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## THE COMPLETE EQUATION, SAVINGS EQUALS INVESTMENT

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### ABSTRACT

Before publication of Keynes' General Theory of Employment, Interest and Money in 1936, Germán Bernácer had discovered both third-degree net availables and second-class working capital two decades earlier in 1916, neither of which has yet been incorporated in today's economics. This work undertakes the task, which results in a significant change to the fundamental equation: savings equals investment.

To facilitate analysis we separate the process into three phases: the first introduces new availables or net availables of the third degree. The second adds second-degree working capital and the new money required to fund it. In the third we reach the final equation, the result of the two previous phases.

**Keywords:** income, production, net availables, second-degree working capital, savings, investment, static, dynamic.

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## 1. INTRODUCTION

Income arises from production and is numerically identical but different in kind. Whether an economy is complex or primitive, savings are required to pay for the fixed factors of production, i.e., capital, the funding of which is called investment. Given that earnings equal production, this investment may be funded by means of two dynamic components in a two-way economy: consumption and investment. The latter is a sequence of means of intermediate production resulting finally in the finished goods.

Savings and investment are two different activities in a money-based economy. In fact, even in a non-monetary economy, a "Robinson Crusoe economy", differences are observable.

The fact that they are different activities does not mean that they are numerically different. In fact, this numerical identity is a condition of the balance of an economy as revealed by Germán Bernácer in 1916 in his book *Society and Felicity* and confirmed subsequently by John Maynard Keynes in 1936 in his publication *The General Theory of Employment, Interest and Money*, the analysis that was first recognised and accepted at an international level. The difference is that Bernácer's definition results in a different point of equilibrium, thus affecting the equation "savings equal investment"<sup>1</sup>.

At times directly and at others, more commonly, indirectly, via the worldwide financial market, savings connect with investment. This connection is represented by the dual integrated activity whereby savings serve to fund the formation of fixed capital and/or the purchase of fixed capital, two activities called investment. Investment is in essence a form of demand and if there is no demand, in this case for fixed capital, there is no investment.

It is an equally a fact that income is equal to the monetary value of production and arises out of production, as it is that savings proceed from earnings, and that there is a part of savings that is not invested, which we call net availables or third-degree availables. These net availables race frantically around the world funding speculative assets that are not current production but sterile assets in terms of real production.

Savings (S) arise out of income (Y) and both have a monetary basis. Capital, i.e. the factors of fixed production (K), has a material existence – tangible in the majority of cases. The condition of balance requires that savings equal investment.

In the period under consideration events occur that impinge on our equation: one is the formation of production and the other is represented by the money required to fund this new production.

For the balance to be maintained it is necessary that part of that money be created. The two events represented monetarily, new production and new money must conform to the equation  $S=I$ .

Taking all these economic events into account, whether or not a balance exists, allowance must be made for net availables, new production and new money, to be incorporated in savings and investment<sup>2</sup>.

The reasoning behind this article is that of Bernácer whereas the conclusions are my own, derived from him. Time and the progress in economic theory have enabled us to advance beyond the discoveries of this groundbreaking researcher.

## 2. INCOME AND THE SOURCE OF SAVINGS

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 the exercise, to discover the process and nature of capital, these activities can be seen as very complex or very simple. The flow of savings comes from many savers in many countries and, by means of complex financial entities, funds investment, which is varied and multi-faceted in an expanding world network of technological evolution.

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<sup>1</sup> The similarities between Bernácer's availables and Keynes' liquidity are easy to confuse. They are different concepts, a circumstance that has a significant bearing on the conception in modern economics of monetary demand, especially the demand for speculative money.

<sup>2</sup> Bernácer stressed, after the 1940s, particularly in 1955 in his book *A Crisis-Free Economy Without Unemployment*, that income and production coexist and though numerically equal are in fact *different* things and actions.

The act of generating a production flow requires the cooperation of factors of production that receive for their work a monetary flow known as income (Y). The cost of this production flow is represented by payment of the factors of production known as income, which does not encompass all the 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 the factors of production. These two flows measured in units of time, income and production, are monetarily equal and share monetary purposes. One is to act 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 that require them to form capital and/or obtain capital, transactions that we call investment ( $\Delta K = I$ ).

Hence, savings constitute the instrument used to reward the formation of capital, ( $\Delta K$ ), 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 have to accept that savings play a specific role in production, i.e., in that part of production comprising the factors of the production, i.e., capital. Thus, savings are reflected in the production they generate, i.e., capital or, to be more precise, the flow of capital.

These words indicate to us that the primary purpose of savings is the formation of capital and that alone, provided what we require is an increase in productive capacity accompanied by equilibrium. Our concept of equilibrium is special, given that it implies a dynamic equilibrium, which means that within the period there are successive events of production of supply and demand<sup>3</sup>.

### 3. THE USES OF SAVINGS

An act of saving is a deliberate act of refraining from consuming and constitutes, until someone claims the contrary, that part of income that is not devoted to either production or investment. Economic reality determines whether or not savings are transformed into active demand for goods or services as the factors of production are.

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

The term balance becomes equivocal when we talk about time and events that succeed one another. In a given period current production is generated, thus constituting a fresh flow of supply to the market. The formation of savings signifies a decision to waive consumption above a certain level of income ( $I - C = S$ ). That is its monetary effect. The practical effect is a quantity of production that is left over in the marketplace as a direct consequence of failing to generate demand. Thus, there will be two flows corresponding to two time periods, t-1 and t. We will call them  $Q_{t-1}$  and  $Q_t$ .

Part of production ( $Q_{t-1}$ ) was not acquired as a consequence of the decision not to consume. It corresponds to the formation of savings (S) in the period. The other part corresponds to the current production within the period ( $Q_t$ ). Generating the latter production, that pertaining to the current period t, would have required generating an income of the same value, *exactly the same*. This new production still in the hands of the producers is *still called* working capital (WC) and will generate an income that is monetarily equivalent. To put it another way: the fixed factors of production, the so-called capital, remains working capital insofar as it remains in the hands of *its* producer.

In a static sense, which is the sense generally used, income has the capacity to absorb current production within the 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 of the present production, but not all, with the result that a certain amount of present production remains unsold. This is the static version that Keynes instituted and is still used today, and which we will amend.

### 4. THE MONETARY ORIGIN OF NEW PRODUCTION

Production has two components: one is volume or number of products; the other is the diversity of production. The term signifies a flow of new production that ideally is acquired by national income in a dynamic sequence, provided there are sufficient new monetary means to enable such acquisition.

The cause of these imbalances lies in financing by means of savings of the new production, with the result that two production flows enter the market: one made up of savings, which resulted in an amount of goods unsold and awaiting buyers, and the other by the net formation of this new production in the present period t using as finance the savings within the system. This means that with the investment of these savings new production is generated, which corresponds to the period t ( $Q_t$ ), to which is added the *pending* supply arising from the decision to save ( $Q_{t-1}$ ). This results in two flows of supply (made up of t-1 and t) denoted by  $Q_{t-1} + Q_t$ , in contrast to a single generation of demand within the period (present demand or PD) that is less than the goods on offer. In other words,  $Q_{t-1} + Q_t > PD = Y$ .

<sup>3</sup> If income arises from production and savings are a part of income, the equivalent of savings is an item of capital equipment. Bernácer lays special emphasis on the key idea that one thing is an accumulation of capital and another the formation of capital as market demand. One should never say that the amount of goods held by companies constitutes an investment.

A dynamic economy that generates production requires new finance, which has to 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 ( $M_i$ ). If this new money is not generated the economy enters a depression, as we shall see hereafter.

## 5. THE ROOTS OF THE SYSTEM OF PRODUCTION AND INCOME; THE SYSTEM OF PRODUCTION AND INCOME ; AND THE SECONDARY FINANCIAL AND REAL SYSTEMS.

As noted above, savings constitute a part of inactive income and it is economic activity, in the form of production or speculation, which determines the balance between the productive market and the real financial market or the second-hand financial market, this last constituting a monetary fantasy that 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 in 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 part 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 that are *neither* invested *nor* hoarded. This is the part of income that demands insistently and instantly secondary financial assets and second-hand physical goods. *Neither of these represents current production* and, consequently, they 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 finance the productive activity of the period concerned.

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

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

$$S + A + M (1)$$

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 the true amounts<sup>4</sup>.

## 6. INCOME FLOWS AND AVAILABLES

Availables are part of the money that flows from production and are, therefore, an income that is preferred or desired depending on the character of their holder and on the needs they satisfy. They are not, therefore, an alternative or preference for money as opposed to other assets that earn interest. Availables is a new concept, derived from Bernácer, which differs from Keynes’s preference for liquidity. Availables fall into three categories: those of the consumer, those of the producer and those of the speculator. It is this last category that interests us<sup>5</sup>.

### 6.1. Total and net availables

It is necessary to provide an explanation of Bernácer’s availables, that 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 Availables and the Social Problem”, that was read and reviewed very favourably by Robertson in the publication *Economics* for the year 1940.

It is a term that appears to correspond to Keynes’ “liquidity” but in fact denotes something very different, though equally pertinent to monetary theory. Today, the term remains unknown to economists despite its relevance to economic analysis.

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

For Bernácer, the financial market is the market on which *secondary* financial assets are traded, i.e. assets that have *already completed their purpose of converting savings into investment*. Also present on this market are second-hand items

<sup>4</sup> Bernácer’s monetary critique of Say’s Law is based on net availables of the third degree, i.e., on the part of savings that is not invested and that as a result races furiously around the secondary financial market.

<sup>5</sup> For purposes of clarity we refer to speculative availables as “net availables”. They are the flow of net income that enters speculation. The availables of consumers and producers refer to what Keynes calls “transactional availables”.

such as real estate, fixed assets, etc. 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 availables (M), proceeds from income (Y) that was generated on the conventional market and therefore constitutes a macroeconomic *leakage*, as 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) that operates in continuous, almost perpetual, acts of speculation on the financial markets, is called availables. It is available in the sense that it is available on the financial and speculative markets in the hands of any economic agent. We denote these availables (there are others) also as net or third-degree availables. The terms “net” or “third degree” are ours, borrowed from Bernácer.

This rising spiral of availables is permanently present on the non-productive market. Thus we can say that they form part of the savings that are not capitalised, i.e.:  $S_d$ :

$$Y - C - S_k = D \quad (2)$$

$$S \text{ total} = S_k + S_d \quad (3)$$

$$Y - C - D = S_k \quad (4)$$

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

$$i = R/V \quad (5)$$

In other words, given that there is a flow of income 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 availables form the part of income in the demand for money that is elastic with respect to interest rates. The other availables are inelastic with respect to interest and depend on the level of income (Y) and on transactions<sup>6</sup>.

## 6.2. Availables of the first order.

Economic subjects require earnings sufficient to cover their basic needs. Consumers require them to defray the costs of normal consumption in a modern society. These are the availables of the consumer.

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

Both these availables are characterised by the fact that they are present in the market of production and national income – the normal market – are heavily dependent on the level of transactions and only mildly affected by the rate of interest. The life of these availables is short, given that as soon as they become available they disappear to meet the inevitable needs of consumers and producers.

Both constitute demand for availables for purposes of transaction.

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

## 7. THE DYNAMICS OF UNINVESTED SAVINGS AND IMBALANCE

Within the income circuit there is another circuit that 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 path and the pathology of savings.

It is in this ordinary market in which production, and with it income, is born. From it come savings (S) part of which goes to investment ( $S_k = I$ ) and part remains available ( $S_d = A$ ).

If we admit the existence of total savings and that a part of these is not invested ( $S_d = A$ ), we cannot accept a mathematical – far less a functional – equation that claims savings equal investment; in the first place because they do not and, secondly, because doing so opens the door to grave operative and conceptual errors.

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

$$S > I \quad (6)$$

Given that:

$$S = S_d + S_k \quad (7)$$

And therefore:

$$S_k = I \quad (8)$$

<sup>6</sup> The Keynesian model of monetary demand fails to recognise the significance of the fact that the money required for purposes of speculation depresses the market for goods and services given that it pursues artificial wealth.

This confirms the following imbalance:

$$S_k < S \quad (9)$$

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

If we hold that  $S > I$  and at the same time argue that  $S = I$ , it is due to the fact that certain goods manufactured 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 that remain unsold are incorrectly labelled as inventory investment,  $I_u$ .

The mistake arises from calling investment something that is not an investment but its precise opposite. The misnomer “inventory investment” ( $I_u$ ) is used in companies precisely because there was *no* demand for the products in question.

The second error arises from the nature of the good. 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), not final investment.

It appears to us that as yet no one has been able to distinguish correctly between total savings ( $S$ ) and effective investment ( $I = S_k$ ), which is, first and foremost, demand. Put another way, no one has yet been able to mark the difference between savings and genuine investment. Instead, they have violently hammered a piece of the puzzle into place, that piece being inventory investment ( $I_u$ ), in order to complete the picture, willy nilly<sup>7</sup>.

There are, in fact, bookkeeping text books that force the issue even more crudely, saying that an inventory investment is *as if the company had bought the goods from itself*. In short, this is unreal; it is not final market demand.

We turn now to the other side of the equation, net availables. These availables ( $A$ ) constitute a reduction in total savings on the left-hand side of the equation and thus denote the operational saving, i.e., the saving that will be invested ( $S_k$ ).

$$S - D = I = S_k \quad (10)$$

From this equation we remove the inventory investment as this is not an investment.

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

## 8. NATURE AND FORMATION OF WORKING CAPITAL

To understand a national economy it is important to understand corporate economies and use the appropriate term 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 availables ( $A$ ), we now look at the other side of the equation: the real supply of goods and services within the period, represented initially by the investment.

Working capital comprises the products made by the company itself, on which it has expended its physical and variable factors of production 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 has not exceeded the period of production of the company.

Any item or factor of fixed production: a hook, a net, an iron foundry, etc., is working capital insofar as it is physically on the premises of the company, was made by the company and has not yet been sold. The instant 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 called “fixed” capital. In the second case, the purchase was achieved using the savings of the company and/or the savings ( $S$ ) of the overall system, and can thus be legitimately referred to as an investment.

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

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

This transaction is significant as it allows us to differentiate two groups on the other side of the equation. One is investment as such ( $I=S_k$ ); the other is working capital, (WC), understood as including the 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<sup>8</sup>.

$$I + CC \quad (11)$$

<sup>7</sup> The investment is significant because: 1. It is in essence demand. 2. They are fixed factors of production. 3. For as long as the item of capital remains in the hands of the producer and is not delivered to the customer, it is working capital. In Bernácer’s analysis this detail alters the entire picture.

<sup>8</sup> Within the period production takes place and is known as working capital, whatever its nature, including capital goods. This increase in the period CC gives the fundamental equation a dynamic category.

## 9. THE PROVISIONAL MONETARY SYNTHESIS

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

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 availables or money in the financial part of the equation ( $A=0$ ,  $M=0$ ). The second is where savings (S), availables (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) only is present; and where working capital (WC) is also present.

To this explanation we must add another.

That there should be *solely* total savings may be admitted as a valid statement in a given case. But this does not mean that it must be *admitted always* 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 admit 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 that is in addition to the investment ( $I + WC$ ).

In the fundamental equation the macroeconomic balance plays no role, as this is a purely functional and economic relation of different variables, some of which represent money and monetary origin (the left-hand side of the equation), that are different from those that 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 impinge on the other side. This is because we are dealing with functional, arithmetical and accounting relations among monetary variables, S, M, 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 due to the fact that we are dealing, as noted above, with arithmetic equalities. The functional relations we will discuss below.

In the paragraphs that follow we will include, step by step, the new variables of Bernácer, which are net availables (A) of the third degree and the new money. And, at the same time, also step by step, we shall add the real variables of Bernácer, which make up working capital and investment. This succession of including new variables in the fundamental equation happens subsequent to the work of Bernácer, where we have been active, particularly as from the 1990s.

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

## 10. DYNAMIC TREATMENT OF CIRCULATING CAPITAL AND ITS CLASSES

It is necessary to draw a distinction between two facts that, simple as they are, tend to escape common attention: one is the generation of added values and their subsequent incorporation in the national product. The other is the addition of the sums of these added values that comprise the Nth sum of said added values and constitute payments among companies and which in our view do not constitute national product. To consider that they do, would result in multiple accounting exercises, which we hold to be a grave error.

Of all the discoveries of Bernácer, none is simpler or more elementary than his explanation of the different classes of working capital, and none is more difficult to grasp. Unfortunately, this researcher devoted little time elucidating the explanation, possibly because he considered it obvious.

In a sequence of production, the intermediate goods, starting with the original product, accumulate added values until they reach the final product. The first clarification that should be noted is that added values accumulate simultaneously *in all* the phases of production and that said production takes place in many different companies. This means that multiple added values have to 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 implies an additional phase of production. The pipe is always full because all the sections are working on adding 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<sup>9</sup>.

This is always the case and is perfectly logical. We add the value of the fallen tree to the value of the shredded tree, arrived at by first freeing the tree and then shredding it. These two values are prior to the value of the pulp, the value of the cellulose and the value of the 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 several times the same operation. 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.

<sup>9</sup> This concept of Bernácer's of working capital is somewhat at odds with intuitive logic. Perhaps this explanation will help: one thing is the volume of added values, i.e., production; another is the sum of the sums comprising the payments the companies make among themselves. We hold that these last are payments, not added value.

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

We have to separate the sum of the added value, whose monetary value comprises the gross national product, from the sum of the payments that are made simultaneously among companies to manufacture the national product. They are two different operations and two different concepts. Let us look at other examples. Imagine a series of companies (the plurality is crucial) that process cloth. Some work with basic fibres having a value of 20,000 (million euros). Others, in the same timeframe, spin; work worth 25,000. Others weave the 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 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 value added, which is different from the payments.

Value of the fibre.....	20,000	
Cost of the spinning.....	25,000	45,000
Cost of the weaving.....	15,000	60,000
Cost of the tailoring.....	30,000	90,000
Cost of distribution.....	10,000	100,000
	-----	
		100.000

We determine that the cost of the added values is 100,000, which represents national production and national income, undertaken in the course of five periods. The income, which is the same as the production, pays for the production, in principle and assuming there are no added values incorporated. That these are the added values in the course of five periods does not mean that these are the total payments among the companies concerned.

The total of payments among companies is the sum of the added values in all the periods added, as we have just seen, 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
<hr/>	
315.000.....	Total payments

We underline the clarification: 315,000 is the value of the payments. It is not the added value of the final product. Bernácer gave the title of circulating capital of the first class to the sum of the added values, which is the same as the national product, having a value of 100,000. And he called second-class working capital the total payments changing hands among the companies, which is 315,000 less the first-class working capital of 100,000.

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

315,000 .....	total payments
-100,000 .....	working capital of the first class or domestic product
<hr/>	
215,000 .....	working capital of the second class

This division of working capital into first and second class plays a crucial role with respect to the funding of productive activity and, by derivation, of the fundamental equation<sup>10</sup>.

<sup>10</sup> In my book *The Origins of Macroeconomics* there is a glossary of Bernácer’s terms that will help the reader conceptualise what only appears complex.

## 11. NEEDS FOR NEW MONEY TO FINANCE WORKING CAPITAL

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

There is a connection, already touched on in sections three and four, between savings, new money and the formation of production. This last we may now call working capital. What we now need to know is what kind of working capital we are talking about. Bernácer says that within the system more money is required than exists to satisfy all the payments, 315,000, which is the sum of all the payments due to the producers of the first class, 100,000, plus those of the second class, 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 drawn to the money needed to create the new production, from which derives the income, worth 100,000, and also the simultaneous payments among the companies, which total 215,000.

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

## 12. THE BALANCE BETWEEN NEW MONEY AND WORKING CAPITAL

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: the first is that it prompts new production and new income equal to it: production = Y. This new production is working capital of the first class. Alongside this working capital appears working capital of the second class. Before going on, we should explain that working capital of the second class ensures payment but is not new production.

However, given that there was a saving (S), there will be production to the value of that saving that weighs on the market and is determined by the supply available in the preceding period ( $Q_{t-1}$ ), on account of the working capital of the first and second class, 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). This we saw in section three.

The only way of financing the economy without having insufficient demand to acquire all production, is to create money. This new money must be of an amount equal to the total working capital (WC)<sup>11</sup>.

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

$$M = WC \quad (12)$$

## 13. THE DIFFERENCE BETWEEN SAVINGS AND AVAILIBILITIES IN THE FUNDAMENTAL EQUATION

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

We now implement a strategy to construct the fundamental equation.

The strategy will consist in dividing the equation into two parts: the first is the one we explain in this section. It consists of allowing availables only to be used. In the second part working capital plus availabilites will be at work.

Bernácer contemplated the inclusion of availables (D) in his fundamental equation in the year 1941 in an article entitled: "Monetary Theory and the Market Equation", published in the review *Anales de Economía* (pp. 36-71) nine years after 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:

$$\text{Income (Y)} = \text{the value of production} = \text{consumption} + \text{capital value (I)}$$

$$\text{Savings (S)} = \text{income (Y)} \text{ less consumption}$$

Whence:

$$\text{Savings (S)} = \text{investment (I)} \quad (13)$$

This equality assumes that in all cases, all economies are necessarily in balance. Furthermore, it disregards availabilites (A) altogether. Another implicit error is to assume that, even supposing availables to be nil ( $A = 0$ ), it assumes that savings are

<sup>11</sup> Bernácer always believed in fiduciary money based entirely on credence for purposes of funding production. Despite writing in 1916, he had no faith in the gold standard.

born already invested. Savings are in fact different from the act of investing. Indeed, in many economies savers and investors are different persons.

The correct expression is:

Income (Y) = the value of production = the production of consumer articles + the production of capital items = consumption (C) + investment (I) + availables (D).

Given that:

Savings = income (Y) – consumption (C)

Showing that:

Savings = investment + availables (14)

The presence of availables, i.e., savings invested for purposes of speculation in the financial markets ( $A = (D = S_d)$ ) 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<sup>12</sup>.

#### 14. DIFFERENCES BETWEEN CIRCULATING CAPITAL AND MONEY

We have now reviewed the differences between working capitals, which show the difference between money in circulation and new monetary needs for payments among companies: *countless* payments among companies. The understanding we have gained of this new money allows us to incorporate it in the fundamental equation. In this section we consider that the new money and the 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 that lends realism and dynamism to the fundamental equation. This national production is called working capital of the first class. As explained in Section 12, the system requires a greater amount of money to finance itself, given that circulating capital of the second class is also present, plus, in addition, the supply of goods pending (period t-1) for the generation of savings. In consequence 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:

$$S + M = I + CC + A \quad (15)$$

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

$$S + M - A = I + CC \quad (16)$$

This equation may be considered complete as it expresses on 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 that have flowed from the ordinary market of production and earnings ( $S_d$ ). It is, first and foremost, a relation that explains the function of economic activity.

#### 15. LIST OF SYMBOLS

Below we give a brief list of the symbols, concepts and relations.

We set out for greater understanding the notations employed.

S = total savings within the period.  $S_k$  = invested savings.  $S_d$  = uninvested savings. Y = national income. D = availabilities of the third degree.  $D = S_d$  = uninvested savings that make up 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 money<sup>13</sup>.

#### 16. CONCLUSION

The findings of Germán Bernácer with respect to the financial system are to be found in his book, *Society and Happiness, or an Essay in Social Mechanics*, published in 1916, together with other books and articles, including details on the dynamic sequence of real production: real investment, real capital. Bernácer's version of the fundamental equation, savings equal investment, was wrong. We add to it net availabilities of the third degree, excluding those of the first and second degree. We also incorporate the difference between second-degree and first-degree circulating capital.

<sup>12</sup> Bernácer succeeded in incorporating availabilities in the fundamental equation. The other inclusions, i.e., new money, working capital and net or third-degree availabilities, are our own. They are detailed in *The Origin of Macroeconomics*, New York. LID Publishing, 2010.

<sup>13</sup> In *The Origin of Macroeconomics* there is a glossary of Bernácer's symbols. This was a complex matter requiring considerable research, which explains why I have reduced it to the present shorter list.

The discovery of macroeconomics by Germán Bernácer signified a major change in the fundamental equation, Savings equal Investment,  $S = I$ . Availabilities will mean an equally important review of that equation, given that they constitute a part of savings that is not invested.

New production, until the period ends and insofar as its definitive purpose is not defined, is working capital. It is even fixed capital in the hands of a producer. Working capital of the first class is part of gross domestic product and occupies a monetary mass larger than this if we take into account working capital of the second class. If the savings are devoted to production, twice the production on offer will be achieved: that of the former period (t-1) and that of the present period (t). This will generate an imbalance that only the creation of new money can solve. This second part and part of the first part are our contributions to the findings of Bernácer.

## NOTES

Not all domestic spending is equivalent to domestic product or domestic income. At least, not always. The merchandise that 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 that is missing from the pack: income that is not capitalised. 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 the 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-bernacerian economy but a fatal reality that occurs continually in modern economies.

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

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

*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 the businessman fails to acquire the machine, this forms part of circulating capital.*

*This new money created must be of a magnitude to equal 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 we refer to are those of Germán Bernácer Tormo and José Villacís González, each divided into two groups: books and articles.

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

### Publications:

Bernácer Tormo, Germán

- *Sociedad y Felicidad. Un Ensayo de Mecánica Social.* Madrid. Editorial Beltrán. 1916.
- *Interés del Capital.* Alicante. Edición Lucentum. 1925.
- *La Doctrina Funcional del Dinero.* Madrid. Consejo Superior de Investigaciones Científicas. 1945.
- *Una Economía Libre sin Crisis y sin Paro.* Madrid. Editorial Aguilar. 1955.

### Articles

“La Teoría de las disponibilidades, como explicación de la Crisis y del Problema Social”. *Revista Nacional de Economía.* Madrid, Barcelona. 1923.

- “Análisis de la Demanda y Síntesis del Mercado”, *Revista Nacional de Economía.* Madrid, Barcelona. 1933.
- “Etiología de la Crisis”. *Revista Economía Española.* Madrid. 1934.
- “La Teoría del Mercado Financiero”. *Revista Española de Economía.* Madrid. 1935.
- “La Teoría Monetaria y la Ecuación de Mercado”. *Revista Española de Economía.* 1941.
- “La Ecuación de Mercado en el Mundo Mercantilista”. *Anales de Economía.* 1943.

- “La Ecuación Monetaria de una Economía Capitalista”. *Anales de Economía*. 1944.

Villacís González, José.

Books

“*La Teoría de las Disponibilidades, el Interés y el Dinero*”, Madrid. Editorial Universitas. 2009.

“*The Origin of Macroeconomics*” Madrid. Lid Editorial. 2010.

Articles:

- “Companies Prefer Liquidity”. *Business Review*. Cambridge, volume 3, number 2. 2005.
- “Monetary Policy as Company Guiding Principle”, *The Business Review*, Cambridge, volume 3, number 2, pp. 64-68, 2005.
- “Production and Macroeconomic Equilibrium”. *The Business Review*, Cambridge, volume 3, number 2, pp 335-340, 2005.
- “The Dynamic and Full Significance of Macroeconomics’ Main Equation”. *The Journal of the American Academy of Business*, Cambridge, volume 12, number 2, March 2008.
- “*La Teoría de las Disponibilidades, el Interés y el Dinero*”. Madrid, Editorial Universitas, 2009.