle of effective demand (which rules out the investment share adjusting itself to the marginal propensity to save) and with the Classical-Surplus (or Sraffian) notion of an exogenously determined distribution of income (consistency with the latter ruling out the adaptation of the aggregate marginal propensity to save to the given required investment share via changes in distribution). We can thus see that in this framework the average actual degree of capacity utilization will generally be different than the 'planned' level (u=1). Deviations from normal capacity utilization will simply have to be the adjusting variable in the long run when capacity itself can change no less than in the short run when capacity is taken as given.

2.The Marginal and Average Propensities to Save

The above result is well known and does not require further elaboration. However, what seems to have gone unnoticed is how radically things change if we take into account the presence of autonomous components in final demand. In order to demonstrate that let us go back to our original model of chapter ONE above and assume again the existence of a positive level of autonomous expenditures ($Z > 0$).

In any case, in an economy in which a substantial amount of autonomous consumption is present we must distinguish carefully between the average and marginal (aggregate) propensities to save [31]. This is of, course , a distinction which is not necessary when all consumption is viewed as being induced by income, for in that case the marginal and average propensity to save are equal (with the latter being determined uniquely by the former).

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[31]For our purposes it will be convenient to define saving as total output minus expenditures that do not create capacity. That definition allows us to identify all such "unproductive" expenditures with "consumption". This definition greatly simplifies the exposition and is harmless because the important economic distinction is not between consumption and investment as such but between expenditures that may have capacity effects and those that do not. The key to our argument is that there are autonomous components in the class of expenditures that do not create capacity, whether or not those expenditures are "officially" (i.e. in accounting terms) considered as "consumption".

Once we introduce the autonomous component of final consumption (Z), we see that the marginal propensity to save becomes only the upper limit of the average propensity to save. Thus, while the average propensity still cannot be higher than the marginal it now can and will be lower , since the autonomous expenditures term provides a source of 'dissaving'. Thus:

[4] $$S/X = s - (Z/X)$$

shows that the average propensity to save now becomes an increasing function of the level of output.

Note also that with positive levels of autonomous expenditures changes in the level of investment change output in the same direction, but not in exactly the same **proportion, since by its very nature autonomous expenditures do not change automatically when production changes** . Therefore the level of investment now not only determines the amount of saving but also affects the average propensity to save (and hence the ratio of investment to output) . The average propensity to save now depends on two elements : the marginal propensity to save s (the share of gross profit in our simple model) and the relative sizes of the levels of investment and autonomous expenditures.

[5] $$\frac{S}{X} = \frac{I}{(Z+I)} . s$$

The average propensity to save will, for any given amount of autonomous expenditures, depend on the absolute level of investment.[32] Note that the second component on the right hand side is the marginal propensity to save (gross profit share) and the first is simply the ratio between the average and the marginal (gross) propensities to save. This ratio can take any value between zero and (less than) one and is an increasing function of level of investment.

3.The Propensity to Save and the Supermultiplier

We can now return to the question of the inevitability of the adjustment via changes in the degree of utilization discussed in item II.1 above. We now know that if we take autonomous expenditures into account then it becomes clear that factors such as the distribution of income determine uniquely only the aggregate marginal propensity to save, which becomes the upper limit for the average propensity to save. The latter, in the presence of autonomous expenditures, is an endogenous variable which is both a function of the level of output and of the level of investment.

[32] Note that equation [5] was obtained by replacing the equation that shows how the level of output X is determined via the multiplier (i.e. equation [3] of chapter ONE) in equation [4] above.

We may thus ask, given that the average propensity to save is endogenously determined by the level of investment (i.e. given that we now should write (I/[Z+I]).s rather than s for the average propensity to save in equation [3] above), is it not possible that this propensity adjusts itself fully to the required ratio of investment to capacity, thereby eliminating the need to turn the actual degree of utilization into the adjusting variable ?

In order to answer that question we need to see what would happen to the average propensity to save in a model in which there are autonomous components in final demand and in which capacity-generating investment is induced via the accelerator. Such model is precisely our Sraffian supermultiplier presented in chapter ONE. And indeed when we calculate what will be the average propensity to save generated by the normal operation of the Sraffian supermultiplier we get[33] :

[6] $$S/X = a.(1+ g_{+1})$$

which shows that the operation of the supermultiplier will always generate the required share of investment, not by changing the degree of utilization but by changing the level of investment by

[33] In order to calculate [6] we must replace X in equation [4] above by X=X* determined via supermultiplier in equation [8] from chapter ONE.

more than 'consumption' (inclusive of autonomous expenditures) and therefore through changes in the ratio between the (endogenous) average and (the given) marginal propensity to save. Capacity can and does adjust to demand and there is no need to deviate permanently from the 'planned' degree of capacity utilization.

The idea that such an adjustment was impossible is not a general result and depends entirely on the fact that if there are no autonomous expenditures then , as we have seen, it is simply impossible, irrespectively of how much the level of investment changes, to change the ratio between investment and output which is given uniquely by the marginal propensity to save.

III.THE STATIONARY STATE

4. The SuperMultiplier in the Stationary State

Let us illustrate the role of autonomous expenditures in rendering the average propensity to save endogenous and thus allowing the adjustment between capacity and demand by means of a special case of our Sraffian supermultiplier: the stationary state.

Let us imagine a situation in which distribution (the real wage), technology (the capital-output ratio and the labour coefficient), and also autonomous expenditures are constant through time (and hence the correctly foreseen expected rate of growth of demand is zero). In that situation our supermultiplier equation would reduce to:

[7] $$X^* = \frac{Z}{(s - a)}$$

Equation [7] shows that the economy, to be viable at all (i.e., to have a surplus after the payment of wages), needs to have a positive net marginal propensity to save (1- v.l - a) where a covers the replacement of used up (circulating) capital.

It also shows that, in the stationary state, the level of gross output and capacity is determined by the ratio between the autonomous expenditures and the net propensity to save.

The fact that the marginal propensity to save is positive when net investment is zero means that the marginal propensity to save is always greater than the marginal propensity to invest and

hence autonomous expenditures must be positive if the gross level of capacity and output is to be positive.

In the thirties, before the work of Harrod(1939) we can find a few studies of what would happen, in a system operating according to the principle of effective demand, if the economy somehow settled in a stationary state. In these studies, the capital stock of the economy for one reason or another showed no long-run tendency to grow in an economy which was in principle capable of having positive net savings or , in other words, in an economy with a positive (and exogenously given) aggregate net marginal propensity to save.

The stationary state was obtained by imposing on the system the condition of zero net investment . That made gross investment become induced since in this situation investment was assumed to be fully determined by the need to keep the capital stock (and the productive capacity) of the economy at a stationary level.

The particular level of output at which the economy would settle in a stationary state was , on the other hand, determined by the fact that in a stationary state aggregate demand and supply must be equal to each other which meant that if net investment was zero, in spite of the positive net marginal propensity to save, net saving also had to be equal to zero.

Given a positive marginal propensity to save (itself connected to some exogenously determined distribution of income) zero net saving could only obtain if the average propensity to save were a function of the level of income, in other words if there were a given (and constant) level of autonomous expenditures in the system. If there was an autonomous component then even with a positive marginal propensity to save there would be a level of income so low as to make net saving equal to zero for the economy as a whole with the dissaving represented by the autonomous expenditures exactly matching the induced gross saving obtained at that level of income. At that level, demand, output, gross investment and the capital stock would stop falling and the economy would be in long-period equilibrium.

In these studies the equilibrium level of income would be equal to the ratio between the level of autonomous expenditures and the net marginal propensity to save.

5. Kalecki, Keynes and Joan Robinson

There are three well-known examples of the kind of 1930's stationary state effective demand theory I referred to above. The first is found in Kalecki's analysis of the 'automatic cycle' in an economy 'devoid of trends' which he developed in the early thirties , even before Keynes's General Theory. As is well known, whenever Kalecki wanted to study the cycle independently from the

trend (or 'development factors') he assumed that the economy was stationary in the long run. Moreover Kalecki always treated distribution as exogenously given in his macrodynamic models (determined by what he was later to call the "degree of monopoly") . As for autonomous expenditures we find in his important 1935 paper on the "The Mechanism of the Business Upswing" a statement such as " Capitalists' consumption changes but little during the course of the business cycle " (Kalecki, 1971, p. 27) . [34] Therefore in Kalecki's theory of the stationary state we find that it is capitalist's consumption that plays the role of the autonomous component of final demand.

The second example can be found in chapter 16 of the General Theory (Keynes, 1936), in one of the few discussions of the long-period implications of his theory that we can find in that book,

[34] In his "Outline of a theory of the business cycle" (published in 1933) Kalecki assumes that the economy is "**devoid of trends** ,i.e. .... returns to its original state after each cycle". In this economy "the personal consumption of capitalists is relatively inelastic." It " consists of a constant part B_0 and a part which is proportionate to gross profits" and adds that the latter proportion is "a small constant" (Kalecki 1971, p. 1, emphasis in the original).
In the 1934 article "On foreign trade and 'domestic exports' " Kalecki assumes capitalists' consumption to be constant " we assume - as is actually the case - that increased investment is carried out by means of creation of purchasing power rather than at expense of capitalists' consumption" (Kalecki, 1971, p. 15) and that the marginal propensity to save out of profits is equal to the profit share.

Keynes asked himself what would happen in the long run in a rich community which "in conditions of full employment " was " disposed to save" if continuous capital accumulation tended to make capital less and less "scarce" and the rate of interest did not fall enough to compensate for that. He concluded that this would easily lead to a situation of zero net investment and since the community's marginal propensity to save of a rich community is clearly positive, incomes would have to fall and "Hence the stock of capital and the level of employment will have to shrink until the community becomes so impoverished that the aggregate of saving has become zero, the positive saving of some individuals being offset by the negative saving of others" (Keynes, 1936, p. 217).

Here capital saturation leads to a stationarity condition which makes gross investment (in that situation) induced (and equal to replacement) and the 'constant' in the consumption function reflecting the 'negative saving' of some individuals guarantees the existence of an equilibrium by providing the autonomous component of final demand.

The third example consists of what is probably the last study of this (pre-Harrod) phase: Joan Robinson's paper on The Long Period Theory of Employment (Robinson, 1937). In that paper Joan

Robinson set out to study the long-period implications of Keynes's General Theory by analyzing stationary states.[35]

Joan Robinson starts by assuming a stable population and "given tastes and technical knowledge", and in the first part of her article [36] she also assumes that a "certain rate of interest has been established and is maintained at an unvarying level. In this situation, and provided that the given conditions have endured for sufficient time , net investment will have ceased . For as long as capital goods continue to accumulate , their profitability at the margin declines and the incentive to further

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[35] Keynes saw the analysis of the stationary state as being just an interesting special case , one of the many things that could happen in the long run. On the other hand, Joan Robinson saw the stationary state as the essence of long period analysis (which she labelled Marshallian) . She identified long period analysis with the analysis of stationary states arguing that (note that by investment she means net capacity generating investment) "long-period conditions are established only when investment has come to an end" (Robinson ,1937, p. 77). In "The General Theory" Keynes had argued that "it is not necessary that the level of long period employment be **constant** , i.e., long period conditions are not necessarily static... The only condition is that the existing expectations should have been foreseen sufficiently far ahead"(Keynes , 1936 ,p. 48n, emphasis in the original). Robinson conceded in a footnote that Keynes "uses long-period equilibrium in a slightly more general sense. My long-period equilibrium is a special case of Mr. Keynes' equilibrium..." (Robinson, 1937, p. 77).

[36] In the rest of her article Robinson moves on to examine what would happen to the system at different levels of the rate of interest. That part of the analysis contains neoclassical concepts of no particular interest to our discussion here (for a criticism of those latter aspects see Eatwell (1983)).

investment is continuously weakened. Investment is always bringing itself to an end" (Robinson, 1937, p. 76). She further adds that the aggregate marginal propensity to save depends on the distribution of income but that the latter is exogenously given. She then argues that saving is a positive function of income (output): "it is natural to assume that a higher level of saving will correspond in the schedule to a higher level of output"(Robinson, 1937 , p.77-78). and that there is an autonomous component in consumption because "the unemployed must somehow be provided for , and their consumption is likely to be made to some extent at the expense of the savings of the rest of the community" (Robinson, 1937, p. 79). She then argues that " in equilibrium ... net investment is zero. There is therefore only one level of total output which will give equilibrium- the output at which net saving is zero" (Robinson, 1937, p.78). She proceeds to show that an "increase in the desire to save will reduce the level of total output, for it will reduce the level of output corresponding to zero saving. Moreover, it will reduce the total stock of capital that will be maintained at a given rate of interest. For with a reduction in output there will be a reduction in employment , and , if the stock of capital were maintained , there would be ... a fall in the marginal efficiency of capital. But if the rate of interest is unchanged the marginal

efficiency of capital cannot alter . Therefore the stock of capital will decline to the point at which , with zero net investment, the marginal efficiency is restored to the former level. Thus thriftiness tends to reduce the size of the equilibrium stock of capital." (Robinson, 1937, p. 79).

In these three examples their authors, although starting from very different premises, at some point made assumptions that rendered their theories formally equivalent (in the stationary state) to our analysis of the Sraffian supermultiplier.

IV. GROWING WITHOUT AUTONOMOUS EXPENDITURES

6. Harrod's Warranted Rate

After Harrod(1939) attention shifted from the study of stationary economies with autonomous expenditures to the study of steadily growing economies but without autonomous expenditures.

Indeed, both Harrod (1939,1948) and Domar(1946) worked with the assumption of exogenously given levels of the capital-output ratio (a) and of the marginal propensity to save (s), where the latter was equal to and uniquely determined the average propensity to save (i.e., Z=0).[37]

[37] Harrod (1939,1948) did extend his analysis to take into account the presence of a given **level** of autonomous components of aggregate demand in the short run (such as government expenditures and exports). He did not, however, seem to have realized how much

As it is well known, one of the most important and influential results obtained by Harrod concern the famous "warranted rate of growth" and its relationship with what he called the actual growth rate (i.e., the rate at which capacity generating investment actually grew).

Harrod shows that even starting from a situation in which capacity and demand are balanced the full (or normal) utilization of newly created capacity will only be guaranteed (i.e., the capacity and demand generating effects of investment will only be consistent with each other) if the level of investment happens to grow at a particular rate , that he calls the warranted rate. This warranted rate is uniquely determined by the (ratio of the) aggregate marginal propensity to save and the normal capital-output ratio. If investment happens to grow at any other rate there will be either underutilization of capacity (in case the actual growth rate is lower than the warranted rate) or overutilization (if the actual growth rate is higher than the warranted rate).

We can easily derive the Harrodian warranted rate in our modified simple model, by going back to equation [3] above and seeing

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the results of his analysis would change if he allowed those autonomous expenditures to grow in the long run at an independently determined **growth rate.**

under which conditions investment and saving (both measured relative to capacity output) will be equal. That, under Harrod's assumptions (i.e., without autonomous expenditures), will only obtain if:

[8] $$1+ g_w = s / a$$

where g_w is the Harrodian warranted rate.[38]

One cannot overestimate the importance and influence of Harrod's results. He has shown that there is a single rate at which investment, demand and capacity can grow in line with each other. This rate, however, is entirely determined by the parameters that govern the supply side (and surprisingly not the demand side) of the process of accumulation, namely the marginal propensity to save and the capital-output ratio.

Furthermore , precisely because the warranted rate depends on elements related to the supply (and productivity) of saving there is simply no economic force or mechanism that should lead the economy to gravitate towards the warranted rate. Indeed, to assume a long-period tendency of the economy to grow at the

[38] Note that our formulation is different from Harrod's in the following inessential aspects: (i) we are always working in gross rather than net terms; (ii) our economy employs only circulating capital; and (iii) we use discrete rather than continuous time. Note also that we are assuming that the average and the incremental normal capital-output ratios are equal to each other.

warranted rate is (in this context) one and the same thing as assuming Say's law to hold.

Moreover, not only there is no force moving the actual rate towards the warranted rate, but starting from a situation in which the actual and warranted rate differ there may also be strong forces making the actual rate move progressively further and further away from the warranted rate. This is the famous 'knife-edge' problem or principle of fundamental instability. The 'knife-edge' argument is easily understood if we recall that

if investment grows at a rate below the warranted rate then inevitably there will be a situation of undesired underutilization of capacity, while if investment grows at a rate faster than the warranted rate there will be overutilization.

Now if we assume that investors are more likely to cut down their investment when there is underutilzation and speed it up when there is overutilization we see that to the extent that in disequilibrium the growth of investment is responsive to the degree of capacity utilization (or to the extent that investment is induced) we would have that any initial divergence between the actual and warranted rate in either direction would endogenously tend to become wider and wider. The economy then either collapse

into a depression or explode towards runaway demand hyperinflation.[39]

These remarkable results have had a very large influence on the subsequent development of the theories of growth based on the principle of effective demand. In particular there are two general implications that derive directly from Harrod's analysis that have received widespread acceptance .

The first, and perhaps the most important, of this two corollaries of Harrod's analysis is the general identification (already discussed in section II above) between situations in which capacity and demand are balanced with the idea that if that happens it is because demand has somehow adjusted itself to capacity. In other words, after Harrod it became commonplace to say that the long-run operation of the principle of effective demand precludes the adjustment between capacity and demand because capacity and demand can only grow in line if investment grows at the warranted rate and hence if it is the marginal propensity to **save** and the normal capital-output ratio that is determining the growth of investment.

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[39] From [3] and [8] we see that under Harrodian assumptions the actual degree of utilization is given by
$u = (1 + g)/(s/a)$ where g now stands for the current actual growth rate of investment.

The second implication concerns the determinants of investment in the long run. From the knife-edge problem, which shows that if, in disequilibrium, investment is sensitive to fluctuations in the actual degree of capacity utilization the economy will tend to explode, it became clear that if the theories of growth wanted to replicate the same minimal degree of stability that we clearly observe in the actual economic system then capacity-generating investment must even in the long run be considered as autonomous in the sense that its role cannot be that of making capacity adjust to demand. For if investment is viewed as induced the economy would necessarily fall into the knife-edge trap.[40]

7.The Trouble With Harrod

Harrod's results and their influence are very well known. The interesting question is to try to understand why he obtained such

[40] We must briefly mention, since developing these points would take us too far afield, two other Harrodian propositions that seem to be incorrect. The first regards Harrod's frequent claim that in his theory in the long run all (capacity-generating) investment is always induced, when in fact his model becomes violently unstable if such an assumption is made. By force of his own 'knife edge' argument capacity-generating investment must be autonomous, an independent variable rather than a derived magnitude. The second questionable proposition relates to Harrod's frequent habit of using the warranted rate to explain the trend, while his instability principle could be used to explain the trade cycle around it. This is not correct, as Kalecki(1962) pointed out. For under Harrod's own assumptions there is no reason to assume that the actual trend of the economy follows the warranted rate unless one arbitrarily assumes Say's Law to hold.

results. That becomes clear if we take a closer look at the warranted rate . Harrod defines it as the rate that would kept entrepreneurs content with what they are doing . That is a very general definition, and does not takes us very far.

Let us then see how he actually derives it. The warranted rate is derived by checking what the expected growth rate of the economy should be in order that the economy automatically generates enough induced consumption and induced investment to buy the whole increment of output and capacity and hence guarantee the continuing full utilization of the expanding newly created capacity.

When we start looking at the warranted rate in this way we see that Harrod's reasoning proceeds in two steps. The first is to note that if we think investment is induced we know that, given the capital-output ratio, the investment share will be a function of the expected rate of growth. What Harrod is really asking, therefore, is : what should be the value of the expected growth rate in order that so much induced investment is generated that the sum of the shares of induced investment and induced consumption in income add up to 1 ?

In other words, since the marginal propensity to consume is given and the marginal propensity to invest is a function of the

expected growth rate, what is the rate of growth that makes the overall long-period marginal propensity to spend equal to one ?

Now, if that constitutes a reasonable interpretation of what is the warranted rate, what Harrod is really asking is under what conditions would Say's Law hold in the long run.

If that is the case, then it is no wonder that the answer is: only if investment grows at the same rate at which potential saving can grow.[41]

Although Harrod's analysis was meant to provide "the marriage of the acceleration principle and the multiplier theory" (Harrod ,1939, reprinted in Sen (ed.), 1970, p. 45) what he (and also Domar(1946)) actually accomplished was to answer to the question "under which conditions would we obtain Say's Law ?".

It is this particular question which is answered by the warranted rate, a question which is of course completely different from the question "under what conditions would we have a balance between capacity and demand in a system in which **demand** is the independent variable?".

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[41]That would also explain why Harrod's warranted rate looks so much like our own Sraffian supermultiplier's maximum rate of growth, since the latter is precisely the limit beyond which demand-led growth regimes are not feasible as the economy becomes supply or resource constrained.

It is, of course, only the latter (not the former) question that is relevant for the development of a long-period theory of effective demand.

However, as we have seen in section II above, the answer to this second , and more important, question in the context of Harrod's assumptions is simply under no condition whatsoever.

The inadequacy of Harrod's framework is better understood if we recall our discussion of the Sraffian supermultiplier and the long-period marginal propensity to spend in chapter ONE above. There we have shown how that the existence of a definite level of capacity output determined by effective demand requires two conditions, namely : a) that the economy's marginal propensity to spend be lower than one ; and b) that there is a positive level of autonomous expenditures that is both independent from income(output) and does not generate capacity.

In keeping with Harrod's assumptions we are faced with two possibilities. Either we assume that the actual growth rate coincides with the warranted rate or does not. In the former case , as we have seen, that would equivalent to assuming that the marginal propensity to spend is equal to one (i.e., Say's Law) and hence we would be violating condition a) above.

In the latter case, if we assume the actual growth rate to be different from and lower than the warranted rate, we would

certainly fulfil condition a) above since the marginal propensity to spend would then certainly be less than one. However, because in Harrod's theory there is no room for an independently growing autonomous component of aggregate demand (autonomous consumption or non-capacity generating gross investment) in the long run it is not possible to fulfil condition b) above. [42] Intuitively, it should not come as a surprise that if we take, as Harrod wanted, both consumption and investment as being fully induced then either we obtain Say's Law (if the shares of both in income adds up to one) or the model collapses (if they do not add up to one and there is no autonomous injection of demand).

V.GROWING WITH AUTONOMOUS EXPENDITURES

8. The SuperMultiplier Under Steady Growth

[42]Note also that if we then assume that all capacity generating investment is induced the model would necessarily collapse since for any positive level of income, output or capacity, demand and supply would be different since one unit of aggregate supply (an increase in output) generates or induces less than one unit of aggregate demand (given a marginal propensity to spend below one), but at the same time there are no autonomous demand injections. But, if we assume that capacity generating-investment is autonomous, we get a system in which the level of output is demand determined via the multiplier, but the level of capacity output is not since if investment is autonomous capacity output is necessarily a consequence of the exogenously determined level of investment. Only by a fluke would such level of capacity output turn out to be adjusted to aggregate demand (see Chapter THREE below).

We can now see what happens once we allow for the presence of autonomous (non-capacity generating) components of final demand in the context of a steadily growing economy.

We obtain steady growth as another special case of our Sraffian supermultiplier by assuming, like Harrod and Domar, that the distribution of income and aggregate marginal propensity to save (s) and also the normal capital-output ratio (a) are constant through time, but, differently from Harrod and Domar, that there is a truly autonomous component in long-period aggregate demand ($Z > 0$) and that this component grows over time at an exogenous and constant (proportionate) rate z .

In order to obtain a demand-led regime we must, as we have seen in chapter ONE above , assume that z is lower than the maximum rate of growth (i.e., $z < s/a - 1$) . Assuming also that firms as a whole correctly foresee the evolution of effective demand, we get a situation in which the supermultiplier will be constant through time, and aggregate demand will grow at the same rate z as the autonomous consumption expenditures expand (i.e., $g_{+1} = z$). The Sraffian supermultiplier equation for this steadily growing economy is:

[9] $$X^{*} = Z / (s - a.(1+ z))$$

which shows that capacity is driven by aggregate demand , which will grow at the exogenously determined rate z . Thus, provided

that we allow for the presence of autonomous expenditures there is no contradiction between the actual and the warranted rate (and no "fundamental instability" either). There is always a truly demand-led equilibrium growth rate of capacity output equal to the rate of growth z of autonomous demand for values of z below the maximum growth rate. Below that limit, however, any value of the growth rate z is so to speak "warranted" and both the level and rate of growth of capacity can adjust to demand.[43] In terms of the propensity to save, what happens here is that, once again, in a manner that is entirely analogous to our discussion of the stationary state, the presence of autonomous expenditures makes the average propensity to save flexible downwards which allows it to adapt endogenously to the ratio of investment to capacity required by rate of growth of demand (itself equal to and determined by the rate of growth of autonomous consumption z).

[43] Note that differently from Harrod's theory in the case of a steady growth Sraffian supermultiplier, whenever investment grows faster than the equilibrium rate z we get a situation of underutilization of capacity (because capacity grows more than demand). Conversely if by chance the actual growth of investment is lower than z we obtain a situation of overutilization (since capacity is growing slower than aggregate demand). We see that if in disequilibrium investment responds to the actual degree of utilization in the usual way here there is no "fundamental instability" since the response of investment will be in the "right" direction.

9.Hicks, Kaldor and the Sraffian Supermultiplier

We have seen that both the stationary and the steady-growth versions of our Sraffian supermultiplier provide
a satisfactory explanation for the stylized fact of the long- run congruence between capacity and demand and at the same time avoiding the well known Harrodian paradoxes.

We are thus ready to compare and contrast our results with those of the original steady growth supermultiplier model of Hicks and the supermultiplier based analyses long-run growth of Kaldor. Let us begin with Hicks who introduced in his trade cycle book (Hicks,1950) the concept of the supermultiplier.

Now the main problem with Hicks's version of the supermultiplier is that in the same book he also introduced the concept of (and the term) autonomous investment. In Hicks's theory all consumption was induced by income (although with a one-period lag) and his supermultiplier (super)multiplied an independently determined level of autonomous investment. Hicks acknowledged that his own autonomous investment component had capacity-generating effects (contrary to our Sraffian supermultiplier in

which all capacity-generating investment is induced and the only autonomous investments are those expenditures by firms that cannot alter the capacity of the economy).

Hicks could only ignore the capacity effects of his autonomous investment as he did because his supermultiplier was supposed to determine only actual output and income (unlike the our Sraffian supermultiplier that also determines productive capacity).

It is true that implicitly the distribution of income is exogenous in Hicks's supermultiplier theory (at least in the short run) but it is also clear that he thought that ultimately distributive shares would be determined in the long run by the traditional neoclassical forces of supply and demand for factors of production.

The strongest evidence for that comes from the fact that not only does Hicks consider only output but not capacity to be demand determined but also clearly restricts the validity of the determination of output by effective demand to the short- run business cycle. Indeed, he has the long-run trend of both capacity and output determined by the growth of the endowment of nonreproducible factors and their productivity by the simple device of assuming that his 'autonomous' investment grows at the socalled natural rate , i.e., a rate that consists of the sum of the increase in labour productivity plus the growth of the labour

supply of the economy[44]. His treatment of the induced component of investment is also very unsatisfactory. Hicks decided to use the accelerator and induced investment to explain the fluctuations of investment over the cycle. The problem with that , as it is very well known (see Knox(1952)) is that during the business cycle the actual degree of capacity utilization varies and therefore the simple or rigid accelerator is not at all a good predictor of the short-run fluctuations of investment.[45]

Therefore we can see that Hicks own pioneering supermultiplier suffers from the fundamental problem that we simply cannot have capacity adjusting to demand in a theory in which in the long run capacity generating investment is viewed as being autonomous instead of induced.[46]

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[44] This is an arbitrary assumption since he gives no reason why the supposedly 'autonomous' investment should grow at that particular rate. Note, however, that this assumption though unreasonable plays an important mathematical role in Hicks's model. Indeed, if his autonomous investment grew at a rate lower than the natural his 'floor' would grow at a different rate from his full employment 'ceiling' and the economy would become increasingly unstable over time.

[45]As it is also well-known in Hicks's model the interaction between the accelerator and the (lagged) multiplier generates an explosive cycle in which the economy keeps hitting alternatively its 'floor' and the full employment 'ceiling'.

[46] In the preface of the second edition of his trade cycle book Hicks, accepting a criticism from Harrod , acknowledged that his notion of autonomous investment was unsatisfactory and reluctantly admitted that in the long run all investment should be seen as

It is instead to the work of Kaldor since the early seventies rather than that of Hicks that we must turn to if we want to find a supermultiplier-based analysis that comes very close to what we are trying to do with our own Sraffian supermultiplier.

Indeed in Kaldor's work from that period we can find that the supermultiplier is used to explain long-run trends and not the business cycle, that he is concerned with the evolution of capacity and not only with actual output, that all investment that generates capacity is seen as induced and, last but not least, that there are truly autonomous components in final demand that do not generate capacity (see the essays in Kaldor(1978) and Kaldor(1989)).[47]

Now it is true that in his supermultiplier phase Kaldor "never felt that the new theory has reached a mature stage to merit publication without further work on it" (Kaldor,1978, p. xxii) and hence never published a complete formally consistent model of

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induced. In his later work he started using a Harrod-type and a Cambridge model for discussing long run-growth and reserved the supermultiplier (which he renamed the Keynes-type) model for the analysis of the short run. In his Keynes-type supermultiplier all investment in fixed capital was seen as autonomous and only circulating capital was seen as induced (see Hicks (1965,1974)).

[47] Notice that in Kaldor's review of Hicks(1950) he had already argued that in a supermultiplier analysis the autonomous component of demand should not include expenditures that created capacity (see Kaldor(1951).

the supermultiplier. Nevertheless, even without an explicit and complete formal model, Kaldor's analyses and conclusion are implicitly based on a model exactly like our own steady- growth version of the Sraffian supermultiplier.

It seems then that the only reason why Kaldor did not get to point of producing a explicit model of the industrial economy identical to our Sraffian supermultiplier must be attributed to his reluctance to abandon completely his own version of the Cambridge theory of distribution. In fact , a consistent supermultiplier analysis requires the distribution of income (and the aggregate marginal propensity to save) to be treated as an exogenous parameter, being therefore incompatible with the idea that distribution is somehow endogenously determined via the Cambridge equation.[48]

VI.THE ROLE OF CAPACITY UTILIZATION

10.The Degree of Capacity Utilization

By spelling out the conditions under which capacity can adjust to demand, the Sraffian Supermultiplier implicitly provides us also

[48]The Cambridge theory of distribution which Kaldor put forward in the fifties (Kaldor,1956) will be discussed in chapter THREE below. Note also that Bortis(1989,1993) has independently developed a supermultiplier analysis that leads to an approach very similar to the one we are trying to develop here.

with a theory of the behaviour of the actual degree of capacity utilization in the long run . Indeed, the (average) actual degree of utilization is, of course, an indicator of the extent to which (normal) demand and (normal) capacity are balanced. According to our supermultiplier , decisions to purchase capacity-generating commodities (i.e. capital goods proper) will be in the long run completely dominated by the firms' competitive imperative to attempt to adapt capacity to demand. And this adjustment is in principle feasible for the economy as a whole if induced capacity-creating investment is determined by the technology and by the long-run evolution of effective demand.

Thus, if firms as a whole try to adjust capacity to demand and if this adjustment is possible when they (taken as a whole and on average) manage to forecast demand appropriately, then we can conclude that systematic departures from the normal or planned degree of utilization in the long run can only be attributed to a persistent collective failure, on the side of those firms, to anticipate the evolution of effective demand. In other words, persistent differences between the average actual and the planned degree of utilization are a consequence of (and solely of) a definite and systematic bias in the firms' long-term demand expectations.

If we denote by D the level of effective demand (and output) actually realized in a given period t and by X^* the (normal) level of capacity output in that same period we have that the actual degree of utilization in period t is given by:

[10] $$u=D/X^*$$

where u=1 denotes a situation in which the actual degree of capacity utilization is equal to its planned level.[49]

According to the hypotheses of our Sraffian Supermultiplier, the single determinant of the level of capacity that firms would want to have available at any period t is equal to the normal effective demand for that same period. Therefore their investment behaviour in period t-1 was necessarily guided solely by the (then) current technical conditions of production (at t-1) and the level of effective demand they then expected to rule during period t .

The consequence of such behaviour is to endow the economy with a level of normal capacity output in period t that is identical to the level of effective demand that was expected to materialize by then. Hence normal capacity at time t is always

[49] Note that u can also be (within certain limits) greater than one since we are allowing for a margin of planned spare capacity (roughly given by the usual ratio of peak to average demand). On the notion of planned, 'desired' or normal degree of capacity utilization see Ciccone(1986,1987) and Kurz(1990).

equal to the expectation, formed at t-1 , of normal demand in period t (which we will denote by D^e).

Now, the actual degree of utilization during period t is by definition the ratio between the actually realized level of normal effective demand and normal capacity output. But if normal capacity is equal to the demand that was expected for this period, we have that the actual degree of utilization in any period will be equal to the ratio of realized to (previously) expected normal effective demand for that same period. Planned or desired utilization of capacity will obtain only if expectations were justified and under(over) estimates of current normal effective demand will lead to unplanned over(under) utilization. Formally:

[11] $$u= D/D^e$$

This simple "theory" of the actual degree of utilization in the long run emerges as a logical consequence of the assumption that the desired level of normal capacity output is determined via the supermultiplier by effective demand . It might seem obvious but it has one important implication. It shows that in a Sraffian supermultiplier framework arguing that the actual degree of utilization in the long run is systematically different from the planned one is the same thing as saying that there are

persistent collective "mistakes" or a bias in long-term demand expectations.[50]

These observations bring us to the distinction between the actual long-run behaviour of the economy and the analysis of that behaviour by a path of theoretical long-period positions in which capacity is adjusted to demand.[51]

It is clear that the long-run behaviour of an economy will only be well explained by a sequence of these type of (theoretical) long-period positions if there are reasons to think that on the whole and on the average demand expectations are not

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[50] Note, however, that Garegnani has argued that "Even correct foresight of future output will not eliminate average utilization of capacity at levels other than the desired one" (Garegnani(1992), p. 59). This peculiar conclusion follows from the fact that he explicitly takes the " initial arbitrary level of capacity" as **exogenously** given by history. He would not have reached such conclusion had he asked why was that "initial" level of capacity output put there in the first place (for the answer would be precisely because firms had expected that such was going to be the level of normal effective demand that would be forthcoming in that period).

[51] Long-period positions will be here taken to mean "situations ... resulting from the adjustment of production and productive capacity to the level and composition of demand" (Vianello(1985),p. 71) and where normal prices prevail. for a similar view see also Eatwell(1979,1983).We may also note in passing that Keynes himself seemed to be convinced that a long-period theory of accumulation should refer to positions in which capacity is adjusted to demand. In fact, in a letter to Joan Robinson commenting on a paper on by Kalecki Keynes asked "..Is it not rather odd when dealing with 'long run problems' to start with assumptions that all firms are always working below capacity ?" (Keynes, [1941] 1991, p. 531).

systematically biased (or to put it in a slightly different way that whatever bias that might be empirically observed is not systematic enough to form a clear trend which is susceptible to general theoretical explanation). Under those conditions the path of long-period positions will provide the best (no matter how imperfect) explanation of the average long-run [52] behaviour of the economy. [53]

If expectations do happen to have a strong systematic bias in any direction then the actual path of the economy in the long run will move systematically away from the path formed by the corresponding sequence of long-period positions, causing the

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[52] Vianello(1989) has convincingly argued that long- period positions are unlikely to ever be **exactly** equal to the corresponding long run averages of observed market magnitudes (prices and quantities) but nevertheless still provide the best (though imperfect) theoretical explanation for these averages.

[53] Note that postulating a tendency of capacity to adjust to demand does not at all imply denying the argument, put forward by Garegnani (1979) and Ciccone (1986), that gravitation of market prices towards (or around) their normal or long period values can occur much faster than the corresponding adjustment of both sectoral and aggregate capacity to the corresponding normal levels of effective demand. That faster gravitation of prices is to be expected since in general changes in productive capacity can take a long time whilst market prices (say after an unexpected change of technique) can start tending towards their new normal levels rather quickly, as soon as "**some** producers have adopted the new method, the competition between these and those who are still using the old method will be in general sufficient to render effective the new price system" (Garegnani(1979), p. 137, emphasis in the original, my translation).

average actual degree of utilization to deviate persistently from the planned degree . Note that if these deviations are of a considerable magnitude then, while it can still be true that induced investment depends on expected demand , we cannot really say that (realized) normal effective demand determines capacity in the long run . In other words, the statement that capacity adapts to demand in the long run, a statement which we are taking here as a generally agreed upon "stylized fact", logically implies that the long-run trend of investment can (or to put it more bluntly must) be well explained by changes in the technical conditions of production and the (actually realized and, on the whole and on the average correctly anticipated) long-run trend of effective demand.[54]

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[54] Garegnani(1962,1982,1992) seems to have been particularly impressed by the seemingly large quantitative effects on the future evolution of capacity of even a **temporary** underutilization of existing productive capacity on the grounds that "...even a small degree of excess capacity may involve a failure to obtain an appreciable increment in investment obtainable by using the initial excess capacity. ... such a potential increment of capacity grows over time ... at a compound rate..." (Garegnani(1992), p. 50). Note however that equally large but symmetric capacity effects would also happen in situations of temporary **overutilization** of existing capacity. Thus, in order to demonstrate the importance of the effects of temporary episodes of underutilization for the long-run evolution of capacity a further argument would be necessary explaining why we should expect episodes of **unplanned** underutilization are on the average more common and/or of greater magnitude than those of unexpected overutilization of capacity. This further argument would then inevitably boil down to an assumption that firms for some reason

11. Structural Change and the Supermultiplier

There is a widely held belief according to which long-period positions (understood for our purposes here in the very restricted sense of theoretical positions characterized by a balance between capacity and demand) are necessarily associated with stationary or steadily growing economies. In this popular view long-period positions are incompatible with a process of accumulation in which either the structure of the economy or its rate of growth is changing over time.[55]

In principle, however, there is no incompatibility between long-period positions and structural change as such (as we may see by reading Pasinetti(1981) or Schefold(1990b)). Persistent deviations from long-period positions (and hence departures of the actual degree of utilization from its planned levels), important as they may be in practice, are not the result of

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tend to be on the average persistently **overoptimistic** about the long-run evolution of effective demand. Such a reformulated argument would thus only confirm our own general point that departures from the planned degree of utilization are to be explained exclusively by systematically biased expectations of demand.

[55] Joan Robinson(1962) was a major exponent of this view and always associated what she called conditions of "tranquillity" with steady growth and has also popularized the idea that if the structure of the economy is changing we must necessarily do "traverse" analysis, i.e., study the disequilibrium process of transition between one steady growth path to another.

structural change as such but of **unexpected** changes in demand (and thus possibly the result of equally unexpected changes in the structure of the economy). What the Sraffian supermultiplier tells us is that in general all foreseen changes in the structure of the economy which imply changes in normal effective demand will, through their accelerator effects, have an impact on the long-period levels of normal capacity output themselves. Thus only unexpected changes can make the actual degree of utilization of those productive capacities deviate persistently from their planned levels.[56]

Indeed, our Sraffian supermultiplier formula (equation [8] in chapter ONE above) remains equally valid also in the presence of structural change. The crucial point is that in the general case g_{+1} , the expected rate of growth of aggregate demand will naturally be different from the current rate of growth of autonomous expenditures z whenever the rate of growth of autonomous expenditures or the other parameters of the model such as the normal capital-output ratio and the marginal propensity to save are expected to undergo changes over time (in

[56]As Keynes(1936, p. 48 n. 1) said "long period conditions are not necessarily static." ..." the only condition is that the existing expectations should have been foreseen sufficiently far ahead."

other words, whenever the supermultiplier itself is expected not to remain constant over time).[57]

[57]For a different point of view see Trezzini(1994).

CHAPTER THREE

THE OXBRIDGE EQUATION

Table of Contents

I.INTRODUCTION

The purpose of the present chapter is to show that the fact that the operation of the Sraffian supermultiplier guarantees the endogenous adjustment of the aggregate average propensity to save to the required investment share has important implications for the study of the long-period relation between consumption (broadly defined in order to include the autonomous components of final demand) and (capacity-generating) investment.

Indeed, we demonstrate that in the context of our Sraffian supermultiplier, even under conditions of exogenous distribution and normal or 'planned' degree of capacity utilization, while there is necessarily an inverse long-period relation between the normal rate of profits and the real wage, there is no direct necessary connection between the rate of accumulation and the distribution of income. Thus there is also no long-period trade-off between the levels of consumption and investment (even in long-period positions in which the average degree of capacity utilization does not deviate permanently from its 'planned' level).

These results are in striking contrast with those of orthodox neoclassical theory and with the classical version of Say's Law. More importantly they also represent a considerable departure from the standard results of the theories of growth that are based on extending the principle of effective demand to the long

run , both in their Cambridge and "Oxford" (i.e., endogenous actual degree of utilization) versions.[58]

It will thus be necessary to start the chapter (section II) with a critical review of the relationships between demand, output and productive capacity postulated by these two types of modern Post-Keynesian growth theories.

Then, in section III, we show how the Sraffian supermultiplier provides us with an alternative way of interpreting the Cambridge equation. In this alternative "closure" it is the fraction of profits saved s_p (or more generally the ratio of the average to the marginal aggregate propensities to save) that emerges as the

[58] In what follows by Cambridge theory I shall mean the well-known theory of distribution in the form it was presented by Kaldor([1956] 1970), Robinson(1962) and Khan(1959).By Oxford theory I mean the view that the actual degree of capacity utilization is the main macroeconomic adjusting variable in the long run as put forward mainly by Steindl(1952, 1979, 1985) (and more recently by Rowthorn (1981), Dutt(1984), Lance Taylor(1985), Amadeo(1986), Bhaduri & Marglin (1990) and many others). Note that Steindl's work was very strongly influenced by Kalecki and to a lesser extent by Harrod and probably also by Hicks. Note also that Steindl,Kalecki, Harrod and Hicks were all associated to Oxford University. My Cambridge and Oxford distinction corresponds to what Lavoie(1992) calls Neo-Keynesian and Kaleckian theories respectively. Over the years many individual Post-Keynesian authors have switched from a Cambridge-type to an Oxford-type theory and a large number of variants, extensions and syntheses of these two (and other) theories have been developed. It is however beyond the scope of this chapter to survey this literature (for a recent survey and references see Lavoie(1992)). Here we are interested only in the theoretical properties of the more basic or pure versions of the two macroeconomic adjustment mechanisms.

dependent or adjusting variable, and such adjustment occurs automatically through the normal operation of the Sraffian supermultiplier.

We then proceed (in section IV) to illustrate how the operation of the Sraffian supermultiplier makes the levels of consumption and investment move together in the long run and to briefly examine the direct impact of changes in the distribution of income on the long-period levels and rates of growth of productive capacity.

II.THE OXBRIDGE THEORIES

1. Harrod's Legacy

In the Post-Keynesian theories of growth, the long-period version of the principle of effective demand is seen as being essentially a proposition about investment. The central idea is that in the long run, no less than in the short , decisions to invest are completely independent from decisions to save. The equality between investment and saving is thus brought about by the total amount of actual saving adjusting to the independently given level of investment. Therefore investment is the key independent

variable , not only in the short-run business cycle, but also in the long run process of accumulation .[59]

When we turn from the relation between investment and saving (or the multiplier relation) to the analysis of the relation between investment and creation of productive capacity (or the accelerator relation), we find that the main feature of the Post-Keynesian growth theories lies in their taking the long-run trend of (capacity-generating) investment as being fundamentally autonomous rather than induced by the growth of demand, as an independent variable rather than a derived magnitude.[60]

This view of (capacity-generating) investment as an independent variable[61] is justified by Post-Keynesian authors by arguments that emphasize the essentially speculative nature of investment

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[59]That is what Kaldor([1956], reprinted in Sen(1970),p.84) called the " the 'Keynesian' hypothesis ".

[60] Indeed, it is quite common to see Post(or Neo)Keynesian theories of growth defined as those which contain an "independent investment function", where that independence regards both the multiplier and the accelerator relation (see Sen (1970, Introduction)).

[61]It is true that in Post-Keynesian theories a considerable part of the cyclical short-run fluctuations in investment are explained as being induced by changes in aggregate demand (or in the actual degree of utilization of productive capacity) according to some version of the socalled principle of the adjustment of the capital stock (or accelerator). However, the situation is markedly different, when we turn to the Post-Keynesian explanation of the long-run trend of capacity-creating investment.

expenditures in the long run whether by stressing the disruptive effects of 'true' Keynesian uncertainty and 'animal spirits' or the consequences of Schumpeterian entrepreneurship, dynamic competition, technical change and the process of 'creative destruction'. For the Post-Keynesians that makes investment in the long run depend upon a complex set of economic, institutional and even cultural and psychological variables, which are often difficult to formalize in a simple 'investment function.'[62]

Irrespectively of the possible merits of such justifications the analysis of chapter TWO above should help us to understand that this view of investment as an independent variable rather than a derived magnitude is in fact a logical consequence of Harrod's (1939,1948) influential analysis of the relationship between the actual and warranted rates and the presumed "fundamental instability" of a theory based on induced (capacity-generating) investment.

Indeed, the Post-Keynesian growth theories (following Harrod) usually abstract entirely from the presence of "unproductive" (i.e. non-capacity-generating) autonomous components of final demand in the long run. That, as we know from our discussion in

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[62] Cf. Robinson ((1962) reprinted in Sen (1970), p.118) " To attempt to account for what makes the propensity to accumulate high or low we must look into historical, political and psychological characteristics of an economy...".

chapter TWO above, in turn implies that the aggregate marginal propensity to save uniquely determines the average propensity to save, and makes the assumption that capacity-generating investment is not fully induced absolutely necessary in order to avoid the "fundamental instability" or "knife edge" problem.

It is true that in a large number of Post-Keynesian growth models ever since Steindl(1952) part of capacity generating investment is seen as autonomous and another part is viewed as being induced (the induced component being sometimes formalized as depending on the growth of demand and sometimes as a function of the actual degree of capacity utilization). However, it is not entirely clear that adding autonomous and induced capacity-generating investment is a consistent procedure, since the amount of investment induced say by a given expected growth rate of demand cannot be the assumed to be independent of the amount of autonomous capacity creating investment being currently undertaken. For instance, an increase in the autonomous component should, cet. par., decrease the induced component by exactly the same amount since taking into account the capacity effect of the autonomous component less induced investment is now required to adjust capacity to the given expected growth of demand.[63]

[63]See chapter ONE above and also Harrod(1939). See also the debate between Committeri(1986, 1987) and Ciccone(1987) versus

In any case (whether all investment is autonomous or only a part) the requirement that capacity-generating investment should not be entirely determined by the competitive imperative of adjusting capacity to demand remains since under the assumption of an average propensity to save uniquely determined by the marginal propensity such adjustment is, as we saw in chapter TWO above, logically impossible.

Therefore, the Post-Keynesian growth theories based as they are on the notion of autonomous capacity-generating investment, [64]

Amadeo(1986, 1987) on the presence of induced investment in a Post-Keynesian "Oxford" model presented by Amadeo.

[64]A comment is in order here on an argument (see e.g. Kalecki(1968), Garegnani(1962), and Vianello(1985)) according to which the "autonomous" component of investment should include precisely those investments that, by introducing innovations, do not really amount to any net increase in the productive capacity of the economy since they just replace part of the already existing capacity that is rendered obsolete by the innovation. However, once we start working solely in terms of gross rather than net investment, as we should, principally when dealing with technical change, it becomes clear that all investment (if investment is defined as purchases of produced means of production) whether or not embodying innovations necessarily always has effects on gross capacity output. If we further recall that individual capitalist investors are not indifferent to whether or not there will be enough effective demand (i.e., buyers for their gross output) to justify the gross capacity they are installing, then we see that all gross investment must be considered as being induced by expected effective demand. We then see the inherent weakness of the above mentioned argument for deriving a long-run trend for "autonomous" investment based on the obsolescence of existing capacity caused by technical change. change. Even assuming that innovations do not have lower capital-output ratios when compared to the older technique (see

must necessarily view the technological 'accelerator' relation that associates investment and the creation of capacity as showing the capacity effects of the (independently determined) level (and share[65]) of autonomous investment.

2. Cambridge

So far we have established that the Post-Keynesian theories of growth possess two common features. First, they follow the Post-Keynesian version of the principle of effective demand in which the level of investment generates an identical amount of saving in the long run. The second common feature is that they also see capacity-generating investment as being fundamentally of an autonomous nature . Hence in the accelerator relation it is

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Caminati(1987)) here again it seems more likely that in the long run the increased "autonomous" investment of some firms (the innovators) should, cet. par., cause a offsetting decline in the induced investment of others (the ones who lost market share). It is not clear why the final net effect of this should result in an increase in the long-run trend of gross investment unless perhaps we assume that in the long run and on average firms as a whole tend to have an overoptimistic bias in regard to their technological expectations.

[65] Note that if in every period the level of autonomous investment is exogenously given then the share of investment in capacity output is also exogenously given. For that share has current investment in the numerator and the equally autonomous investment of the previous period has determined together with the corresponding capital-output ratio the current level of capacity output , which we find in the denominator.

the autonomous level of investment that determines the subsequent level of capacity output.[66]

There are however , broadly speaking, two distinct versions of modern Post-Keynesian growth theories. While both versions share the notion of autonomous capacity-generating investment that we have just mentioned, they differ significantly concerning the role that the multiplier mechanism plays in the long run.

Thus on one side we have the Cambridge theory where in the long run the multiplier generates the saving required to match the autonomous capacity-generating investment expenditures by means of changes in the distribution of income between wages and profits. On the other side we have what for the sake of symmetry we shall call the Oxford theory, in which in the long run savings are generated through changes in the level of output and in the actual (as opposed to the planned or normal) degree of capacity utilization.

As it is well known, in the Cambridge theory an independently given ratio of autonomous investment to capacity output is reconciled with the maintenance of a planned degree of capacity

[66]Moreover, it is also an independently determined share of investment in capacity output that determines the rate of growth of capacity.

utilization, by making the distribution of income endogenous. This is done by means of two main hypotheses:

i.In the long run the prices of commodities (and given money wages and the prevailing techniques also the share of profits) are flexible, in the particular sense that they tend to increase whenever aggregate demand is higher than normal capacity output ($u>1$) and to fall when demand is lower than normal capacity output ($u<1$). In other words, prices change in the same direction as the divergence between the actual and planned degree of capacity utilization.

ii. The marginal propensity to save of capitalists is higher than that of the workers.

Assumption i makes the distribution of income shift towards profits whenever there is an overutilization of capacity and symmetrically shift towards wages in situations of underutilization. Assumption ii makes these changes in distribution cause changes in aggregate demand. Shifts towards wages lead to increases in total consumption (because of the lower marginal propensity to save of workers) and given the level of investment , this also increases aggregate demand. For the same reason , shifts in distribution towards profits lead to decreases in total consumption and aggregate demand.

These two assumptions taken together assure that in the long run the prices of commodities, and given money wages also the share of profits, are determined by demand. They simultaneously guarantee that in the long run the productive capacity of the economy will tend to be utilized at its planned level.

In the Cambridge theory in the long run the level and rate of growth of productive capacity depends directly on the evolution of autonomous investment (and on the technology).[67]

Given that productive capacity is thus generated as a consequence of independently determined levels of autonomous investment, the Cambridge theory explains the stylized fact of the observed long-run rough balance between aggregate demand and capacity by making aggregate demand adapt itself endogenously to the available capacity.

Hence the direction of causality of the Cambridge explanation of that stylized fact is similar to both the corresponding Neoclassical and the traditional Classical Surplus explanations. However, while in all these three cases in the end it is

[67] in Kaldor's original paper (Kaldor, [1956] 1970) the investment share adapts itself to create capacity at the natural rate of growth (i.e. the rate of growth of population plus the rate of growth of labour productivity) but this happens only because Kaldor is dealing with a special case in which investors have very high "animal spirits" that make the economy keep hitting the full employment ceiling in the long run. The analysis of more general situations can be found in Robinson(1962).

aggregate demand that adjusts to capacity, in the Cambridge theory both the way capacity is generated and more importantly the mechanism by which aggregate demand adapts itself to capacity output is radically different.

Indeed, in both the traditional Classical Surplus and Neoclassical theories the mechanism is based on the idea that any discrepancies between capacity output and aggregate demand (or in other words between potential saving and actual investment) will tend to be eliminated by compensating changes in the amount of investment (respectively, either by arbitrarily invoking Say's Law as in the case of the classics or by assuming that the Neoclassical market clearing mechanism works in the capital market).

In the Cambridge theory investment is in the long run both completely independent of savings and autonomously determined. Therefore the adjustment mechanism that brings demand into line with capacity does not (and could not) work by means of changes in investment. In the Cambridge theory the mechanism works through compensating changes in aggregate consumption. Moreover, those changes in consumption are the result of income effects (instead of the substitution effects of the Neoclassical theories) since these changes are induced by changes in the distribution of income between wages and profits.

Whenever the current level of autonomous investment and the level of aggregate consumption induced by the current distribution of income are not enough (is too large) to allow the utilization of the current available productive capacity (the latter itself a result of previous levels of autonomous investment) at its planned or normal degree , the peculiar pricing mechanism of the Cambridge theory guarantees that prices and the distribution of income will change; and that these changes will bring forward a redistribution of income that will result in a compensating increase (or decrease) in aggregate consumption. This mechanism is supposed to allow any initial level of aggregate productive capacity to be normally utilized in the long run.[68]

Therefore, and in spite of the long-run validity of the principle of effective demand in regard to investment , it is important to note that in the Cambridge theory neither productive capacity nor

[68]Cf. Robinson (1962, p. 11) "In the short period ... the equalization of saving to investment comes about mainly through variation the level of utilisation... "In long-run competitive equilibrium the relation of ... income to the stock of capital is determined ... by technical conditions ... "The distribution of income, however, is strongly influenced by ... investment." More recently Marglin (1984, p. 974-5) explained the Cambridge mechanism as follows: "In the short run ... capacity utilization changes ... with aggregate demand... But in the long run ... there is no excess capacity to accommodate demand. Distribution must bear the brunt of adjusting aggregate demand to supply".

realized output are determined by aggregate demand in the long run. Indeed, the exact reverse is true.

3. Oxford

Still within the Post-Keynesian approach, however, there is also a different tradition, based on the work of Kalecki and Steindl. The central feature of this Oxford version (besides, of course, the view that in the long run investment is fundamentally autonomous) is the idea that in modern oligopolistic economies, both in the short and in the long run, prices and therefore the share of profits are determined by mark-up rules. The magnitude of the mark-up and hence of the share of profits in income depends on various elements of the industrial structure summarized in what is often called the "degree of monopoly".

The determinants of the degree of monopoly are seen as being of a structural and microeconomic nature , making the distribution of income independent relative to aggregate demand, output or capacity.

As a consequence of the assumption of an exogenously given distribution of income, the aggregate marginal propensity to save also becomes a given parameter.

In the Oxford theory there is no long run tendency towards capacity being utilized at its planned degree . Given the joint assumptions of autonomous (capacity-generating) investment and

exogenous distribution (and hence a rigid marginal propensity to save) such a congruence between capacity and demand can only happen as a fluke if all these independent parameters by accident happen to be in a particular relation to each other.

Therefore in the Oxford approach the actual degree of utilization is the dependent or determined variable.

The Oxford theory are also based on the specific Post-Keynesian version of the operation of the principle of effective demand in the long run and its associated notion of autonomous investment.

Therefore in these theories the level and rate of growth of capacity in the long run are determined , in the same way as in the Cambridge theory, by the evolution of autonomous investment.

This means that in the Oxford theory (as in the Cambridge theory) in the relationship between productive capacity and aggregate demand the former has the status of a predetermined or independent variable . Thus the balance between productive capacity and aggregate demand is only conceivable if aggregate demand somehow adjusts itself to capacity .

However, as we have seen above, a central element of the Oxford theory is that in the long run the distribution of income is exogenously determined by the degree of monopoly. An important consequence of this different hypothesis about pricing and distribution is that the Oxford theory lack the long-run price

and profit margin flexibility that is responsible in the Cambridge theory for generating the level of consumption demand that would be required to make aggregate demand equal to the independently given level of productive capacity.

Therefore there is no endogenous tendency in the Oxford theory towards the adjustment between capacity and demand. In this theory in the long run aggregate demand determines the level of output. The level of productive capacity , however, is the result of previous autonomous investment decisions. Since there is no mechanism that would bring these two variables in line with each other in the Oxford theory the long-run discrepancies between aggregate demand and capacity can be of a considerable magnitude .

For this reason the Oxford theory do not offer any explanation for our stylized fact about the long-run congruence between capacity and demand. The proponents of these theories argue instead that such a stylized fact is not a fact at all because they do not recognize any long-run tendency of capacity to adjust to demand . On the contrary these authors often argue that in the oligopolistic conditions of modern capitalism the relevant stylized fact would be a chronic stagnationist long-run tendency

towards a persistent degree of underutilization of productive capacity.[69]

4.Competition and Price Flexibility

There are a number of problems with the both the Cambridge and the Oxford versions of the Post-Keynesian theories of growth.In order to clarify the nature of these difficulties it is useful to restate two propositions which are derived from the Oxford theory but which would also be accepted (though conditionally) by the proponents of the Cambridge theory. These propositions are:

a) the exogenous character of the distribution of income between wages and profits in the long run is a consequence of monopolistic and oligopolistic impediments to the free working of competition in the products markets .
b) This exogenously determined distribution of income, by suppressing the long-run flexibility of prices and profit margins,is what causes the stagnationist tendency to a chronic underutilization of productive capacity.

Note that both propositions are directly (a) or indirectly (b) a consequence of the prevalence of oligopolistic conditions.

Note also that followers of both versions of Post-Keynesian theory would agree with both theoretical propositions . Naturally the followers of the Cambridge and the Oxford versions

[69] see for instance Steindl (1952,1979,1985)

disagree on the question of whether the economic system in reality should be seen as being on the whole competitive (Cambridge) or dominated by oligopolies (Oxford) . However, both groups would agree that competitive conditions are associated with long run price flexibility (and the consequent tendency to normal or planned degree of capacity utilization) while oligopolistic conditions imply rigid prices and an endogenously determined actual degree of utilization.[70]

Let us start by examining critically proposition a) above and more generally discuss the association between competition and price and profit margin flexibility and monopoly or oligopoly and price and markup rigidity .

There are many good reasons to doubt that prices and profit margins would be flexible in the long run under free competition. Indeed such flexibility, if it were to occur, would in general be incompatible with the central features of the behaviour of

[70]On the Cambridge side we have Robinson(1962, p. 46) admitting that she is assuming "competition ... is sufficiently keen to keep prices at the level at which normal capacity output is sold". From the Oxford side Steindl(1985, p. 61) argues that a fall in the rate of growth "depresses utilisation..." and that "This... could be avoided if the profit margins... were to decrease" since "...this would reestablish a normal degree of utilisation". He then adds that "In an industry dominated by oligopolies, however,this mechanism can not easily work".

capitalist firms in the long run, which is their search for profits .

In the Cambridge theory, prices are determined by cost conditions in the short run but are seen to be flexible and hence completely demand-determined in the long run (independently of cost conditions). This view seems to be the exact reverse of what actually happen in capitalist economies. Theoretical and applied economists of all persuasions would agree that , considering a situation in which money wages and techniques could be taken as given, the prices of reproducible commodities could only be considered to be demand-determined in the very short run. In the long run those prices would be entirely dominated by cost conditions (i.e. market prices would tend to gravitate around supply prices which over their costs of production including some normal profit margin) . The obvious reason for that consensus seems to lie in the widely agreed fact that the longer is the amount of time available clearly the easier it is to adjust output to demand and hence the greater is the ability of the system to respond to demand pressures via changes in the quantities produced.

The peculiar pricing and distribution mechanism of the Cambridge theory openly contradicts this plausible idea about the economy having greater elasticity in the long run. Therefore, given that

short-run supply rigidities are the only plausible reason why prices of produced commodities could be demand determined , there is simply no rational reason to expect those prices to be demand-determined in the long run .

Given, for instance, a reduction in the current level of autonomous investment the more plausible and logical long-run response of the system would evidently be the adaptation of the level of output to this lower level of aggregate demand, with (supply) prices remaining unchanged. The Cambridge theory implies that what would happen instead would be an implausible permanent fall in the price and profit margins , whilst output in the aggregate would remain unchanged.

The implausibility of such long run downward flexibility of prices and profit margins becomes more clear when we note that such downward flexibility , if it were to be present, would never be capable of securing more profits for the firms whether individually nor as a whole (the profit margin would be lower but neither the absolute amount nor the realized rate of profit could be any greater). The reason for this impossibility is naturally that the possible increase in demand caused by the lower prices and the ensuing redistribution of income from profits to wages will at very best be entirely matched by the

increase in costs (if workers do not save).[71] Therefore, such long-run flexibility would be a completely irrational action from the point of view of profit-seeking firms either individually or even collectively.[72]

Therefore, the Cambridge explanation for our stylized fact about the long-run balance between capacity and demand , which as we have seen depends entirely on that implausible pricing mechanism, must be rejected.

It is important to note that this association between long-run price flexibility and competition on one hand and price and

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[71]Kaldor ([1956] 1970) seemed to be aware of this implausibility given that not only he presented the argument mainly in terms of upward flexibility (the case of "profit inflation" or "forced saving") but he also admitted that profit margins might have a floor determined either by the rate of interest or by a minimum profit margin corresponding to a degree of monopoly.

[72]Indeed, flexible margins in the long run can only be reconciled with rational economic behaviour if it is assumed that firms regard production or sales (or capacity utilization) as an end in itself, a long run objective towards which firms would be willing to sacrifice opportunities of making profits. Indeed, in an attempt to reconcile the Cambridge view that there is a positive link between accumulation and distribution with the evidence that most prices are set by oligopolies following markup rules has led to a number of managerial variants of the theory, where the target markup is itself a function of the desired rate of accumulation. This is suggested in Kaldor(1966) and developed in different ways by Wood(1975), Eichner(1976) and many others [criticisms of those versions can be found in Pivetti(1989) and Cowling (1981)].These managerialist versions will not be discussed here.

markup rigidity and oligopolistic conditions on the other seems to be intimately related to a misunderstanding of the notion of "fix" and "flex" prices . The problem appears to revolve around a widespread confusion between short-run price setting procedures and mechanisms of long-run price determination.

The former are related to the short-run adjustment between output and demand and the latter has to do with the determination of normal long-period profit margins under different market structures.

In short-period analysis we often find the distinction between the two forms of adjusting supply to the current level of demand. In one kind of market producers fix their prices in advance , prices which include the cost of production (in our case the exogenous money wage and the labour coefficient) and the normal desired profit margin,and the short-term adjustment between demand and supply is made through changes in inventories (or variations in the actual degree of utilization of capacity). These would be the rigid or fix-price markets. In other markets where producers do not hold large inventories (nor spare capacity), firms simply produce and bring to the market the quantity of output that they think is appropriate (i.e.,the one that given the expected level of demand they think will fetch the desired price and profit margin) and let the adjustment of supply

and demand be made through price changes.These would be the flexible margins markets (flex-price).[73]

Both in the fix and flex markets, producers simply must have some normal long-period desired profit margin .Indeed , the role of changes in inventories or in capacity utilization in the fix price markets and the changes in prices in the flex price markets (its deviations from the normal prices) signal if supply should be increased or decreased to make actual and desired long-period normal prices coincide.

As far as the determination of these normal long-period prices is concerned , the only difference between competitive and oligopolistic markets (irrespectively of the fact that they are fix or flex in the short period) is that the profit margins will probably be higher in the oligopolist markets which will be able to secure persistent or long-period monopoly profits.In both cases, however, the prices will be determined by normal costs and an essentially exogenous profit margin (given by the general or

[73] See Kalecki([1954] 1991) and Hicks (1965,1974). Note that the fix-flex distinction relates only to the short period. Note that Kalecki was fully aware of that and explicitly rejected the Cambridge mechanism for the long run. In fact this is the main reason why I have associated the Oxford theory mainly with Steindl instead of Kalecki. Note also that although there is in general a high correlation between oligopoly and fix-price markets and competition and flex-price,this correlation is not perfect : fixprice is not synonymous with oligopoly and flex-price is not synonymous with full competition.

competitive rate of profits and the determinants of market structure) .

Therefore it seems clear that in the long run all prices both under free competition and under oligopolistic conditions are essentially 'fix' prices (in the sense of being determined by cost conditions). Hence the distribution of income in the long run should always be seen as exogenously determined irrespectively of the prevailing competitive conditions.

Therefore it seems that there is no basis for the association between the degree of competition and degree of long run price flexibility.[74]

We can now turn to the second proposition (proposition b) above) on the link between oligopolistic conditions , exogenous distribution and the lack of adjustment between capacity and demand .

We know from the reasoning of the preceding paragraphs that the first part of this second proposition (the link between oligopoly and exogenous distribution in the long run) is fallacious . What remains to be discussed is the other link, that between exogenous distribution (irrespectively of how this variable is

[74] for an interesting analysis of fix and flex prices that avoids all these problems see SylosLabini(1984).

ultimately explained) and the inability of the system to adjust capacity to demand in the long run .

This second link also turns out to be misleading. It is true, of course, that if distribution (for whatever reason) is taken to be exogenous in the long run demand certainly cannot be expected to adapt itself to capacity **in the specific manner prescribed by the Cambridge theory** . Interpreted in this rather limited sense this link is undoubtedly correct, though it does not really take us very far. However, it would be seriously misleading to deduce from the fact that the Cambridge mechanism cannot be at work that no adjustment between capacity and demand will take place.

This further deduction would require an additional proposition stating that the Cambridge mechanism is the only conceivable mechanism by which capacity and demand could be brought to balance in the long run . Such additional proposition would clearly be absurd and therefore the endogenously determined actual degree of capacity utilization cannot be meaningfully considered a consequence of the exogenous character of the distribution of income in long run.

We are then led to conclude that both parts of proposition b) are problematic and that therefore the whole proposition that links oligopolistic conditions to a lack of a long-run balance between capacity and demand is also incorrect.

Indeed, the true reason for the lack of balance between capacity and demand in the Oxford theory in the long run is actually much simpler. As we have seen above in this theory, in the long run the level of output adapts itself to the level of aggregate demand. The level of productive capacity, however, cannot adjust to this level of aggregate demand because current capacity has already been determined as the result of previous autonomous investment. Hence it is the idea that investment is autonomous and not anything related to oligopoly or competition that explain the long-run discrepancies between capacity and demand .

III.THE OXBRIDGE EQUATION AND THE SUPERMULTIPLIER

5.The Oxbridge Equation

In order to compare the Cambridge and Oxford theories to each other and also to our Sraffian supermultiplier it will now be useful to recall our discussion in chapter TWO above. There, we have shown that we can always write the conditions for the balance between saving and investment when both are expressed as ratios of current capacity output in a way in which, on the left hand side, the ratio of actual saving to capacity output is

expressed as the product of the actual degree of capacity utilization($u = X/X^*$) times the average propensity to save (S/X):

[1] $$u.\ S/X = I/X^*$$

Equipped with the above equation (which is equation [2] of chapter TWO above) we can show the main difference between the Cambridge and the Oxford theories by modifying the assumptions of the simple model presented in chapter ONE above. Thus, let us now assume that autonomous capacity-generating investment (driven perhaps by "animal spirits") grows at a constant exogenous rate g. Let us also assume that there are no autonomous final expenditures that do not create capacity ($Z=0$) so that the aggregate and marginal propensity to save coincide. Finally let us assume that capitalists do consume (and save) an exogenously given (and constant) fraction of their gross profits s_p while workers still "spend what they get". That allows the aggregate gross saving of economy to be described as:

[2] $$S=s_p.(1 - v.l).X$$

The above set of assumptions imply that the aggregate marginal propensity to save , which is be equal to $s_p.(1 - v.l)$ (the given share of gross profits that is saved) will be equal to and uniquely determines the average propensity to save S/X.

Replacing the relations of our modified model in [1] we get:[75]

[3] $u.s_p.(1 + r) = (1 + g)$

which is our "Oxbridge" equation[76] which shows the relations between the "rate of accumulation" g, the (normal) rate of profits r and the degree of capacity utilization u.

Now, in the Cambridge theory, as we have seen above, in the long run profit margin flexibility is assumed to allow a tendency towards a normal utilization of capacity and hence u can be set equal to 1 in [3]. The equation should thus be read as showing that the rate of accumulation and the proportion of profits saved determines the normal rate of profits r :

[4] Cambridge $(1 + r)= (1+ g)/s_p$

On the other hand, in the Oxford theory the gross share of profits and given the capital-output ratio also the normal rate of profits (the rate of profits obtained at normal degree of capacity utilization) is an independent variable. Thus, given the rate of accumulation and the proportion of profits saved, in the

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[75]Note that $u.s_p.(1- v.l) = a.(1+ g)$. Dividing both sides by a we get: $u.s_p.(1- v.l)/a = (1+ g)$. Since $(1- v.l)/a$ is by definition equal to one plus the normal rate of profits r, we obtain equation [3].

[76]We are calling equation[3] "the Oxbridge equation" because it is just an extension of the usual Cambridge equation that allows us to take into account explicitly the possible role of the actual degree of capacity utilization (and hence represent the Oxford theory).

Oxford theory equation [3] above is used to determine endogenously the actual average degree of capacity utilization (which only by a fluke will be equal to the normal or planned degree (u=1)). Thus :

[5] Oxford $u= (1+ g) / [s_p.(1+ r)]$

6.Induced Investment and Autonomous Final Demand

We now compare the Oxbridge theories with our Sraffian supermultiplier. The first important difference between the Sraffian supermultiplier and both the Cambridge and Oxford theories lies on the fact that in the former in long-period positions all gross capacity-generating investment is seen as induced, as a derived magnitude rather than an independent variable.[77] The second important difference is that in the case of the Sraffian supermultiplier rather than consuming (and saving) a fixed proportion of their gross profits capitalists expenditure decisions are assumed to relate to levels of autonomous final demand that do not generate capacity (Z>0). Moreover in the case

[77]Note that the title of Sraffa(1960) "Production of Commodities by Means of Commodities" in itself suggests that the demand for produced means of production should be seen as a derived magnitude. See also Pasinetti(1981).

of steady growth it is assumed that those levels of autonomous final demand grow at an independently given rate z.[78]

That means that in the context of our Oxbridge equation (equation [3] above) if we are dealing with the Sraffian supermultiplier we do not take g the rate of accumulation as given by "animal spirits" but by the (expected) growth rate of aggregate demand which in the case of steady growth will coincide with the exogenous rate of growth of the autonomous components of final demand z.[79]

7.The Fraction of Profits Saved

As we have shown in chapter TWO above these assumptions on the presence of autonomous components of final demand have also the effect of forcing us to distinguish between the aggregate average and the marginal propensity to save. Moreover the presence of this type of autonomous expenditures makes the aggregate average propensity to save endogenous even under

[78]The third difference from the Cambridge theory is that the Sraffian supermultiplier, like the Oxford theory, takes distribution as exogenously given (though determined by different forces).

[79]As we have seen in chapter TWO above in a more general case the rate of accumulation of the Sraffian supermultiplier is given by the expected rate of growth of demand g_{+1}, where g_{+1} should include the effects of expected future variations of z and also of all foreseen changes in the distribution of income and in the capital-output ratio.

conditions in which the aggregate marginal propensity to save can be taken as given. As we now know, the economy's average propensity to save depends on two elements : the marginal propensity to save (equal to the gross profit share in our simple Sraffian supermultiplier model) and the relative sizes of the levels of investment and autonomous expenditures (Z).

It is now time to mention an important but generally neglected economic implication of this distinction between marginal and average propensities to save. In the case of our simple Sraffian supermultiplier model it is easy to see that although all saving comes from profits and the marginal propensity to save from profits is assumed to be necessarily equal to one , we cannot know the share of savings in income by just looking at the gross profit share, because the actual proportion of profits saved (i.e. the average propensity to save), instead of being a parameter, depends on the actual level of investment. Indeed, since the autonomous expenditures of capitalists is given, and total realized profits are equal to capitalist's autonomous expenditures plus (capacity-generating) investment , if the capitalists as a whole invest more then they will collectively increase their profits and thereby save more. This means not only that the absolute amount of profits actually saved increases with the level of investment but also that this increased level

of investment, given autonomous expenditures, implies that the proportion of profits saved has also increased. Hence we can write the average propensity to save as being determined by two components:

[6] $$\frac{S}{X} = \frac{I}{(I+Z)} . (1 - v.l)$$

where the second component on the right hand side is the marginal propensity to save (gross profit share) and the first component is nothing more than the actual proportion of profits saved s_p , a proportion that **cannot** be taken as a given parameter since it is a endogenous variable determined by the actual amounts of investment and autonomous expenditures , i.e. :

[7] $$s_p = \frac{I}{I+Z}$$

As a consequence , whenever we take into consideration the presence of autonomous expenditures, as we do in our Sraffian supermultiplier, there simply cannot be any univocal and direct relation between the distribution of income and the share of savings in the economy, even if all saving comes from profits.[80]

[80]Note that for the reasons connected to our study of the circular flow of income in chapter ONE above we are assuming that all capitalist expenditures that do not create capacity are autonomous. However, the argument for the endogeneity of the average proportion of profits saved would remain the same as long as there is some autonomous expenditure even if part of capitalists consumption is seen as induced. Indeed if we had assumed that the proportion (1- s_p^*) of profits is spent on

This endogeneity of average propensity to save and hence of s^p allows us to see that our Sraffian supermultiplier provides a third way of looking at our Oxbridge equation. Thus, while for the Cambridge theory distribution is determined by the rate of accumulation and the Oxford theory deny that link between distribution and accumulation but at the cost of abandoning the idea that capacity can adjust to demand (i.e. using the average actual degree of utilization as the adjusting variable), according to the Sraffian supermultiplier there is no necessary long period between accumulation and distribution and the Oxbridge equation should be read as simply determining what will be the value of s_p that will be associated with the adjustment of capacity to demand (u=1).[81] Thus:

[8] $$s_p=(1 + z)/(1 + r)$$

which shows that the Sraffian supermultiplier provides us with an alternative way of arguing in favour of what Garegnani(1992) called "the second Keynesian position", for it shows that even if

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induced consumption but there is still a given (and independently growing) level of Z, we would then have that the average share of profits saved would be equal to $sp=(I /[I+Z]).s_p^*$ where the first term is the endogenous ratio between the average and marginal propensity to save out of profits.

[81]To the best of my knowledge the only author who has independently arrived at this result relating the supermultiplier to making the fraction of profits saved endogenous has been Bortis(1984, 1993).

in situations in which we allow for the adjustment between "actual" (realized) and normal magnitudes (situations which Vianello(1985) called "fully adjusted situations"), contrary to what is commonly asserted there is no necessary connection between the "normal" rate of accumulation and the normal rate of profits[82]. What happens in the case of the Sraffian supermultiplier is that with regard to the rate of accumulation it is the "normal" rate that adjusts itself to the actual rate (i.e. it is capacity that adjusts itself to an independently growing demand). However, at the same time it is the "actual" rate of profits that ends up adjusting itself to the normal (exogenously determined) rate.

Note also that since s_p is the proportion of gross profits saved its value, although endogenously determined, has to lie between zero and one (and it has to be strictly lower than unity). Looking at equation [8] we see that this is only another way of saying that the adjustment via the Sraffian supermultiplier, and hence the possibility of a regime of demand-led capacity growth, can work only for rates of growth that are below what we have

[82]In fact those who that affirm the necessity of that connection always "abstract" from the presence of autonomous components of final demand. Our whole argument here since chapter ONE has been based on the claim that the presence of autonomous demand is and must be an essential feature of a long-period theory of effective demand.

called the maximum growth rate in chapter ONE and found that it was analogous to Harrod's warranted rate in chapter TWO. We now see that this viability condition is also equivalent in the case of this particularly simple model, to the familiar viability condition that states that the long-period rate of growth of capacity (and demand) must necessarily be lower than the normal rate of profits.[83]

IV.CONSUMPTION,INVESTMENT AND THE SRAFFIAN SUPERMULTIPLIER

8.On Levels and Shares

One important stylized fact about the process of accumulation is the strong observed long-run correlation between the share of investment and the rate of growth.[84]

However, this same stylized fact has also been used to suggest that there is after all a long-run trade-off between consumption and investment . The idea here is that if the share of investment in income has to be increased in order to allow the economy to

[83] Note that in a more general Sraffian supermultiplier model in which we allowed for the possibility of a positive marginal propensity to save of workers and also for taxation and induced imports, the aggregate marginal propensity to save would be correspondingly higher and hence the maximum rate of growth would be greater than the normal rate of profits.

[84]As an example of recent econometric evidence in favour of this well-known "stylized fact" see DeLong & Summers (1991).

achieve higher long-run rates of growth then the level of consumption must be reduced in order to allow for the required increase in the level of investment. Hence there is a necessary negative long-run relation between the two components of demand.[85]

The Sraffian supermultiplier provides us with a completely different view. According to it increases in consumption go hand and hand with increases in investment through multiplier and accelerator effects.[86]

How then does the supermultiplier explain the stylized fact that shows that higher rates of growth are associated with lower shares of consumption ? Precisely by showing that a higher rate

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[85]We should not underestimate the intuitive power of this view which associates the connection between the rate of growth and the investment share with the idea of a trade-off between levels of investment and consumption (and hence with the rejection of the idea that the economic system is demand-led). It is this view that has led some authors, in an attempt to defend the notion that the growth of the economy is demand-led, to reject that long-run connection between investment share and the rate of growth both in theory and in reality. An example of the former reaction may be found in Vianello(1985) who gets to the point of arguing that the investment share in "fully adjusted positions" is not an indicator of the pace of accumulation but of income distribution. As a recent example of the latter reaction see Palumbo(1994).

[86]Recall that whenever we say "according to the Sraffian supermultiplier" we are naturally assuming that we are within the confines of the demand-led regime, i.e., long-period rates of growth are below the maximum growth rate.

of growth of autonomous demand increases "consumption" but also requires (and induces) a higher share of investment in capacity. But in the supermultiplier the share of investment increases not because consumption falls but because the accelerator makes investment increase for a while more than proportionately to the increase in final demand, to adapt the size of the capital goods industries to the higher long-run rate of growth of consumption. Hence the investment share can increase and the consumption share decrease while both the levels of investment and consumption are actually increasing.

In fact according to our Sraffian supermultiplier, the economy that has the higher rate of growth of autonomous demand will have in the long run the lowest share of those expenditures in output.

To illustrate this apparently paradoxical point let us compare two economies, say, A and B, which had at the same point of time the same aggregate marginal propensity to save and the same level of autonomous (non-capacity-generating) expenditures . However in one of them, say, economy A, autonomous consumption is growing at a relatively high rate z while the other, economy B, is in a stationary state in which autonomous consumption does not grow at all. In both economies of course all (capacity-creating) investment is induced via the accelerator.

One could then be easily led to think that the share of consumption in the country that is having an consumption-led boom with the rate of growth of consumption at z% per year (economy A) should be higher than in the stagnating economy B. However this will not be the case .

In the case under consideration the share of consumption in country A (the fast growing one) will certainly be lower . The reason is simply because since economy A is growing at z% and economy B is not growing at all , the level of gross investment in economy A will be much higher in A than in B . That makes the share of investment in output be higher in economy A and hence the share of total consumption lower in the economy in which the levels of both consumption and investment grow faster.

Note that even the share of autonomous expenditures (as opposed to total consumption) will be lower in the fast growing country A. Since aggregate capacity has three components and we have assumed that the share of induced consumption to be equal in A and B , if the share of investment is higher in economy A then clearly the share of autonomous demand in the fast-growing economy A will be lower than in the stagnating one (economy B).

Therefore the logic of our Sraffian supermultiplier can explain satisfactorily a number of well-known stylized facts.[87] First, the observed long-run approximate balance between capacity and demand (discussed in chapter ONE above). That is explained according to the supermultiplier by the long-run adjustment of capacity to effective demand. Then there is the above mentioned stylized fact concerning the long-run connection between the share of investment and the rate of growth, which we have just explained. Finally, there is the stylized fact according to which while the levels of consumption and investment do seem to move together in the long run , the levels of investment seem to be much more variable than the levels of consumption.[88] The Sraffian supermultiplier also explain this latter stylized fact simply because first of all the economy is demand-led (and hence consumption and investment increase together) and second given

[87] Note that the above arguments about the positive relation between the investment share and the rate of growth of demand do not at all depend on the fact that autonomous demand grows at a constant rate z . Exactly the same kind of reasoning would apply, mutatis mutandis, even if in economy A the fast rate of growth of demand was the combined result of growth of autonomous expenditures and say an expected, once-for-all, increase in the aggregate marginal propensity to consume, or any other form of structural change that implied an increase in the expected rate of growth of aggregate demand.

[88]For evidence on the latter stylized fact see Blanchard and Fischer(1989, chapter One).

the presence of independent autonomous components in final (consumption) demand it is natural that total consumption should be less variable than investment, since changes in investment will not translate themselves into proportionate changes in total consumption.

9.Level and Growth Rate Effects

Let us now examine the permanent capacity effects of unexpected once for all changes of some of the independent variables of our simple steady growth model of the Sraffian supermultiplier.[89]

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[89]A clarification of the meaning and role of a steady growth macroeconomic model is perhaps in order here.In chapter TWO above we have shown that steady growth paths are only a special case of the more general paths of long-period positions. We have also shown that it is possible to use our Sraffian supermultiplier to analyze those more general paths with structural change.The reason why we are going to analyse the economy by means of comparisons of different steady growth paths is strictly empirical. Indeed, while changes in the composition of demand and divergent rates of growth of sectoral productivity are one of the most firmly established empirical regularities of the development of all capitalist economies [see Pasinetti (1981)] it is also true that in this very same economies, in spite of structural change, the order of magnitude of the changes in the average levels (or rates of growth) of certain **aggregate magnitudes and** parameters has been surprisingly small for very long periods of time. That does not mean this aggregate parameters are equal for different economies nor that they never change. What seems to happen is that they do suffer infrequent, once-for-all changes and then remain relatively constant for long period of time (often decades). For instance, variables such as the distribution of income between wages and profits and the capital-output ratio seem to be virtually trendless for very long periods of time, while other variables such as the levels of output (and capacity), employment, and labour productivity seem to have nearly constant rates of growth for equally long periods of time.

In order to do that, however, we must make the assumption that those changes were completely unexpected, because if they were already expected to happen these changes would already have affected the evolution of the economy (as we have seen in chapter TWO above). Since the changes here are being treated as being totally unexpected, they will, as we have also discussed in chapter TWO above, necessarily lead the actual degree of capacity utilization to deviate temporarily from its normal or planned level.

Here we are not interested in studying these deviations (which at any rate will be temporary) but in seeing what effects these changes in parameters has on the long-run evolution of the productive capacity of the economy.

There are of course 'structural breaks' that change such trends but these are relatively infrequent. From these observations we can conclude that **aggregate** macroeconomic models under conditions of steady growth are the most useful instruments for the analysis of observed long-run trends since those models do replicate the aggregate movement of the relevant variables (that is of course what reasonable people like Harrod(1939) always meant by steady growth).On the other hand, the fact that this aggregate stability occurs during a process of rapid sectoral structural change means that disaggregated "steady-state" models with n sectors or products, despite their greater formal complexity, are virtually useless as a tool for the analysis of long-run trends of any real capitalist economy. In this case, contrary to common sense, disaggregating actually reduces the usefulness of the model since the information that is added (absence of 'microeconomic' structural change) simply does not correspond to reality.

The permanent capacity effects of these (once-for-all and unexpected) changes will be of two kinds and we must distinguish carefully between them. These two kinds of effects are what we can call level and growth rate (capacity) effects.

Let us examine, for instance, an increase in the rate of growth of autonomous expenditures z . Our previous discussion shows that the long-period level of capacity output will depend on the level of autonomous expenditures and on the determinants of the supermultiplier (marginal propensity to consume, normal capital-output ratio, and the rate of growth of autonomous consumption).

The increase in the rate of growth of autonomous expenditures will have two effects. The first is a growth rate effect. The increase in z will cause a permanent increase in the secular trend growth rate of the system, provided, of course, that the new higher growth rate are still lower than the maximum rate. The second consequence of that change is a level effect. Since the increase in the rate of growth of autonomous expenditures will permanently increase the rate at which the economy grows, it will also cause a once-and-for-all increase in the magnitude of the supermultiplier, as soon as the system adjusts its 'long-term expectations' to the new higher 'secular' rate of growth. Therefore, the fact that the economy requires a higher share of induced investment (and hence a larger supermultiplier) to

support the new higher secular rate of growth means that the rate of growth of capacity output initially will be higher than this new secular growth rate. This will occur as a consequence of the combined effects of the change in the secular rate of growth itself and the once-for-all change in the size of the supermultiplier. The supermultiplier will change only once and as soon as it becomes compatible with the new secular growth rate it will remain constant again but at its new secular magnitude. Then the economy will settle down to its new secular rate of growth.

Therefore, changes in the rate of growth of autonomous expenditures will have both a once-and-for-all positive level effect and a permanent positive secular rate of growth effect.[90]

10.Changes in Distribution and Capacity Growth

Let us finish by examining the case of a permanent (and unexpected) change, say an exogenous increase, in the real wage. That will, cet. par., decrease the economy's aggregate marginal

[90] The same sequence would occur in reverse in the case of a reduction in the rate of growth of autonomous expenditures. The productive capacity of the economy will initially grow by even less than the new lower secular growth rate because of the level effect of the once for all reduction of the supermultiplier, since a lower share of induced investment will be required by the lower trend growth rate of autonomous expenditures. As soon as the supermultiplier reaches its new secular value, capacity output will start growing at the lower trend rate, which is given by the new, lower, rate of growth of autonomous expenditures.

propensity to save (which is equal to the reduced gross profit share). That lower marginal propensity to save will increase the level of induced consumption and aggregate demand, and, consequently, also the long-period level of productive capacity. However, this will be a once-and-for-all effect. Once capacity has adjusted to the new (higher) level of effective demand implied by the higher (super) multiplier, the economy will settle back to steady growth grow at the unchanged rate given by the growth of autonomous expenditures. Therefore, on the demand side, a decrease in the marginal propensity to save brought about by the rise of the real wage will have a positive long-period level effect (on capacity output), but will have no effect on the sustainable secular rate of growth of capacity. Note that the same increase in the real wage will entail a permanent decrease in the normal and actual rate of profits (since when capacity adjusts to demand both coincide) and thereby reduce the system's maximum but not the actual rate of growth of capacity.[91]

[91]The same kind of effects would happen in reverse in the case of a reduction in the economy's capital-output ratio (presumably caused by a 'capital saving' cluster of innovations). On one hand, a lower capital-output ratio would mean that less investment is needed or induced by a given secular rate of growth of effective demand. This would cause a permanent reduction in the size of the supermultiplier which would lead to a once-for-all reduction in the long period level of effective demand and its associated capacity output, relative to their previous trend. However, after this relative slowdown, the economy would resume

Note that the increase in the level (and share) of wages increases both (induced) consumption and induced investment. This happens because in the Sraffian supermultiplier investment depends on effective demand but not on the level of the normal rate of profits (for the same reasons explained in Petri(1994)). Note also that expansionist result does not depend on assuming that the system exhibits permanent unplanned capacity underutilization in the long run (differently from what happens in the Oxford theory).[92] On the other hand, the stimulus to

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growing at its secular rate, given by the trend growth of autonomous expenditures. Thus, a reduction in the capital-output ratio would, on the demand side, have a negative long-period level effect and no lasting secular rate of growth effect. On the other hand, given the real wage and the labour coefficient that reduction in the capital requirements would evidently cause a permanent increase in the normal (and actual) rate of profits (and also in the maximum rate of growth of the system since now a smaller share of investment would be required to support any given growth rate of productive capacity).

[92]In an Oxford model, the higher real wage would imply a higher level of induced consumption and output, this higher output being accomodated by a permanent increase in the actual degree of capacity utilization. In an Oxford model, such as the simple one we are using in this chapter, in which all investment is autonomous, that would be the only long-run effect of this change in distribution. However, if we add to the basic model, the idea that in the long run the rate of accumulation is also a direct function of the actual degree of capacity utilization (seeing investment as being partially induced) we would obtain a positive relation between changes in the real wage and the growth rate of both (consumption and investment) output and productive capacity (for a discussion of these extensions of the our basic Oxford model see Lavoie(1992), chapter 6).

aggregate demand (and to the creation of capacity) brought about by the change in distribution is a once-for-all level effect and hence the Sraffian supermultiplier lends no support to the idea of a "wage-led" growth regime since that would depend on the implausible assumption that real wages should keep growing always faster than productivity, with the multiplier increasing every period and with the corresponding continuous and indefinite fall in the actual and normal rates of profit (and the associated maximum rate of growth).[93]

[93]Note that the independence between accumulation and distribution in the context of our Sraffian supermultiplier works both ways. On one hand taking investment to be induced by effective demand one sees that "profit squeeze" theories are implausible (see Petri(1994)). On the other hand, the argument in the text shows that the opposite idea of a "wage-led" regime of accumulation spoused by some regulation theorists (see Boyer(1988)) is also problematic.

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