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Reformulation of the Main Equation

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Abstract
The Economic concept of availabilities - different to liquidity - along with that of first- and second-class working capital, appeared in 1916 in the book *Sociedad y Felicidad. Un Ensayo de Mecánica Social* (Society and Happiness. An Essay on Social Mechanics) by the Spaniard Germán Bernácer. These concepts allow for a richer understanding of Economics and, particularly, of the fundamental equation of Macroeconomics: savings equal investment. This article aims to take this historic finding further, moving towards a new formulation of the concepts of availabilities and working capital.

Keywords: first degree availabilities, second degree availabilities, third degree availabilities, investment, financial system, first degree working capital, second degree working capital

Introduction

The existence of third degree net availabilities means non-invested savings and prevents the existence of the savings-investment equality. To this, the first and second degree working capital is added, as required for the balance of new money.

Six years after his book *Sociedad y Felicidad. Un Ensayo de Mecánica Social* (Society and Happiness. An Essay on Social Mechanics) – which lays the foundations of Macroeconomics – was published in 1916, an article by Bernácer was published in 1922: *La Teoría de Las Disponibilidades, Como Interpretación de las Crisis Económicas y del Problema Social* (The Theory of Availabilities, as an Interpretation of Economic Crises and the Social Problem). Availabilities are an income flow, created through production, like all income, and which pass between several economic agents: consumer, producer and capitalist net saver. In contrast, liquidity is the alternative produced in a money portfolio in relation to other financial assets. The movement of money towards becoming part of financial assets, or the settlement of financial assets in money, represent speculative demand for money and money supply.

Availabilities and liquidity are different in nature from one another, as explained in the aforementioned book, published in 1916. In the article published in 1922, particular attention is paid to availabilities in the dynamic sense of a monetary flow – income - and which passes from consumer to producer to capitalist net saver. Consumers and producers' availabilities (i.e., cash in hand) are ephemeral because they are spent on or settled by immediate, urgent questions relating to domestic economic life and business production. Nevertheless, there are surplus economies, which possess savings; in the financial system, they move towards purchasing capital equipment through the financial system. In other words, saving finances investment.

But not entirely; as some surplus saving does not finance investment and frantically finds itself financing second-hand real and financial assets. We will call this net or ultimate availabilities, the importance of which is as huge as it is complex, and which will be expressed using the following lines of argument:

1.- These availabilities buy ghost wealth, or dead wealth; in other words, they do not acquire the production from which they were created. It is not the same as the proportion of savings used to buy capital goods.

2.- The relationship between these availabilities, or cash in motion: D with the market value of the aforementioned assets: V, determine a percentage (i), which is interest rate: $i = D/V$. Not for nothing interest rates are confirmed to be fundamentally born from the money market, especially from speculative demand for money, as Bernácer explained in 1916.

3.- The existence of interest translates to capitalisation costs.

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3.1.- This means that, potentially, only marginal investments: r which exceed interest rate: r>i will be possible.

3.2.- This means a given quantity products will be unsold, the same quality as of second-hand financial and real assets, which we named ghost wealth. Although it may seem strange, the agreed name for this is inventory investment.

4.- The following words by Bernácer (Bernácer, 1945) are a direct introduction to the relationship between liquidity (Keynes), third-degree net availability (Bernácer) and investment:

In my opinion, a liquidity position (he references Keynes' liquidity) *is that of the saver who preserves his/her savings in monetary form, instead of acquiring real goods, and I cannot understand how it is possible to capitalise on savings and, simultaneously, preserve them in liquid form. Keynes sustains that all savings should be capitalised upon, and that this is compatible with preserving a certain state of liquidity; however, in truth, since what is done is done, it is impossible for capitalised savings to remain available, thus implying the possibility of re-capitalising upon or re-consuming them* (1945:285).

In short, we will formulate our fundamental equation by including both availabilities and working capital.

II. The origins of real and monetary saving

Income is created through production and is both a real and monetary variable. Considering that saving is born from income, real and monetary saving also exist.

For ease of analysis, we assume that there is no public sector or import/export activity. Given the personal nature of savings and investment and the object of our exercise - to discover the process and nature of capital - these activities can be viewed as very complex or very simple. The flow of savings comes from many different savers in many countries and, by means of complex financial entities, funds investment, which is varied and multi-faceted in an expanding global network of technological evolution.

The act of generating a production flow requires the cooperation of production factors which receive a monetary flow known as income (Y) for their work. The cost of this production flow is represented by payment of the production factors known as income, which does not encompass all income earned. In addition to the cost of production there is profit, which is a *special* income, from which we obtain the total value of production, which is total income or national income, also known as gross domestic product.

Income results from the product in the same way that production results from the cooperation of production factors. These two flows measured in units of time - income and production - are monetarily equal and share monetary purposes. One acts as direct demand via consumption (C); the other is saved (S). These savings, domestic and foreign, flow into the financial and banking system, where they are used in the form of loans to *final* business borrowers which require them to form and/or obtain capital; we call these transactions investment ($\Delta K = I$).

Hence, savings constitute the instrument used to reward the formation of capital (ΔK) and/or to buy capital.

If *all* income is the monetary equivalent of *all* real production, and given that *all* savings constitute a monetary version of *all* real production, we must accept that savings play a specific role in production,; in other words, the part of production comprising production factors, i.e. capital. Thus, savings are reflected in the production that they generate, i.e. capital or, to be more precise, the flow of capital.

This indicates to us that the primary purpose of saving is capital formation alone, provided that we require an increase in productive capacity accompanied by equilibrium. Our concept of equilibrium is special, since it implies a dynamic equilibrium, meaning that within the period there are successive occurrences of production of supply and demand[1].

III. Destinations of real and monetary saving

Saving is the deliberate act of refraining from consumption and constitutes, until the contrary is claimed, that a proportion of income is neither devoted to production nor to investment. Economic reality determines whether or not savings are transformed into active demand for goods or services, as occurs with production factors.

Saving which is not capitalised is fraud against the community. It is the multiple, rational and intuitive coordination among savers, banks and business which permits anonymous and impersonal savings to be employed in acquiring the part of production which is capital and, in principle, allows for an increase in productive capacity and the overall balance.

The term balance becomes equivocal when we talk about time and events which succeed one another. In a given period current production is generated, thus constituting a fresh supply flow to the market. Saving formation signifies a decision to waive consumption above a certain income level (I – C = S). This is its monetary effect. The practical effect is a proportion of production being left over in the market as a direct consequence of failed generation of demand. Thus, two flows will correspond to two time periods, t-1 and t. We will call these Qt-1 and Qt.

Part of production (Qt-1) was not acquired as a consequence of the decision not to consume. It corresponds to the formation of savings (S) in this period. The other part corresponds to current production within the period (Qt). Generating the latter production, which pertains to the current period t, would have required generating income of the same value, *exactly the same.* This new production, still in producers' hands, is *still called* working capital (WC) and will generate monetarily-equivalent income. In other words, fixed production factors, so-called capital, continue to be working capital insofar as it remains in the hands of *its* producer.

In a static sense (which is most generally used) income has the ability to absorb current production within period t but will refrain from acquiring the production corresponding to the prior period t-1, the latter production having arisen from the formation of savings. Of course, income may absorb the previous production t-1 and still have sufficient surplus to acquire part, but not all, of the present production, with the result that a certain amount of present production remains unsold. This is the static version instituted by Keynes and still used today, which we will amend.

IV. The coupling of money with generated production

Production has two components: volume or number of

products and diversity of production. The term signifies a flow of new production ideally acquired by national income in a dynamic sequence, provided that there are sufficient new monetary means to enable such acquisition.

The cause of these imbalances lies in the funding by means of savings of the new production, the result being that two production flows enter the market: one composed of savings, resulting in a certain amount of goods which are unsold and awaiting buyers, and the other composed of the net formation of this new production in the present period t, using savings within the system as funding. This means that with the investment of these savings new production is generated, corresponding to period t (Qt), to which the *pending* supply arising from the decision to save (Qt-1) is added. This results in two supply flows (made up of t-1 and t) denoted by Qt-1 + Qt, in contrast to a single generation of demand within the period (present demand or PD), which is less than the goods on offer. In other words:

(1) $Qt-1 + Qt > PD = Y$

A dynamic economy which generates production requires new funding, which must come from *outside* the market. In particular, it requires the new money generated within the system to produce new goods and, in particular, to pay new incomes, these being, in fact, new money (Mt). If this new money is not generated, the economy enters into a depression, as we shall see hereafter.

V. The beginnings of production, income and the primary and secondary financial markets

As noted above, savings constitute a part of inactive income and it is economic activity, in the form or production or speculation, which determines the balance between the productive market and the real financial market or the second-hand

financial market, the latter constituting a monetary fantasy which, in practice, 'steals' income.

The law of markets, Say's law, establishes a framework to represent the balance, both in its static form, which represents the present national economy, and its dynamic form: economic events in time.

This law may fail. It works when market demand, which generates income, which in turn proceeds from production, absorbs the production that it caused to occur. It fails when there is hoarding, i.e. when a proportion of income is not spent but saved and those savings are not invested.

In a dynamic sense, as Bernácer stated first in 1916 and again in 1923, and as we have explained over the last ten years, Say's law fails to operate for two reasons:

1.   Due to the presence of available funds comprising savings which are *neither* invested *nor* hoarded. This is the part of income which insistently and instantly demands secondary financial assets and second-hand physical goods. *Neither of these represents current production* and, consequently, both thwart normal market demand for goods and services, causing depressions.

2.   For the reason explained in section four above, whereby depressions occur when savings fund the productive activity of the period concerned.

Consequently, the fundamental law must include both availabilities and the new money generated either by demand or, as the case may be, by the money supply.

The route we will take consists of two steps: first we include availabilities, then new money. Thus, in this second step we have savings (S), net availabilities (A) and new money (M), all on the side of demand, i.e. on the monetary side.

(2) $S + A + M$

This inclusion makes the fundamental equation realistic and is, in fact, essential for determining the balance.

We now turn our attention to the events of supply and to true amounts2.

VI. The three availability flows

In our book The Origins of Macroeconomics, we analyse Bernácer's availabilities and insert them alongside a new version of real and monetary saving in the primary and secondary finance systems.

Availabilities are part of the money which flows from production and are, therefore, income which is preferred or desired, depending on the nature of their holder and the needs that they satisfy. They are not, therefore, an alternative or preference to money, unlike other assets which earn interest. Availabilities are a new concept, derived from Bernácer and one which differs from Keynes's preference for liquidity. Availablities fall into three categories: those of the consumer, those of the producer and those of the speculator. It is the latter which interests us3.

A. Total and net availabilities

It is necessary to provide an explanation of Bernácer's availabilities, which represented one of the most significant advances in economic analysis in 1916 and which the author explained in greater depth in 1923 in the article The Theory *of Availabilities and the Social Problem*, which was read and reviewed very favourably by Robertson in the 1940 publication of *Economics*.

It is a term which appears to correspond to Keynes' 'liquidity' but, in fact, denotes something very different, though equally pertinent to monetary theory. Nowadays, the term continues to be unknown to economists, despite its relevance to economic analysis.

There are two supply and demand markets. One is the conventional market, the other the financial market. On the conventional market we find production, income generation and the sale of consumer and capital goods, i.e. demand for consumer and investment products. The latter item is the demand for capital goods. The national product, and thus national income (Y), is generated on the conventional market.

According to Bernácer, on the financial market *secondary* financial assets are traded, i.e. assets which have *already fulfilled their purpose of converting savings into investment.* Also present in this market are second-hand items, such as real estate and fixed assets. In short, on the secondary financial market no demand or creation of national production or income (Y) is generated, only the *image* or *representation* of wealth.

It should be noted that the money used to speculate on the financial market, i.e. net availabilities (M), proceeds from income (Y), which has been generated on the conventional market and, therefore, constitutes macroeconomic *leakage*, since it does not return to the market in the form of demand for production. It moves from one hand to another but does

not return to the ordinary market. This money (wealth), which operates in continuous, almost perpetual, acts of speculation on the financial markets, is called availabilities. It is available in the sense of being so on the financial and speculative markets in the hands of any economic agent. We also denote these availabilities (there are others) as net or third-degree availabilities. The terms 'net' or 'third degree' are ours, borrowed from Bernácer.

This rising spiral of availabilities is permanently present on the non-productive market. Thus, we can say that they are part of non-capitalised savings, i.e. Sd:

(3) $Y - C - Sk = D$

(4) $Total\ S = Sk + Sd$

(5) $Y - C - D = Sk$

Net disposables (D), attracted by ordinary market profit, which generates income for the period 'R', determine the percentage gain which is interest (i), with V being the quoted value of the disposable items.

(6) $i = R/V$

In other words, given that there is an income flow attracted to the financial market, less income is available on the ordinary market, which is obliged to pay a price: interest (i).

On the other hand, net availabilities compose the part of income in demand for money which is elastic regarding interest rates. The other availabilities are inelastic regarding interest and depend on the income level (Y) and transactions[4].

B. Availabilities of the first order Economic subjects require sufficient earnings to cover their basic needs.
Consumers require them to defray the costs of normal consumption in modern society. These are consumer availabilities.

Producers require income to meet the normal expenses of their productive activity, i.e. salaries and wages, energy, machinery, etc. These are called producer availabilities.

Both of these availabilities are characterised by being present in the market of production and national income (the normal market), heavily dependent on the level of transactions and only mildly affected by interest rates. The life of these availabilities is short, since as soon as they become available they disappear through meeting the inevitable needs of consumers and producers.

Both constitute demand for availabilities for transaction purposes.

This is not the case with net availabilities (A) which, among speculators, despite being assets and circulating intensively, remain altogether available and, consequently, are neither capitalised nor invested.

VII. Complementary real and monetary flows
Within the income circuit there is another circuit which flows in the opposite direction. This is production, comprising two flows: consumer goods and capital goods. Given that capital or, to be more precise, investment is funded by real savings, it is very important to track the both the path and pathology of savings.

It is in this ordinary market that production, along with income, is born. From this come savings (S,) part of which becomes investment (Sk = I) and part of which remains available (Sd = A).

If we acknowledge the existence of total savings, and that a part of these is not invested (Sd = A), we cannot accept a mathematical – let alone a functional – equation which claims that savings equal investment; firstly, because they do not and secondly, because doing so opens the door to serious operative and conceptual errors.

The first of these errors arises from the conventional use of words. If D disposables exist, we must admit the following imbalance:

(7) $S > I$ Given that:
(8) $S = Sd + Sk$

And therefore:

(9) $Sk = I$

This confirms the following imbalance:

(10) $Sk < S$

The problem that we face consists of assuming a functional equivalence between savings and investment, an issue which we will address below. Here, however, we must ask ourselves by what means, by what formal breach of logic, were savings equated with investment?

If we maintain that S > I, and at the same time argue that S = I, this is due to the fact that certain manufactured goods remain unsold for a variety of reasons, voluntary or involuntary. It is not a question of arcane disquisitions on what is voluntary and what not, but of hard facts. The products which remain unsold are incorrectly labelled as inventory investment, Iu.

This mistake arises from calling investment something that is not investment but the exact opposite. The misnomer 'inventory investment' (Iu) is used in companies precisely because there was *no* demand for the products in question.

The second error arises from the nature of the goods. All goods, of whatever kind - an apple, a net, a car factory - are, insofar as they remain in the hands of their producer, working capital (WC) and not final investment.

It appears to us that, as yet, no-one has been able to correctly distinguish between total savings (S) and effective investment (I = Sk), which is, first and foremost, demand. Put another way, no-one has yet been able to outline the difference between savings and genuine investment. Instead, they have violently hammered a piece of the puzzle into place - inventory investment (Iu) - to haphazardly complete the picture[5].

There are, in fact, book-keeping text books which force the issue even more crudely, maintaining that inventory investment is *as if the company had bought the goods from itself*. Briefly put, this is unreal; it is not final market demand.

We turn now to the other part of the equation: net availabilities. These availabilities (A) constitute a reduction in total savings on the left-hand side of the equation and, thus, denote operational saving, i.e. the saving to be invested (Sk).

(11) $S - D = I = Sk$

From this equation we remove inventory investment, as this is not investment.

We have now explained and incorporated net availabilities into the fundamental equation, which is a step forward. Below, we will complete the picture by incorporating the effects of new production and new money.

VIII. The true definition of working capital

Economics- and Business-derived concepts applied to Macroeconomics are crowned by the success of Bernácer's dual working capital concept. There are two types of working capital: first- and second-class, as we will see. In our book *The Origins of Macroeconomics*, we express this alongside availabilities for the first time.

To understand a national economy, it is important to understand corporate economies and to use the appropriate terminology for each item. Of particular importance is the term 'working capital', which is the sum of the added values of an economy within a given time, in other words, national product.

Having completed the monetary analysis of savings (S), the creation of money

(M)   and availabilities (A), we will now analyse the other side of the equation: the real supply of goods and services within the period, represented initially by investment.

Working capital comprises the products made by the company itself, on which it has expended its physical and variable production factors within a given production period. It is important to highlight two items. The first is to understand the nature of this production, which falls into two categories: consumer goods and capital goods. The second is the production period, given that working capital is defined as such only insofar as it does not exceed the company's production period.

Any fixed production item or factor - a hook, a net, an iron foundry… - is working capital insofar as it is physically on the company premises, was manufactured by the company and has not yet been sold. The instant that it *leaves* the factory, as a sale, it becomes a fixed asset of the company which buys it. Quite rightly, in both accounting and corporate economics it is referred to as 'fixed' capital. In the second case, the purchase was achieved using company savings and/or the savings (S) of the overall system and can, thus, be legitimately referred to as investment.

In one way or another, 'working capital' ceases to exist as soon as the sale of the merchandise is confirmed, including fixed capital, in a transaction that we call investment.

In one way or another, working capitalisation ceases when goods, including the fixed capital component, are sold, an operation that we call investment.

This transaction is significant, as it allows us to differentiate between two groups on the other side of the equation. One is investment as such (I=Sk); the other is working capital, (WC), understood as including machinery, which are add-ons in production, i.e. part of the gross domestic product now in hand that, until sold, will be working capital (WC). It constitutes the end purpose of the manufacturing exercise[6].

(12) $I + CC$

IX. A summary of the dynamic integration of real and monetary variables

Now that we understand net availabilities and know that their origin is savings, we must understand the dynamic balances and imbalances in production and earnings, with or without availabilities.

Before rearranging all the monetary and real accounts of the fundamental equation, we must first explain two possible realities: theoretical and real. The first is where there are savings (S) only, without net third-degree availabilities or money in the financial part of the equation (A=0, M=0). The second is where savings (S), availabilities (A) and new money (M) are all present.

On the right-hand side of the equation, there are two possible theoretical and practical possibilities: where investment (I) alone is present and where working capital (WC) is also present.

To this explanation we must add another.

The existence of *solely* total savings may be acknowledged as valid in a given case. However, this does not mean that it must be *always recognised* as the only possible interpretation, a point on which we differ.

On the other side of the equation, it is possible in a given economy that investment alone is present due to a breakdown in the system resulting in no current production, in which case working capital is zero (WC = 0). This is possible. What we cannot accept is that investment, in principle, is the only real variable in the equation, given that, as noted above, where there is production there will be working capital, which is in addition to investment (I + WC).

In the fundamental equation, macroeconomic balance plays no role, as this is a purely functional and economic relationship of different variables, some of which represent money and monetary origin (the left-hand side of the equation), which are different from those which appear on the right-hand side of the equation: investment and working capital.

In the data obtained in practice and in mental experiments, any change to one side of the equation will impact on the other. This is because we are dealing with functional, arithmetical and accounting relationships between monetary variables: S, A, M. Both in the data obtained in reality and in the case of mental exercises, any change on one side of the equation will inevitably result in a change on the other. This is because we are dealing, as noted above, with arithmetic equalities. We will discuss the functional relationships below.

In the following paragraphs we will include, step by step, Bernácer's new variables, which are third-degree and new money net availabilities (A). At the same time, also step by step, we will also add Bernácer's real variables, which constitute working capital and investment. This successive inclusion of new variables into the fundamental equation occurs subsequently to Bernácer's work, where we have been active, particularly from the 1990s onwards.

Lastly, the final equation will be expressed, into which all of the variables enter, both in their quantitative and functional dimensions.

X. Added value and simultaneous payments between companies

It is necessary to distinguish between two facts which, simple as they are, tend to escape common attention: one is

the generation of added values and their subsequent incorporation into the national product; the other is the addition of the sums of these added values, which comprise the Nth sum of said added values and constitute payments between companies and which, in our view, do not constitute national product. To consider the opposite would result in multiple accounting exercises, which we maintain to be a serious error. of all of Bernácer's discoveries, none is simpler or more elementary than his explanation of the different classes of working capital, yet none is more difficult to grasp. Unfortunately, this researcher devoted little time to elucidating this explanation, possibly because he considered it obvious.

In a production sequence, intermediate goods, starting with the original product, accumulate added values until they reach the final product. The first clarification to be noted is that added values simultaneously accumulate *in all* production phases and said production takes place in many different companies. This means that multiple added values must be added at each stage.

To obtain a clearer understanding, let us imagine that the added production processes take place in an imaginary pipe. The pipe is divided into several sections and each section represents an additional production phase. The pipe is always full because all of the sections are working to add productive value. We do not say that there is just one stretch in the first section, which expands until it reaches the end and that as it progresses, the previous sections fall empty[7].

This is always the case and is perfectly logical. We add the value of the fallen tree to that of the shredded tree, arrived at by first freeing the tree and then shredding it. These two values are prior to the value of pulp, of cellulose and of paper. What we are doing is adding each section of the pipe several times and at no time do we claim that these dual or triple sums are added values.

This operation is what all economic treatises correctly warn should not be done. One should not make the mistake of adding the same operation several times. By logic and by definition, national production is the sum of the values of the *end* products, i.e. the total sum of the added values.

Why do we make this apparent mistake? Because we are not estimating total domestic product but the monetary exchanges which take place over the course of the different production stages between companies, which amply exceed the sum of added values.

We have to separate the sum of added value, the monetary value of which comprises the gross national product, from the sum of the payments made simultaneously between companies to manufacture the national product. These are two different operations and concepts. Let us look at other examples. Imagine a series of companies (plurality is crucial here) which process cloth. Some work with basic fibres with a value of 20,000 (million euros). Others, in the same timeframe, spin: work worth 25,000. Others weave this cloth: work worth 15,000, also in the same period. Others tailor, work worth 30,000, all in the same timeframe. Each entity is working *at the same time,* which we emphasise so as to clarify that this is not one company operating over the course of five successive separate periods, but multiple companies working simultaneously.

Let us now turn to the value of the production of added value, which is different from the payments.

Value of fibre……………………………. 20,000

Cost of spinning..……………… 25,000……....45,000

Cost of weaving.……………… 15,000……….60,000

Cost of tailoring.…….………… 30,000……….90,000

Cost of distribution…………. 10,000…..……100,000

100,000

We determine that the cost of these added values is 100,000, which represents national production and national income, undertaken over the course of five periods. Income, which is the same as production, pays for production, in

principle and assuming that there are no incorporated added values. The fact that these are added values over the course of five periods does not mean that they are the total payments between the companies concerned.

The total of payments between companies is the sum of the added values in all the periods added, as seen above, to the previous figure. These values are to be identified in the right-hand column of the following series.

100,000………. Sum paid by the consumers

90,000……….. Sum paid by the distributors

60,000……….. Sum paid by the confectioners

45,000……….. Sum paid by the weavers

20,000……….. Sum paid by the spinners

315.000……….. Total payments

We emphasise the clarification: 315,000 is the value of the payments and not the added value of the final product. Bernácer gave the title of 'first-class circulating capital' to the sum of the added values, which is the same as the national product, with a value of 100,000. And he called the total payments changing hands between companies - which is 315,000, minus the first-class working capital of 100,000 - 'second-class working capital'.

It is worth insisting on the point of total payments, i.e. 315,000. At any given time, all the production processes are under way, so the figures must be added together. This is not the same as the sum in each production phase. Accordingly, in each period the added values amount to 100. The example of the manufactured cloth is explained in the following example:

315,000 …….. total payments

-100,000 ……. first-class working capital or domestic product

215,000 …….. second-class working capital

This division of working capital into first and second classes plays a crucial role with respect to the funding of productive activity and, by derivation, of the fundamental equation[8].

XI. New working capital, new production and the need for new money

Once we understand the ever-mounting payments for added value, i.e. payments between companies, we can appreciate the need for new money to cater for them.

There is a connection, already touched upon in sections three and four, between savings, new money and production formation. We may now call the latter working capital. We now need to know what kind of working capital we are talking about. Bernácer maintains that within the system more money is required than that which exists to satisfy all the payments, 315,000, which is the sum of all the payments due to the first-class producers, 100,000, plus the second-class ones, 215,000. In other words the total of the working capital of the first and second classes is 100,000 + 215,000 = 315,000.

Attention should be paid to the money needed to create new production, from which income, worth 100,000, is derived and also to the simultaneous payments between companies, which total 215,000.

We need to know whether the system is self-supporting, i.e. whether it can operate without having to print more external money, thus adding to the monetary base of the central bank, in order to finance continued production.

XII. Equality of balance between new working capital production and new money

If there is sufficient evidence to show that the new money is satisfying the demands for working capital, we are in a position to establish a balance between physical and monetary magnitudes.

Let us imagine a situation in which there is no money and companies voluntarily decide to fund their current productive activity by means of savings (S). Any formation of working capital implies obtaining and making the payments required for first- and second-class working capital. This is an arithmetic reality.

This activity causes a slump in the market for the following reasons: firstly, it prompts new production and new income equal to it: production = Y. This new production is first-class working capital. Alongside this working capital appears second-class working capital. Before continuing, we should explain that second-class working capital ensures payment but is not new production.

However, given that there was saving (S), there will be production to the value of that saving which weighs on the market and is determined by the supply available in the preceding period (Q_{t-1}), on account of the first- and second-class working capital, which is a flow of supply. The total of this working capital, added to that generated in the existing period (Q_t), manifests itself in the form of two supplies versus only one demand (DA). We saw this in section three.

The only way of financing the economy without having insufficient demand to acquire all production is by creating money. This new money must be of a quantity equal to the total working capital (WC)[9].

As a result, we must add the following balance to the fundamental equation:

(13)   M = WC

XIII. Net or ultimate availabilities and the fundamental equation

If we know what savings are and their final behaviour, and if we are aware of the perverse tendencies of net availabilities, we are in a position to establish the fundamental equation, on the understanding that it is a *partial* equation, since in this section we have not *yet* incorporated second-class working capital.

We will now implement a strategy to build the fundamental equation.

The strategy will consist of dividing the equation into two parts; the first will be explained in this section. It consists of allowing availabilities only to be used. In the second part working capital plus availabilities will be at work.

Bernácer contemplated the inclusion of availabilities (D) in his fundamental equation in 1941 in an article entitled: "Monetary Theory and the Market Equation", published in the review *Anales de Economía* (pp. 36-71) nine years after the publication of Keynes' *General Theory*. In the article he criticises not only Keynes' concept but also his arithmetic.

The fundamental Keynesian equation is expressed as follows:
Income (Y) = the value of production = consumption + capital value (I)
(15)   Savings (S) = income (Y) less consumption
Whence:
(16)   Savings (S) = investment (I)

This equality assumes that in all cases, all economies are necessarily balanced. Furthermore, it disregards availabilities (A) altogether. Another implicit error is to assume that, even supposing availabilities to be nil (A = 0), savings are born already invested. Savings are, in fact, different from the act of investment. Indeed, in many economies savers and investors are different individuals.

The correct expression is:
(17)   Income (Y) = the value of production = the production of consumer articles + the production of capital items = consumption (C) + investment (I) + availabilities (D)

Given that:
(18)   Savings = income (Y) – consumption (C) Showing that:
(19)   Savings = investment + availabilities

The presence of availabilities, i.e. savings invested for speculation purposes in the financial markets (A = (D = Sd)), indicates that not all savings are invested.

This is the first part of the full equation. The second part is given in the following section[10].

XIV. New money, new working capital and the fundamental equation

We have now reviewed the differences between working capitals, which show the difference between money in circulation and new monetary needs for payments between companies: *countless* payments between companies. The

understanding we have gained of this new money allows us to incorporate it into the fundamental equation. In this section, we consider that the new money and net availabilities described in section 13 allow us to restate the fundamental equation in its full dimension.

Working capital is generated within the period, a circumstance which lends realism and dynamism to the fundamental equation. This national production is called first- class working capital. As explained in Section 12, the system requires a greater amount of money to finance itself, given that circulating second-class capital is also present, in addition to the pending supply of goods (period t-1) for the generation of savings. Consequently, we will add the following equation: amount of new money equals the total circulating capital (M = CC). The amount of new money will come from outside the system, providing the monetary base determined by the monetary authority. It should support the financing of real activity, which is investment. The new amount of money must be placed on the left-hand side of the equation, alongside savings, leaving the right-hand side for total circulating capital and availabilities. Thus, the fundamental equation reads as follows:

$$(20) \qquad S + M = I + CC + A$$

To appreciate the role of availabilities we can move the last item of the equation to the left-hand side.

$$(21) \qquad S + M - A = I + CC$$

This equation may be considered complete as it expresses, on the one hand, the dynamism of the system in financing with new money the production of the period and because it acknowledges availabilities, which are savings which have flowed from the ordinary market of production and earnings (Sd). It is, first and foremost, a relationship which explains the function of economic activity.

XV. Symbol nomenclature
Below we give a brief list of symbols, concepts and relationships.

We aimed for greater understanding of the notations employed.

S = total savings within the period. Sk = invested savings. Sd = uninvested savings. Y = national income. D = third-degree availabilities. D = Sd = uninvested savings which compose net availabilities. M = new money or exogenous money or the monetary base. I = investment or capitalisation. CC = total circulating capital, which is the sum of first- and second-class circulating capital. Circulating capital is financed with new money11.

XVI. Formal and conceptual information
The foundations of Macroeconomics, especially availabilities and both types of working capital, are the work of Germán Bernácer in his book Sociedad y Felicidad. Un Ensayo de Mecánica Social (Society and Happiness. An Essay on Social Mechanics) (1916) and his article entitled The Theory of Availability, as an Interpretation of Economic Crises and the Social Problem (1922). In this study, we will carry out three versions of the fundamental equation: two partial and one definitive. The first includes net or ultimate availabilities and excludes working capital. The second includes working capital and

excludes net or ultimate availabilities. These two approximations are justified by pedagogical analytical reasons. The third involves both net or ultimate availabilities and working capital. The result is a complete and satisfactory version of the fundamental equation, different to traditional equality between saving and investment.

Notes
Not all domestic spending is equivalent to domestic product or domestic income. At least, not always. The merchandise which a company fails to sell is called, erroneously, inventory investment. Investment is an economic event that presupposes, over and above all other considerations, an act of demand, in this case demand for capital. What is the reason for this error? The reason is that we have not worked out what to do with the card missing from the pack: non-capitalised income. Bernácer has the whole pack in his hand: net availabilities.

Conditions of budgetary balance do not guarantee full employment. Not even a balance between monetary mass and money supply guarantees full employment. Nor does a balance between the supply of speculative money and total financial assets.

The sole condition for balance is that savings equal investments. In reality, this is not a condition for balance in the non-Bernácerian economy but a fatal reality which continually occurs in modern economies.

The passing of time and the advances achieved in macro-economic knowledge have surpassed this researcher's discoveries. We refer to modern studies of national and international markets. There are concepts such as circulating capital and availabilities which constitute incorporations of Bernácer's thoughts and our own.

Availabilities are those parts of the money supply which flow from production and thus constitute earnings which are preferred or desired, depending on the nature of their owner and the needs that they satisfy. We should always use total generation of national income (now denoted by the letter Y) as a starting point. It is from here that savings which would represent total availability arise, along with third-degree availabilities.

On the side of outlay, i.e. on the other side of the equation, two realities are possible: one is that only investment (I) exists and the other is where there is also circulating capital (CC). For there to be circulating capital, it is a requirement that time and the demand of business be taken into account. For as long as a businessperson fails to acquire a machine, this is part of circulating capital.

This new money created must be of a magnitude equal to circulating capital (CC). Bernácer's dynamic refers to the production within the period and the creation of new money to finance the demand for this production.

Bibliography
Comment
The two groups of publications to which we refer to are those of Germán Bernácer Tormo and José Villacís González, comprised by books and articles.

We take the view that including additional bibliographical material would confuse the reader, given the number of similar macroeconomic terms both nowadays and in Bernácer's era.

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