Economic possibilities for our grandchildren...90 years later

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BUSINESS ACCOUNTING, SFC MODELS IN PRICES AND INCOME-VALUE

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Since the 90's I have taught at Université Paris-Sud (now Paris-Saclay) the course *"Analyse financière des entreprises et Théorie économique" (Firms' financial analysis and Economic Theory)*[1], in which I have established links between firms financial analysis and macroeconomics. The main ideas are that the accounting tools used to study an individual firm may be used to study the macrofirm, i.e. all the firms of an economy taken in their whole, and that the analysis of the production cycle of a given firm may be applied to the macrofirm. In that meaning firm financial analysis may be considered as the micro foundation of the Italian-French circuit theory. For that course I have built the case "α β blé" which describes a simple, but complete, economy made up of the banks (B), the firm (I) producing the machines α and β, the firm (G) producing corn and the firm (D) selling corn to households (H)[2]. Following the "business accounting" (BA) rules, which are an official system of compulsory rules used nowadays worldwide, I have built the loss and profit account (LPA) (also called income statement) and the balance-sheet (BS) of each of the three firms and of the macrofirm, which regroups them, to calculate their profit.

Through the example of "α β blé", I have reminded that profit, as well of the individual firms as the one of the macrofirm, is what is measured through the building of LPA or BS. BS measures firm wealth's increase during a reference period (called accounting period), LPA gives the same measure and explains how that increase has been formed during the period. Firm wealth or equity (in French *fonds propres*) is not a set a commodities nor money, it is the value of the firm assets less its debts, so an abstract figure, and so is its increase, the profit.

Nevertheless the economists, and the common language, call profit the revenue of the ruling class, whose most part is nowadays monetary. They have the idea that firms earn a monetary profit, i.e. a sum of money,   which is divided in two parts, one used by firms to buy investment goods, the other going to the rentiers under different names as dividends, interests, repurchase of shares...

This idea has lead to what is known as *paradox of monetary profit*, to which a lot of writings, including my PhD dissertation, have been devoted. This paradox stated as follows: as all money is borrowed from banks and must go back to banks, the macrofirm cannot realise any monetary profit. But this is a false paradox since there does not exist any monetary profit, profit being not in money but being only the monetary evaluation of firm wealth's increase.

In a famous book, exploring the stock-flow consistent (SFC) approach of accounting, Marc Lavoie and Wynne Godley (2007) define the *entrepreneurial profit* by an equation[3] which corresponds to the calculus of profit as given by the current column of their table 8.1[4], which is a

1 This course may be uploaded on the name of *"Monnaie, profit et valeur"* (MPV) on http://a.world.prod.model.free.fr/monnaie_profit_valeur.pdf

2 MPV chapter 12, pp. 88-117 and Vallageas (1996), pp. 9-54.

3 Equation 8,2 p. 255

4 p. 253

transcription of the LPA[5]. But some lines below they write[6]: "*Profit is the sum of money which can be periodically extracted from a set of business operations and distributed while leaving the balance-sheet of the concern unchanged.*"

Now if profit is measured in money, as are all items of BS and LPA, it is not money neither a sum of money. The authors should have been well aware of this, since some pages later[7] they distinguish profit and cash-flow and write: "*To distribute the entire amount of entrepreneurial profit in the form of dividends, firm owners need to borrow from banks the equivalent of the change in the value of inventories.*" They should have written: *"change in the value of inventories and of fixed capital"* or *"change is the value of investment"*. Indeed the products not sold to households are not only the increase of working capital (*inventories*), only considered in table 8.1[8], but also the increase of fixed capital[9].

So Godley and Lavoie affirm that money used to pay dividends is borrowed from banks. Profit being the firm wealth's increase net of its debt may be spilt in increase of capital and increase of money holdings net of debts (cash-flow). Net money holdings may be used to pay dividends and the remainder of dividends, if any, must be borrowed. In the same manner net money holdings may be used to pay wages and the remainder of wages, if any, must be borrowed.

On a macroeconomic point of view, i.e. for the macrofirm, money holdings do not exist, since all money goes back to banks, and the whole of wages and dividends is borrowed from banks.

Therefore there is no difference between paying wages and paying dividends and other rents as interests, repurchase of shares and all revenues paid to non-workers, wages and rents forming the national revenue[10].

Nevertheless throughout their book, Godley and Lavoie consider that dividends are paid out of profit, which therefore can only be a sum of money and on a recent workshop on line[11] Lavoie has affirmed that the paradox of monetary profit is a weakness of circuit theory.

Godley and Lavoie have been reinforced in their ideas by the fact that business accountants and lawyers tell themselves that dividends are paid out from profit but I have shown in Vallageas (1988) pp 357-362, in chapter 8 of my course and in Vallageas (2021) that this affirmation is a misuse of language.

5 With a small difference. To get the *entrepreneurial profit* Godley and Lavoie deduct only the interests paid on the loans financing the changes in inventories, while LPA deducts all the interests, e.g. thus paid on loans financing fixed investment. This difference is mitigated by the fact that *"interest payments* […] *other than with respect to loans for the finance of inventories, are included* […] *as a component of distributed profit"* (p. 381). Thus the retained profit of Godley and Lavoie corresponds to the retained profit of BA rules, and it remains that, whatever the exact definition of profit, dividends and other rents are borrowed from banks.

6 p. 255

7 p. 260

8 p. 253

9 Investment in fixed capital is not mentioned in chapter 8, probably for sake of simplification. It is mentioned in other parts of the book, e.g. in the introduction investment is considered in its whole, so includes investment in fixed capital and on table 11,1 on page 382, it appears under the symbol "I".

10 In MPV chapter 6, pp. 48 and sq I present a model in which there is no distinction between wages and rents, the flow of money going from the macrofirm (called then "Ent") to households (called then "Men") being represented by R'.

11 Workshop on circuit theory, Université de Bordeaux, December 6, 2022

I have not studied that question in the case "α β blé". The core question that I have studied is: do the BA rules give through profit a good measure of firm wealth's increase and of households' exploitation? In a first part of the present paper I expose why a measure of profit, that I call *in income-value* is a better measure of these phenomenons. In a second part I expose how the accounts i*n income-value* that I have built for the "α β blé" economy may be presented in a SFC framework.

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I. TEACHINGS OF THE "α β BLÉ" CASE AND PRINCIPLES OF BUILDING ACCOUNTS IN INCOME-VALUE.

In "α β blé", I have essentially studied the question of the aggregation of the individual firms profits into the macrofirm profit. First following the BA rules I have calculated the profit of each of the three firms considered and of the macrofirm and verified the fact, well known by the specialists of balance-sheets consolidation, that the macrofirm profit is not the addition of the individual firms profits. To explain that phenomenon I have studied the meaning of the profit as it is built by LPA and BS and concluded it would be more appropriate to calculate it with a method I call *in income-value* instead of the official method I qualify *in prices* (see section 1 below). The accounts in income-value have led me to build a matrix explaining the profits formation (section 2). At the end of the presentation of "α β blé" in *Monnaie et Production* (Vallageas 1996)*,* on pp. 52-54*,* I have tried to set the principles of accounting *in income-value* for an economy with n firms (or n activities) and n commodities (section 3).

1. Building accounts in income-value for "α β blé".

First, following the BA rules, I have set the accounts of the three firms. The loss and profit account (LPA) or income statement and the balance-sheet (BS) of each of these three firms give their profits which amount in thousands of francs[12] (kF) to 3,000 for (I) ; to 1,250 for (G) and to 240 for (D), thus for a total of 4,490.[13]. I draw attention on the fact that the accounts of each firm are built by its accountant without any knowledge of the accounts of the two other firms: the only data that the accountant of a firm needs are the monies that his or her firm pays or receives.

Secondly I verify the fact, that these profits are not aggregatable. When we consolidate (G) and (D), we get a profit of 1,440, and thus a diminution of 50 compared to the addition of the two separate profits[14]. And when we consolidate the three firms, the profit of the whole remains 1,440[15]. These variations seem strange and request an explanation. Let us examine the two ways by which profit is calculated. The global profit of 1,440 kF is:

1. got through the LPA of the macrofirm as the difference between the price C paid by households to get 12 months of corn, 3,360 kF (i.e. 280 kF x 12), and the income C' paid to households while producing these 12 months of corn, 1,920 kF (each department (G) and (D) of the macrofirm[16] paying 80 kF during 12 months);

2. got through the BS as the net wealth of the macrofirm, i.e. the difference between its assets of 14,160 kF (14,000 for the machines α and β, 80 for a month of corn stocked in department

12 In my original course at Paris-Sud and in the paper published in *Monnaie et Production* (Vallageas 1996) the monetary unit was the franc, then its legal name in France, but in the version of my course published on internet in 2018, I use the name of euros, certainly to look modern.

13 MPV pp. 92-93

14 MPV pp. 99-100

15 MPV pp. 100-101

16 The firms (I), (G) and (D), having been grouped in the macrofirm; no longer exist legally, but their buildings d other means of production remain separate in "departments".

(G), 80 for 15 days of corn stocked in department (D)) and its debts of 12,720 kF (7,150 of net loans, 5,000 of new equity shares and 570 of bank overdraft).

The LPA method means that households have been exploited by the macrofirm since they paid 3,360 for goods whose cost was only 1,920. When we divide the macrofirm in three independent firms, there is no motive for an increase of exploitation. Therefore global profit should remain 1,440 and the only question should be: how is this profit shared between the three firms? (D) is the only firm in contact with the households as consumers from which it has received the initial monetary flow of 3,360 kF needed for the calculus of global profit. Then (D) has bought corn from (G), this transaction allowing the former to account for a profit, which can only come from an equal transfer of profit from the latter. Eventually (I) realises a profit of 3,000 when selling β to (G) and this profit can only come from a transfer from the profit of (G). It appears that these transfers are not accounted by the official accounting system.

Let us consider the calculus of profit by BS. When we divide the macrofirm in independent firms, there is no more motive for an increase of the net wealth of the firms. But the debt of the macrofirm remains the sum of the debts of each of the three firms, since the debts between the firms (i.e. 540 kF owed by (D) to (G)) are offset, so the increase of the total of profits, from 1,440 to 4,490, which appears with the macrofirm disaggregation can only come from an increase of assets valuation. Indeed the harvest β is accounted for 7,000 on the BS of the macrofirm (that is the income paid to households for its production) while it is accounted for 10,000 on the BS of firm (G) (that is the price paid by (G)) and the 15 days of corn stocked in department (D) are accounted for 80 in the BS of the macrofirm (i.e. 40 paid to households by the department (G) for the production and 40 paid by department (D) for conservation) while they are accounted 130 on the BS of the firm (D) (i.e. 90 for the price paid by the firm (D) to the firm (G) and 40 paid to households for their conservation).

From this analysis I have first concluded and verified that to get profits aggregatable, one must build accounts in which assets; and even all commodities, are measured in income paid to households[17] and I have called this type of measure *income-value* (or simpler *value*). I draw attention on the fact that to build the account in income-value of a firm, one need to know the accounts of another firm or of the two other firms, since, e.g. to establish the BS of (G), one must know that (I) has paid as wages 7,000 to build the machine β. Therefore "one" cannot be the accountant of each firm but an economist having sufficient information on the costs met by each type of firms. Nevertheless when firms are integrated in a group they can, and often are legally bound to build "consolidated accounts" which are similar to income-value accounts.

2. The formation of profits in "α β blé".

Further I have explained how profits of the firms (D), (G) and (I) are formed[18]: the firm (D), which is the only firm in relation with the households as consumers, begins to collect the whole of profit, and then transfers a part of it to (G) and then to (I).

To sum up the analysis I built manually (i.e. without any mathematical process) the two matrices representing the Input-Output Tables (IOTs) in prices and in value of this economy[19]. The IOT in prices is a Leontiev table describing the exchanges between the firms (here (I), (G) and (D) at the effective price at which they occur, as the IOTs built by national accounts. The IOT in

17 MPV pp. 111-113
18 MPV pp. 113-114
19 MPV pp.114-115

income-value or value, that I built, has the same structure as the IOT in prices, but commodities are measured in income paid to households.

Finally, by comparing the two IOTs, I built the matrix explaining how the whole profit is shared between the three firms[20]. I copy this last matrix below:

	I	G	D	reçus	transférés	$\vec{C}-\vec{C}'$	profits nets
I	0	3 000	0	3 000	0		3 000
G	0	0	1 250	1 250	3 000		- 1 750
D	0	0	0	0	1 250	1 440	190
^{t} transférés	0	3 000	1 250				1 440

Table 1 profit formation's matrix

3. The first fruits to a generalisation to n firms and n commodities.

By building these three matrices for a simple case I hoped to find the general algorithm leading to build from an IOT in prices with n activities producing n commodities the IOT in income-value describing the same economy and then the table explaining profit formation.

In my paper published in *Monnaie et Production* (Vallageas 1996) (pp. 52-55), I have tried to build such an algorithm. First, one must determine the n ratios k $\left(\frac{\text{measure in value}}{\text{measure in price}}\right)$ for the n commodities. An IOT in prices may be summed by two matrix equations:

- the "horizontal" equation representing the n lines of commodities:

$$(\mathrm{CI}+\mathrm{Inv})\vec{u} + \vec{C} + \overrightarrow{\Delta S} = \vec{\Sigma} \quad \text{(eq. 1)}$$

- the "vertical" equation representing the n columns of activities:

$$^{t}\vec{u}\,\mathrm{CI} + {}^{t}\overrightarrow{\mathrm{VA}} = {}^{t}\vec{\Sigma} \quad \text{(eq. 2)}$$

CI and Inv are the square matrices (n x n) describing commodities exchanges between the n activities respectively of intermediate consumption and of fixed capital. $\vec{C}$, $\overrightarrow{\Delta S}$ and $\vec{\Sigma}$ are "vertical" vectors of n elements giving respectively consumption, variations of inventories and total uses for the n commodities, $^{t}\overrightarrow{\mathrm{VA}}$ being the "vertical" vector giving the values added of the n activities and $\vec{u}$ the "vertical" vector of n elements of value 1.

An IOT in income-value may be summed up by two similar equations, but in which the values added vector $^{t}\overrightarrow{\mathrm{VA}}$ is replaced by the vector of revenues paid by each activity $^{t}\overrightarrow{\mathrm{VA}'}$ and in which measures in prices are replaced by equivalent measures in value symbolised by the addition of a prime ('). That gives the two equations:

$$(\mathrm{CI}'+\mathrm{Inv}')\vec{u} + \vec{C}' + \overrightarrow{\Delta S}' = \vec{\Sigma}' \quad \text{(eq. 1')}$$

$$^{t}\vec{u}\,\mathrm{CI}' + {}^{t}\overrightarrow{\mathrm{VA}'} = {}^{t}\vec{\Sigma}' \quad \text{(eq. 2')}$$

In *Monnaie et Production* I have omitted by inadvertence the sign (') in the vector $^{t}\vec{\Sigma}'$ of equation (2'), so this last equation has been wrongly written $^{t}\vec{u}\,\mathrm{CI}' + {}^{t}\overrightarrow{\mathrm{VA}'} = {}^{t}\vec{\Sigma}$.

20 MPV p. 117.

If we call $\vec{k}$ the “vertical” vector of the n ratios $(\frac{\text{measure in value}}{\text{measure in price}})$ for the n commodities, the last equation becomes ${}^t\vec{k}\,CI + {}^t\overrightarrow{VA'} = {}^t\vec{\Sigma}$[21] and therefore we may get $\vec{k}$ as it is given by the equation 21 of *Monnaie et Production* (p. 54):

$${}^t\vec{k} = ({}^t\vec{\Sigma} - {}^t\overrightarrow{VA'})\ CI^{-1}$$

As, at that time, since I did not applied the model and gave only its principles, I did not realise that the equation (20) of *Monnaie et Production* was wrong, but two years later in 1998 when applying the model to the French economy of the year 1991 with 38 activities, I gave the true solution starting from equation (2’). If we call Σ the diagonal matrix (n x n) whose elements are the total uses of the n commodities, i.e. the elements of vector ${}^t\vec{\Sigma}$, we get:

$${}^t\vec{k} = {}^t\overrightarrow{VA'}\ (\Sigma - CI)^{-1}$$

${}^t\vec{k}$ being known, it is possible to build the IOT in income-value, and by comparing this last IOT with the standard IOT in prices, we may explain the profit formation by equation[22]:
$\vec{P}_A = (\vec{C}-\vec{C}') + (CI-CI')\vec{u} - ({}^tCI-{}^tCI')\vec{u} + (Inv-Inv')\vec{u} + (\overrightarrow{\Delta S}-\overrightarrow{\Delta S'}) - (\vec{M}-\vec{M}') + (\vec{X}-\vec{X}')$ in which $\vec{M}$, $\vec{M}'$, $\vec{X}$ and $\vec{X}'$ are the imports and exports of each activity measured in prices and in value. To apply the model to a simple economy of only 38 activities, I used the free spreadsheet OpenOffice calc without any programming, The more sophisticated function that I used was INVERSMEMAT to inverse the matrix Σ – CI.

I wrote a paper that the *Review of Political Economy* rejected in November 1998. A referee said my English is poor. I can admit that and the paper could have be rewritten. The referee did not find any mistake in the linear algebra presentation of the IOTs in prices and in value nor in the equation (13) explaining the profit formation. Indeed I had corrected the mistake of the *Monnaie et Production* paper and I had managed to apply the model. But the referee found the transformation of prices in values complex and did not see its interest. Certainly my approach was too much abrupt, since I presented the model directly with n firms, without going through any examples with two or three firms and the referee did not make any effort to understand equation (13) meaning. Nevertheless I think the referee exceeded his role: a referee has to check the validity of an argumentation and the construction of the concepts and not to judge its interest, which may appear only many years later.

I presented the model in some conferences, among which the 7th post-Keynesian in Knoxville, Tennessee, in June 2000 and thanks to my friends Edwin Le Héron and Frank Van de Velde published a paper in French (Vallageas 2001. In this paper I preceded the study of the n activities model by this of a model with only 2 activities. Eventually I presented a paper I in July 2010 at a congress in Bordeaux, France which is displayed here.

II. REPRESENTATION OF THE CASE "α β BLÉ" WITH THE "STOCK FLOW CONSISTENT" (SFC) APPROACH.

1. Description of "α β blé" economy by SFC accounts in price-value.

Following the method given by Marc Lavoie and Wynne Godley (2007) I will give a SFC description of the "α β blé" case and compare it with the description given by the BA system that I have used in MPV. The BA system describes the "α β blé" economy through 14 operations that I recall in § 1.1.

21 Called equation (20) in *Monnaie et Production* on page 54
22 This equation is established as equation 13 on page 15 of Vallageas (2010).

In § 1.2 we will see that the SFC accounts and the BA use the same method to measure the profits for the three firms and they give exactly the same results. They differ only by terminology and presentation.

In § 1.3, I will register the 14 operations in a chronological order on a unique national journal similar to the firms journals in which each accountant of each firm records all the economic events involving that firm.

In § 1.4, I will build from the national journal the transactions matrix of the SFC system as suggested by Lavoie and Godley.

1.1 The fourteen operations registered by the BA and the SFC systems

The "α β blé" economy is made up of 11 monetary flows between the firms, (I), (G), (D), the households (H) and the banks (B). I have numbered them in their chronological order from 1 to 11, These operations may be described by the following matrix (table 2), in which each monetary flow is refereed by its number in brackets) [23].

		recipient agents						
		(B)	(I)	(G)	(D)	(H)	total of paid monies	final treasury balance
paying agents	(B)		3,500 (1)	5,000 (3)			8,500	-7,150
	(I)	350 (10)				14,000 (2)	14,350	-850
	(G)	1,000 (11)	10,000 (5)			1,080 (6)	12,080	-370
	(D)			1,710 (7)		1,000 (8)	2,710	650
	(H)			5,000 (4)	3,360 (9)		8,360	7,720
	total of received monies	1,350	13,500	11,710	3,360	16,080	46,000	0

table 2 monetary flows matrix

As the sum of monies received equals the sum of the monies paid, the sum of the treasury balances is null. In principle the treasury balances of the non-banks agents ((I), (G); (D) and (H)) should be positive and their sum the opposite of the negative bank balance. But it appears that the balances of (I) and (G) are negative. That can occurs only if (B) has provided sufficient overdrafts. In the "α β blé" case I have considered these overdrafts as the supplementary monetary flows 1.5, 5,5 and 6,5[24], however as these flows are not explicitly considered either by the BA or by SFC accounting, I will omit them[25].

Besides these true monetary flows, the BA rules have lead the firms accountants to register at the end of the accounting period (here the 31st of December) 3 “fictive” operations, (a) for the firm (I), (b) for (G), (c) for (D)[26]. These operations are needed to get a profit that is firm wealth’s increase. All these 14 operations are registered in the firms journals involved in a chronological order. They will be registered in the national journal that I present in § 1,3 and will be included in the transitions matrix of the SFC presented in § 1.4.

23 This type of matrix is defined in MPV p. 14 and the table 2 is a copy of the iable 90 of MPV. The numbers in brackets of the 11 operations correspond to the numbers given in MPV.
24 MPV pp.91-92
25 As I have said, in MPV p. 20, the recording of money creation is implicit.
26 MPV p. 94.

1.2. Description of the common accounting rules of BA and of SFC.

a) The different type of accounts.

The BA system uses for each firm two types of accounts: 1. the flows accounts grouped in the LPA; 2. the stocks accounts grouped in the BS and giving the stocks of fixed and working capital, of claims and liabilities, and holdings of money.. On MPV I have grouped apart the treasury accounts, i.e. the accounts giving money's holdings to demonstrate the treasury balance (*excédent de trésorerie global, E,T,G,*) but eventually this balance is reported into the BS. All the other accounts, whether they appear on BS or LPA, will be called non-treasury account.

b) Table of equivalent definitions and proprieties.

BA system	SFC system
LPA variation of BS debit credit Σ debits = Σ credits	current column capital column - + Σ lines = Σ columns = 0

table 3

c) The types of operations.

In **MPV p. 40** I distinguish 3 types of operation. The two first types concern **true monetary flows** (for "α β blé" the operations (1) to (11)) , therefore the operations for which some money leaves a firm (or (B) or (H)) to go into another agent. As Godley and Lavoie (2007, p.38) say "*everything comes from somewhere and everything goes somewhere".* These operations are recorded with the BA presentation in the journals of the firms concerned and with the SFC presentation in the national journal at least in 4 accounts, at the rate of two accounts for each agent with a treasury account for each agent.

These operations concerning true monetary flows are divided in operations of first and second type. This classification is specific to each agent, that means that an operation considered of a type for an agent may be considered of another type for the other agent.

The **first type of operation** concerns the true monetary flows for which the net wealth of the firm is modified, i.e. the monetary flows which imply a loss or a profit. In order to maintain the equality of the profit given by the LPA with that given by the BS these operations must be registered in a LPA account (or "current column") and in a treasury account (which is BS account and registered in the lower part of the "capital column") for the same amount.

The **second type of operation** modifies the composition of the net wealth of a firm without modifying its net value. This operation is registered only in BS accounts.

The **third type of operations** concerns the "fictive" operations registered at the end of the period in order to get the true net value of a firm. As they modify this net value these operations must be registered in a LPA account (or the "current column") and in a BS account (or in the upper part of the "capital column") for the same amount.

d) The partition of the transactions matrix of the SFC system.

Independently of its partition in current and capital columns a complete transactions matrix such as the one given in Godley and Lavoie (2007) p. 382 table 11,3 is divided in three parts delimited by two horizontal lines. The current column of each firm corresponds to its LPA[27] and its items are all recorded in the upper part. The capital column of each firm corresponds exactly to the variation of the BS during the period after payment of dividends. The variation fixed and working capital of the firms are recorded on the upper part and all other items (i.e. variations of claims, liabilities and of treasury) are recorded on the lower part, the middle part being not used for the firms.

1.4. Building of the national journal.

Each firm accountant describes in a firm journal in a chronological order all the operations in which its firm is involved. On the same model I will build a national journal in which I will register in a chronological order the 14 operations occurring in the "α β blé" economy. In the next paragraph I will build from that national journal the transactions matrix as suggested by Godley and Lavoie,

I assume that someone has a complete knowledge of the economy and that he or she may register in the national journal in price-value the true monetary flows as they occur during the year and register the "fictive" operations at the end of the year to get the value of each firm wealth increase. Simultaneously he or she may calculate the income-value to build the national journal in income-value.

In the national journal of table 6. all the investment goods are measured in price-value as they are in the original BS in price-value, while in the table 7 they are measured in income-value as they are in the BS in income-value.

But in the real world these national journals do not exist, because in the real world nobody has a complete knowledge of the operations forming an economy and the SFC or national accounts are built without help of national journal. The only thing that we may say is that if the national journal be existed, the SFC and national accounts could be built from it.

Each of the 11 true monetary flows is registered in 4 accounts of the BA system at the rate of one not treasury account and one treasury account for each agent (cf. 1,2 a for the types of account). On the national journal during the year are registered only the flows between the non-treasury accounts of both agents. The operation (5) being the combination of a purchase and of loan, two non-treasury accounts are used for each agent, therefore, the line (5) is made up four records.

As the current column of each firm is equivalent to its LPA, the total of their current columns give their profits either measured in price or income-value. On the contrary the capital columns include all the items of the BS, but not the treasury account. Therefore I have add a line "Δ treasury" in which I have reported the moves of treasury as they are given as "ERG' on the accounts "Δ trésorerie" in MPV(pp.92-93). I recall that the treasury accounts moves are money moves independent from the measure of investment and thus the lines "Δ treasury" are the same for tables 6 and 7. I recall also that positive number (and thus a "credit" or a liability) means a decrease of treasury and a negative number an increase ("debit" or asset)

When we add these lines in both tables, the "capital columns" give the complete BS and therefore of the profits equal to those given by the "current columns".

27 See note 5.

	I		G		D		H	B	totals
	current	capital	current	capital	current	capital	current	capital	
1 loan		3,500						-3,500	0
2 wages	-14,000						14,000		0
3 loan				5,000				-5,000	0
4 equity				5,000					0
5 purch β	10,000			-10,000					0
6 wages			-1,080				1,080		0
7 purch			2,250	-540	-2,250	540			0
8 wages					-1,000		1,000		0
9 sales					3,360		-3,360		0
10 reimb		-350						350	0
11 reimb				-1,000				1,000	0
a α	7,000	-7,000							0
b stocks G			80	-80					0
c stocks D					130	-130			0
totals	3,000	-3,850	1,250	-1,620	240	410	7,720	-7,150	0
Δ treasury		850		370		-650	-7,720	7,150	0
profits	3,000	-3,000	1,250	-1,250	240	-240	0	0	0

table 6 national journal in price-value

		I		G		D		H	B	totals
		current	capital	current	capital	current	capital	current	capital	
1	loan		3,500						-3,500	0
2	wages	-14,000						14,000		0
3	loan				5,000				-5,000	0
4	equity				5,000			-5,000		0
5	purch β	10,000		-3,000	-7,000					0
6	wages			-1,080				1,080		0
7	purch			2,250	-540	-2,250	540			0
8	wages					-1,000		1,000		0
9	sales					3,360		-3,360		0
10	reimb		-350						350	0
11	reimb				-1,000				1,000	0
a	α	7,000	-7,000							0
b	stocks G			80	-80					0
c	stocks D					80	-80			0
	totals	3,000	-3,850	-1,750	1,380	190	460	7,720	-7,150	0
	Δ treasury		850		370		-650	-7,720	7,150	0
	profits	3,000	-3,000	-1,750	1,750	190	-190	0	0	0

table 7 national journal in income-value

1.4. Building of the transactions matrices in price-value and in income-value.

The transactions matrices of the SFC (tables 8 in price-value and 9 in income-value) may be derived from the respective journal (tables 6 and 7).

On one of their most complete transactions matrices Godley and Lavoie (2007, table 11.3, p. 382) assume that the *entrepreneurial profit* F is shared between the dividends FD_t and the retained profit FU_t. In "α β blé" I do not tell anything about profit repartition especially since I do not think it would be a sum of money that could be shared.

As the firms pay no dividend to (H), I have, for the equilibrium of the line F, put opposite numbers on the capital and current columns of each firm as well on the matrix in value as on the matrix in price. What is the meaning of this opposition? For Godley ans Lavoie and for the matrix in price, it means that e.g. (G) has made a monetary profit of 1,250 and that this profit has been transferred in the "capital column" where it will be used with loans and issuing of equity shares to finance investment.

On page 253 of their book Godley and Lavoie write: *"From the standpoint of accountants, these yet-to-be-sold goods are considered as if they had been sold by the production department of the firm (linked to the current account) to another department, the acquisition department of the firm (linked to the capital account).*

	I		G		D		H	B	totals
	current	capital	current	capital	current	capital	current	capital	
Cons.					3,360		-3,360		0
Interm. cons			2,250		-2,250				0
Fixed invest	17,000	-7,000	-	-10,000					0
Δ inventories			80	-80	130	-130			0
WB	-14,000		-1,080		-1,000		16,080		0
F	-3,000	3,000	-1,250	1,250	-240	240			0
Δ loans		3,150		4,000				-7,150	0
Δ treasury		850		370		-650	-7,720	7,150	0
Δ comm. claims				-540		540			0
Δ equity				5000			-5000		0
totals	0	0	0	0	0	0	0	0	

table 8 transactions matrix in price-value

	I		G		D		H	B	totals
	current	capital	current	capital	current	capital	current	capital	
Cons.					3,360		-3,360		0
Interm. cons			2,250		-2,250				0
Fixed invest	17,000	-7,000	-3,000	-7,000					0
Δ inventories			80	-80	80	-80			0
WB	-14,000		-1,080		-1,000		16,080		0
F	-3,000	3,000	1,750	-1,750	-190	190			0
Δ loans		3,150		4,000				-7,150	0
Δ treasury		850		370		-650	-7,720	7,150	0
Δ comm. claims				-540		540			0
Δ equity				5000			-5000		0
totals	0	0	0	0	0	0	0	0	

table 9 transactions matrix in income-value

So our authors consider that the firm is divided in two departments, and that each department has its own account, which would be a single-entry treasury account. The production department has the current account. It buys goods from other firms, buys initial inventories from the acquisition department, pays wages, sells its production, of which the final inventories are sold to the acquisition department. At the end it has got a monetary profit which is transferred to the acquisition department which registers it in its own single-entry account, the capital account.

With this conception the double-entry system of accounts of the firm is got only by the successive junction of two single-entry accounts, the current account being first.

In the real world the accountancy of a firm is unique and the operations registered in a unique journal and each entry implies as well the profit calculated through the BS as the one calculated though the LPA. Thus one cannot say the LPA (or production department) calculates the profit and transfers it to the BS (or acquisition department), since LPA and BS calculate both and in the same time the profit.

Therefore for me the fact that e.g. the matrix in price (table 8) gives for (G) F = -1,250 in the "current column" and F = 1,250 in the "capital column" does not mean that the production department has calculated and got a profit, which could only be a sum of money, and transferred it to the other department; but it means that the accountant of (G) has kept a journal and that, by grouping the accounts, he has got a profit of 1,250 in a "debit" account in LPA and in a "credit" account in BS. After that contention I can think about the meaning of this number and see it is a measure of wealth increase.

IN CONCLUSION: IS STOCK-FLOW CONSISTENT ANALYSIS A TRUE ANALYSIS (i.e. A THEORY) OR A MEASURING SYSTEM (i.e. AN INFORMATION SYSTEM)?

I have compared the official BA rules and the rules followed by Godley and Lavoie to build the transactions matrices of the SFC and concluded they are similar. Therefore I succeeded to transfer the BA I have set for the "α β blé" economy into transactions matrices. Both systems give the same informations. Both systems give the same definition of stocks and flows and thus calculate the same profit. The only difference is that the transactions matrix groups in a unique table informations that are spread in accounts of multiple agents. By grouping these informations, the transactions matrices verify the compatibility of the different agents accounts, i.e. their consistence. But in practice firms accountants verify also this consistence: a firm accountant compares every day its bank account with the statements received from its bank; the same verification occurs between a shopkeeper and his suppliers. Both systems affirm that dividends are paid from profit, although Godley and Lavoie see that firm owners must usually borrow their amount. Both systems have another default: the BSs of the BA and the transactions matrices of the SFC consider only the variations of financial accounts and not the true financial flows. That has a negative impact on the development of circuit theory and on the importance accorded to flows of money. E.g. firms may borrow from their banks large sums of money during the year and reimburse them before the 31st of December. These moves of borrowing and reimbursement, i.e. ebbs and flows, will not appear on the published accounts of the firms, nor in the national accounts, nor in the transactions matrices: the only numbers which will appear will be the difference between the quantities of money hold at the beginning and at the end of the year. At the opposite the flow of wages and their reflux with their spendings are truly accounted since they are not considered as financial and affect the profit calculus. That gives the impression that the circuits between firms and households can work with a constant quantity of money, while in fact money is constantly renewed as are work and commodities. In Vallageas (1990) I have suggested an accounting reform to solve this problem.

It appears that the SFC system is very similar to BA with the same qualities and defaults. Thus, like the BA, it cannot be considered as a theory but as an accounting and information system.

Albeit the studies of SFC tenants are not only about accounting. Godley, Lavoie and others have developed simulations not only from accounting equations but also from behaviour equations. Their true contributions are neither stocks, nor flows, nor consistency, which have been well known by the business accountants for several centuries, even if they have been forgotten by mainstream macroeconomists. Thus it would be more appropriate to qualify Godley and Lavoie's models of simulation models rather than SFC models.

But simulation method is not a theory. It is a method to verify a theory as is, e.g., econometrics. The theory to which is applied a simulation method depends not only on the accounting framework but also on the behaviour equations.

Therefore SFC models which are not a theory cannot be compared to any theory, and especially not to the circuit theory.

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