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A model for a Representational Theory of Capital[1]

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Resumen

Una vez que se expresó la idea sobre la representación en el lado abstracto de la economía del capital en el lado real de la economía, el propósito de este documento, es ofrecer un modelo formal, en donde, consiste la "teoría representativa del capital". De esta manera, la idea de que los instrumentos financieros son títulos de propiedad que representan reclamaciones sobre bienes reales, es de sentido común si se considera a nivel microeconómico, sin embargo, este concepto de representación sirve también, para fomentar una comprensión a nivel macroeconómico.

Palabras clave: capital, modelo, estructura, representación, derechos de propiedad.

Clasificación JEL: G1, G10, K00, E6, E60.

Abstract

Once the idea about the representation in the abstract side of the economy of capital in the real side of the economy was stated, the purpose of this paper is to offer a formal model of what this "representational theory of capital" consists in. In a way, the idea that financial instruments are

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property titles representing claims over real goods is a commonsensical one if considered at microeconomic level; however, I argue that such concept of representation serves to foster our understanding at a macroeconomic level as well. Such claim, to my knowledge, is a novel one.

Keywords: capital, model, structure, representation, property rights.

JEL classification: G1, G10, K00, E6, E60.

Introduction

With this paper, the purpose is to offer a formal model of what this "representational theory of capital" consists in.

In a way, the idea that financial instruments are property titles representing claims over real goods is a commonsensical one if considered at microeconomic level; however, I argue that such concept of representation serves to foster our understanding at a macroeconomic level as well. Such claim, to my knowledge, is a novel one.

In any case, the purpose of having a model is to have testable predictions about the hypotheses advanced in theory. For reasons explained elsewhere, I am skeptical that the degree of simplification necessary to design a manageable model will allow the use of the model to make predictions about future events; though, I am not skeptical about the possibility of using the model to test the theory using historical data. Something, it is hoped, others will be tempted to do.

This formal statement should not in any way be construed as a final product, but as a suggestion for a departing point for further developments in capital theory. It resembles the system of national accounts which, if it is to be tested, naturally, most of the data will come from; but it is also distinguished from that in many aspects, not the least, its narrower purpose.

My understanding is that this model is compatible with Robert Solow's basic model of economic growth (Solow, 1956), from which it also differ in important aspects as it will be seen below.

As stated by Larry White (Hayek, 2014: xxxii) it was with Solow and others that neoclassical economics found again interest in the problems of intertemporal efficient allocation of resources, after the emphasis on consumption brought about by Keynesian economics. The simplicity of their models though, pass over some essential aspects of capital theory, like the heterogenous nature of capital, to mention just one.

Although I do not think that the representational theory of capital and its model as presented below are incompatible with neoclassical simplified models like the ones of Harrod and Domar (Boianovsky, 2018), something that is possible to perceive once revisiting the "Cambridge capital theory controversies" (Harcourt, 1969), I see it as a development in the tradition of Austrian Economics as exposed by Lachmann (1956), Garrison (2016),

and Huerta de Soto (2006); and related to recent works done by Horwitz (1996, 2009), Levin (1996), Cachanosky (2014, 2016), Hendrikson and Salter (2015), Lewis (2018), Howden (2011, 2014), Braun (2016, 2017), and Endres (2011, 2014) in that tradition. But also, the representational theory deals with some of the same questions as authors interested in economic sociology such as Smithin (2002, 2018) and others, old (Hahn, 1949, 2015) and new (Bortis, 2016).

The paper is divided in six parts, first, this introduction, second, an exposition of the model, third, a description of the classification of goods in the real side of the economy, fourth, a description of property rights and other claims in the abstract side of the economy, fifth, financial instruments are detailed, and sixth, the conclusion.

The Model

In nature, all living beings have as their ultimate goal to survive and procreate. In order to fulfill their *telos*, they interact with both the animate and the inanimate word. Interactions of living beings with the inanimate world, which do not concern other living beings, do not concern us here either. Interactions which do concern other living beings may be adversarial or cooperative according to the particular way in which each specie has evolved and to the circumstances in which each individual finds itself. Be that as it may, there is a moment in each interaction between a living being and the world, in which the individual takes possession of something required for his survival or procreation. Such possession may be of no consequence for other animate beings, such as when an animal breathes; it may not only be of consequence but also adversarial, such as when a plant grows in front of another in order to get better sunlight, or it can be of consequence but cooperative, as in any symbiotic relation.

I do not intend to argue that there is a moral sentiment among irrational beings or that the fact that a lion has killed its prey grants it some "right" in the minds of surrounding hyenas; but the fact that the lion will be willing to fight for the carcass of its prey is part of the same natural order that evolved in a way that most birds make their own nests instead of cuckooing, and most carnivores do their own hunting,or scavenging, instead of stealing.

Whatever other values human beings may hold, they will not be hold for long if they do not survive and procreate like any other living being; and for that, like the irrational beings, humans need to interact with the world.

Because human beings live in particular forms of societies, in political societies, different from the social organizations driven by instincts of insects, for instance, an important part of the rules for their interactions are social constructs; they have evolved by trial and error inside human societies as a consequence of the interactions themselves.

Because of the foresight that their rational faculties allow, once human beings were able to produce and accumulate goods necessary for the fulfilling of their values, they envisaged a way to secure their possessions minimizing aggressive interactions with other human beings; and like Hume (1987), we will call this security of possession as property rights.

The basic notion of property rights on planet Earth where there is only one specie of rational beings is that everything that exists in the world (**Wt**) is either property of someone human (**Pr**)[3] or a *res nullius*, i.e., a property of no one (**Rn**); and we may enunciate this basic notion as follows:

Wt = Pr + Rn

It is from this basic enunciation, after some elaboration, that I intend to derive a model of a representational theory of capital[4].

The Real side

Relevant things that pertain to human beings may be either part of the material world (**Wm**) or social constructs, part of the intellectual world (**Wi**). So, we can say that everything that either has a material existence or exists only in our imagination belongs either to someone or to anyone; and we may enunciate that as:

Wt = Wm + Wi

and

Wm + Wi = Pr + Rn

[3] I am familiar with jurist Karel Vasak's three generation theory of rights (Vasak, 1977) and the attempts to create even a fourth "generation," which would not belong to human beings. To the extent that a river is not a sentient being and a monkey is not a rational being and does not understand what the concept of rights means, all rights continue to belong solely to human beings and continue to do exclusively with the ways, more or less successful as they may be, to avoid conflict among them.

[4] The representational theory of capital is a claim that bundles of goods and processes put to productive use in the real world are represented by different forms of property rights, among them financial instruments; it is therefore a "property rights' theory of capital" and in this sense, it may be understood as based on the same legal commonsensical assumptions used by Jacques Rueff to explain monetary inflation in Social Order (Rueff, 1964: 97) with which, also, it shares many of its conclusions.

Obviously, there are almost infinite categories in which we may divide the things that exist in this world, and since our concern is with the representation of capital, I should move as fast as I can in that direction.

The original factors of production were classically classified as land and labor. In a more modern nomenclature, we may classify the factors of production as either natural resources (**Nr**) or as human capital (**Kh**).

Human capital is basically knowledge (**Khk**) and dexterity (**Khd**), i.e., respectively, the knowledge of what and how to do and the actual capacity of doing things.

From the original factors of production, and aside from natural resources (**Nr**) along the evolution of human societies, some utensils, useful tools and processes for production were conceived, produced and stored, and I will call them either equipment, that is, technical capital (**Kt**) or intellectual capital (**Ki**).

Although things may change categories as human beings become aware of things they did not know that existed or new uses they did not know were possible, generally speaking we may classify things among the ones known (**Kn**) and unknown (**Ku**) to man, things with economic value (**Eg**), things with no economic value (**En**), and among the things with economic value, we may sub-categorize things as consumer goods (**Cg**) and capital goods (**Kg**).

So, now we have a multi-dimensional matrix of things that are known and unknown to man, that have material or immaterial existence, that may or may not have economic value, and among the ones that have economic value, that may serve for human beings to satisfy their final needs as consumer goods or things that may serve human beings as instruments for the production of further goods, that is, capital goods.

I think that a simple illustration may help the reader to visualize the many combinations in which factors of production may be classified. I do not think, though, that an exhaustive listing of the possible permutations serves the purpose of this paper.

So, just for the sake of exemplification, I will enunciate that from all things that exist (**Wt**), there are some we know they exist (**Kn**) and other things we do not (**Ku**), among the things we know that exist, some are consumer goods (**Cg**), others are instruments for the production of final goods, that is, capital goods (**Kg**). Among the capital goods, some have physical existence (**Kp**) others are immaterial (**Ki**). Among the ones which have physical existence, some are just

natural resources (**Nr**), others are pieces of equipment, stocks and inventories of intermediary goods that we have referred to above as technical capital (**Kt**); still others are that part of human capital that represents the capacity to actually do things, which we have called human dexterity (**Khd**). In regard to the immaterial capital, we may find the knowledge already ingrained in social interactions, in processes, for the lack of a better term, let's call that human social capital (**Khs**) and the one inside each individual as the part of human capital we have called knowledge (**Khk**). There is a part of human capital that is in part a capacity of doing things; in part a skill of becoming aware of the surrounding environment, and in part, it is the knowledge of particular circumstances about which someone becomes aware of. Such entrepreneurial capacity I will also classify as immaterial, as part of the human capital, divided respectively in knowledge of particular circumstances (**Khc**) and entrepreneurial skills (**Khe**).

Wt = Kn + Ku

Kn = Cg + Kg

Kg = Kp + Ki

Kp = Nr + Kt + Khd

Ki = Khs + Khk + Khc + Khe

In my attempt to describe reality, I have classified things we know that exist (**Kn**) into consumer goods (**Cg**) or capital goods (**Kg**). Such differentiation is almost never of this absolute nature according to which something is either "A" or non "A." I am not talking here about the fact that some good may both be a capital good while part of the inventory of a retailer and become a consumer good after checked out by a final consumer, such differences in representation of actual goods will be discussed at length when we move to the abstract side of the economy.

The differentiation I am talking here is about the degree in which some goods are more obviously used as final consumer goods, others not so much, and others very rarely, if ever.

So, there is a continuum of the predominant use (***f***), at any given moment, in which, for the sake of a static classification of what exist, we are forced to draw a line establishing a threshold between what we consider a consumer good (**Cg**) and what we consider a capital good (**Kg**); and yet, the known goods may serve different purposes. The existence of such continuum may be stated as follows:

***f*: (Cg,Kg)**

Among the goods with economic value (**Eg**), as said above, we may classify them either as capital goods (**Kg**) or consumer goods (**Cg**). Even acknowledging the permutations that may happen between them, it is reasonable to show different goods as having different degrees of "capitalness" (see figure 1 below), in analogy with the concept of "moneyness" that serves to define money as an "adjective" and not as a "noun."

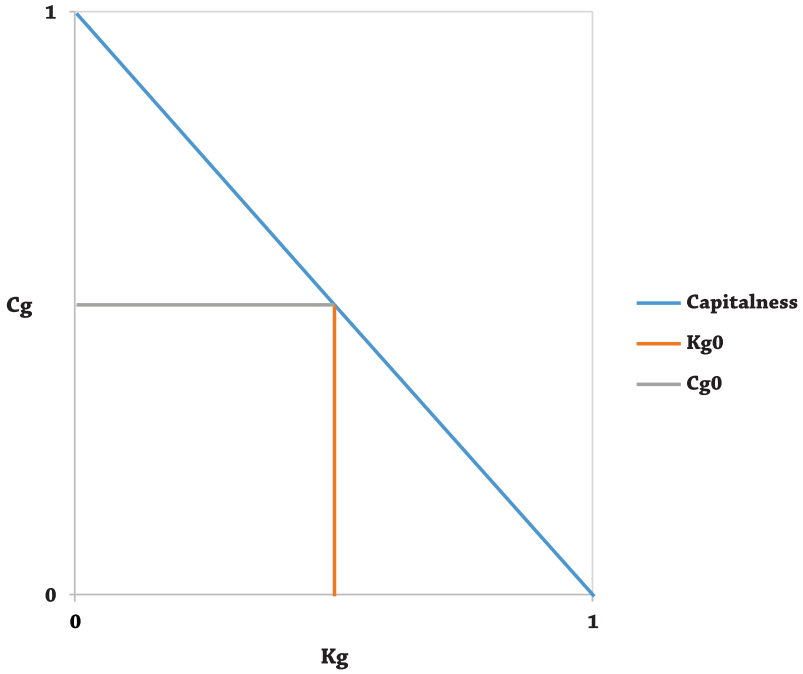

FIGURE 1. Predominant use (*f*) of given goods

Font: own elaboration.

Still in regard to the cut-off line separating what at any given time is considered capital goods and what may be considered consumer goods, although we cannot draw that line other than arbitrarily, the rationale for such classification is given by subjective evaluation of the economic agents about the profitable prospects of having some goods and not others applied to productive processes. In Lachmann's words:

> "Something is capital because the market, the consensus of entrepreneurial minds, regards it as capableof yielding an income". (Lachmann, 56: xv)

So, the direction of the trend (***f***) towards a more evident classification of some goods as capital goods is a consequence of a greater convinction among

"entrepreneurial minds" about those profits' possibilities, what leads them to apply those goods predominantly as intermediary goods. Suppose a baker, for example, how much of the bread he bakes serves for the consumption of his family and how much does he keep as inventory for sale in his bakery? Once a day has passed and some of the bread in the inventory has not been sold, he may decide to give it to charity since the possibility of making a profit with what remained of yesterday's bread has disappeared.

The same idea of a continuum between consumer goods and capital goods may be applied to the different levels of "permutability" among different capital goods. The idea here is that there are capital goods that are more "malleable" to different uses (**Kgm**) while others are much more specific for certain uses (**Kgr**). Again, as a function of their greater or smaller malleability (***m***), the existing capital goods may be classified along a continuum whose formal statement may be the following:

***m*: (Kgm,Kgr)**

A final formulation in regard to actual capital goods (**Kg**) is that they are heterogeneous. By the way, that is already implicit in the previous statement that they have different degrees of malleability; or even more clearly in the claim above that the stock of capital is composed by some goods with physical existence and others which are immaterial. In any case, the proper way to describe more precisely the stock of capital in existence in a given society is to consider such stock of capital (**Kg**) as composed by the sum of many different items whose formulation may be the following:

Σ Kg: (Kg1, Kg2, Kgn)

For the purposes of the model, I will continue to describe the stock of capital (**Kg**) as if it were composed by homogeneous elements with economic value (**Eg**) whose sum is a known amount[5]. To the extent that the irrealism of such assumption is kept in our mind, it serves for didactic purposes; to the extent that one falls for the temptation of taking any figure as representative of the stock of capital really in existence in a given society, he will soon find himself in error.

[5] This simplyfing assumption is similar to the one in Solow's basic model in which there is just one commodity in the economy, and the stock of capital is a sum of some of that commodity (Solow, 1956: 66). Furthermore, following Jones and Vollrath (Jones & Vollrath, 2013: 20), for pedagogical purposes, it is usefult to think in it in terms of units of the gross domestic product (GDP).

The Abstract side

All these categories and combinations have happened so far on the side of things that are the object of property rights; we may begin now to develop a deeper understanding about the other side of the equation.

As already stated above, all things in the world (**Wt**) either belong to someone (**Pr**) or to no one (**Rn**).

Wt = Pr + Rn

Among the things that belong to someone, they may be private property of some individual or group of individuals (**Pp**), or they may belong to some political association (**Pg**).

Pr = Pp + Pg

Among the things owned by individuals, they may be individual property (**Ppi**) or property owned in some form of co-ownership, i.e., in *condominium*, such as a share in a social club or in a business enterprise (**Ppc**).

Pp = Ppi + Ppc

For the purposes of the static model, all the things owned by individuals (**Pp**) are considered equity claims, while fixed income obligations, or "debts" (**D**), regardless of being financial instruments or not, are considered as derivatives of the equity claims.

There are many categories in which the total of credit in the economy (**D**) may be classified and depending on the purposes which the model is applied for, this total may be broken down in more or less detail; for instance, in private (**Dp**) and public debt (**Dg**). Public debt may be understood as a derivative of the government's prerogative of taxation as we will see below.

According to the traditional classification of things owned by political entities (**Pg**) in continental systems of law, those goods may be things for common use, such as a park or a road with open access for most practical purposes (**Pgc**), things assigned to a specific purpose, such as a military base or a public school, in which, entrance is conditioned to the public service performed in the premises (**Pgs**), and things that, despite belonging to the public, they supposedly serve as a source of revenue to the fisc, such as offshore mineral rights (**Pgf**)[6].

[6] See, for example, the Brazilian Civil Code, Article 98, 2002.

For the purposes of the model, aside from public property held for fiscal reasons, I will define the fiscal prerogatives of the government (**Pgp**) respectively to raise taxes (**Pgpt**) and to regulate money (**Pgpm**) as kinds of "property claims;" therefore, the complete categorization of government's "property" will be:

Pg = Pgc + Pgs + Pgf + Pgp

and

Pgp = Pgpt + Pgpm

Since property rights are bundles of more specific rights and a long time ago human societies learned how to unbundle them, they may come in many different combinations, such as the rights to the ownership of some good separated from the right to the income it may generate (such as with usufructuary rigths), the rights to the benefits from the property separated from the fiduciary responsibility to manage the property on behalf of the beneficiary (such as in a trust), etcetera. For the purposes of this model, except for the sovereign's prerogatives which have a more complexform,we will assume property rights as a single bundle, composed of the rights to dispose of the thing and to the possession of the thing itself, that is, to its use and to its fruits, only limited by local ordinances regarding public health and the obligation to pay taxes to fund the provision of public goods.

Because the access to the possession of actual goods in the world (**Wt**) granted by the Sovereign's prerogatives (**Pgp**) are essentially a function of claims on part of the private property rights owned by others (**Pp**), this derivative nature of the prerogatives of government requires a further elaboration in order for us to make a formal statement about them.

For the purposes of the model, I will assume that the exercise of the sovereign's prerogatives of taxing and of regulating money has an impact on the private property claims held over things that exist in the world as a simple discount at a defined tax rate (**tr**) and at certain time intervals (**n, n+1, ...**).

Such tax rate (**tr**) is not necessarily the same as the rate of return (**rr**) in the economy. The tax rate is a political decision while the rate of return in the economy (**rr**) is a brute fact; and, in the model, we define it as net of depreciation but still before taxes, and it may be understood as the difference between the total of property claims (**Pp**) at the inicial moment (**n**) and the total of property claims (**Pp**) at a second moment (**n+1**).

rr = Pp1/Pp0

To the extent that the model is presented as static, there is a given amount of the property claims that belongs to the government.

To the extent that the model is presented as dynamic, property claims in the following moment (**n+1**) will reflect a transference of property by the same tax rate of discount (**tr**) from the distribution of property claims that existed in the initial moment of the analysis (**n**).

For the sake of simplification, it is assumed in the model that only private property (**Pp**) generates economic growth, the rate of return of the entire economy (**rr**) is defined as a function of private property (**Pp**); such simplification means assuming that all governamental property owned for the purpose of generating income (**Pgf**) has a return of zero in the model.

For the purposes of a dynamic model, the notation of the present value of the future stream of revenues of all titles of fixed income in the model (**D**) should correspond to a first derivative of the property rights directly exercised over certain goods and productive procedures in the real side of the the economy; while the government's prerogatives to raise taxes would be also a competitive claim on that, and, therefore, another first derivative of those rights, or a second derivative of those rights, in case that the taxing powers are used to tax fixed income.

In the same way, the public debt, to the extent that it is also a derivative of the the taxing prerogatives of government, may be either a second derivative of property rights over things in the real side of the economy or a third derivative of them, in case they are serviced by taxes over fixed income. For the purposes of the formal model, taxes on equity instruments (that is, on property rights claims over real goods - **Pp**) may be equated to taxes over the goods and productive processes in the real side of the economy directly (**Kn**), since in the model, by definition, taxes have as object the property claims and not the goods themselves. In the model, I have opted to consider taxation as applicable to private property claims (**Pp**) on all known goods (**Kn**) and not only on capital goods (**Kg**); that was an arbitrary decision and serves to highlight that taxation may be an instrument to expropriate unproductive assets. However, the reason for considering tax revenues as derivatives is mainly to emphasize their character, dependent on the existence of actual wealth being produced in the long run; and also, for the purposes of a dynamic model, to avoid double counting of the same stream of revenues once income of some productive activity is transferred to pay equity investors or fixed income creditors financing that operation and such financial income is taxed and the product of those taxes used to service the public debt.

What I will present next is an illustration of what could be a dynamic model.

The illustration is made with the following three figures. First, on figure 2 below, the evolution of the stock of capital (Kg) over time is stated. The stock of capital is assumed to be known at the beginning of the time period (n= 0) and although it is shown in the figure as sufficiently homogeneous to be quantifiable, it is worth once more to remember the heterogeneous nature of all its components as stated above.

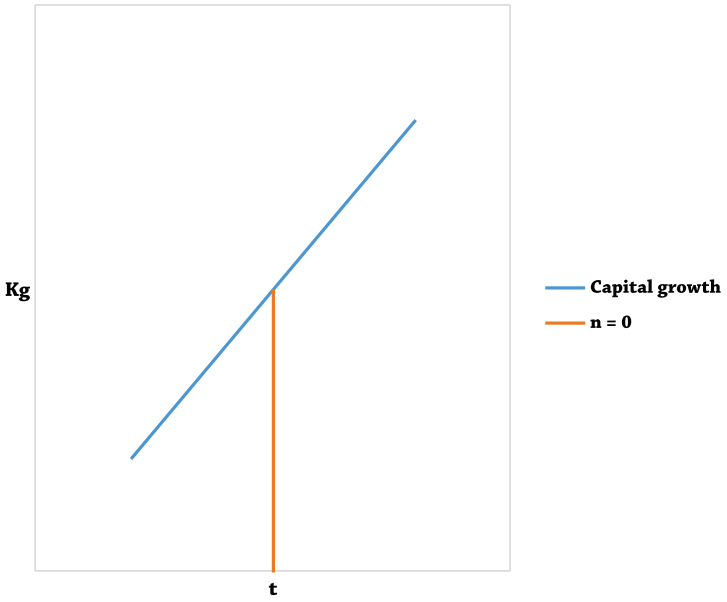

FIGURE 2. Evolution of stock of capital (Kg) over time

Font: own elaboration.

Next, on figure 3 it is illustrated that for a given stock of capital (Kg0) at the beginning of the time period (n= 0) a given amount of goods with economic value is produced (Eg0). This simple counterpoint is meant to shown the inequivocal relation between the two variables; and the curve Eg is shown as growing at a decresing rate based on the usual hypothesis that the productivity of the production factors decreases over time[7].

[7] It is noted here that beginning with "the 'paradox' of saving" (Hayek, 2008: 152) Hayek calls attention to the static nature of the assumption that new capital will not increase productivity; here simply is not the place to dispute the usual form of presenting the evolution of production.

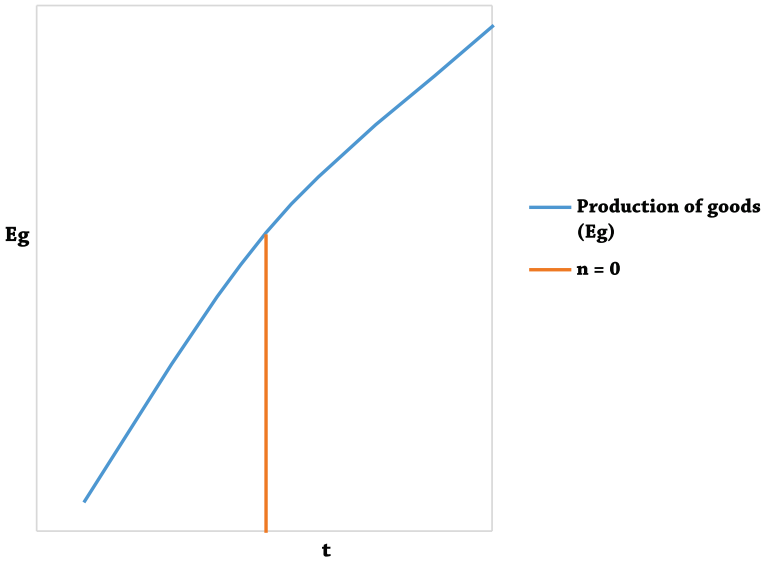

FIGURE 3. Evolution of production of goods with economic value (Eg)

Font: own elaboration.

Finally, on figure 4 it is illustrated the simple relation between the gross productivity of capital, the general rate of return in the economy (rr) with the rate of return for the investors (rr*(1-tr) also departing from the beginning of the same time period (n= 0) and assuming the rate of growth of property claims both gross and net as composed of quantifiable elements.

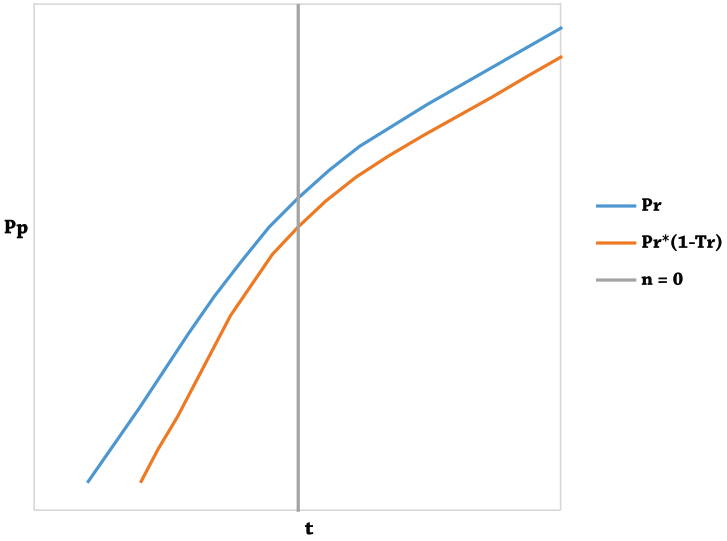

FIGURE 4. Evolution of return in the economy (rr) and net return for investors (rr*(1-tr))

Font: own elaboration.

I don't think it is necessary to illustrate that here, but the illustration of the dynamic model, of course, may be made more complex. For instance, it is possible to conceive a dynamic model where it is also considered a net variation (after depreciation) at a given rate of return (**rr**) in the amount of property claims by private individuals (**Pp1**) is distributed to equity investors (**Pp0-D**) and fixed income creditors (**D0**), it is taxed (**Pgpt**) at the given tax rate (**tr**), and some of the taxes used to service a given stock of public debt (**Dg0**), which varies at the natural interest rate in the economy, which is the same than the net growth in the stock of capital in the economy (**rr**), for the purposes of the model.

In continuation, and in regard to the classification of the property rights in the abstract side of the economy, we may have the following elements:

Wt = (Ppi+Ppc) + (Pgc+Pgs+Pgf+[Pgpt+Pgpm]) + Rn

Financial instruments

Next, and always keeping in mind our aim at developing a formal model for the representational theory of capital, let's define what financial instruments are.

Financial instruments (**Ppcf**), for the purposes of the model, are defined as a kind of private property held in common (**Ppc**) which, for their properties of liquidity and certainty, are traded in financial markets. As explained in the previous article, this is not a circular argument, instruments traded in financial market acquire greater liquidity and certainty, but in order to be accepted in those more organized markets, the instruments should have intrinsic features making them congenial to be traded in financial markets. Therefore, different from other forms of private property held in common which are traded in less structured markets (**Ppcn**); then:

Ppc = Ppcn + Ppcf

And, the complete classification of the elements in the abstract side of the economy is:

Wt = (Ppi + [Ppcn+<u>Ppcf</u>]) + Pgc+Pgs+Pgf+[Pgpt+Pgpm] + Rn

And that is to say that all things in the world, material and immaterial, known or unknown, with economic value or not, suitable to final consumption or to be used as intermediary goods, including human capital, if they are not public

property, or the property of no one, they are either (i) the private property of some individual or (ii) common property of some group of individuals, and in this case, their property claims may be represented by illiquid instruments or by relatively more liquid instruments, when then, they are considered financial instruments.

In regard to public property, some are of common use of the people, others are designated to some special uses and others are simply held by some political entity with the purpose of getting income, as any private owner would do; also, I have classified as "public property" the prerogatives of the government of taxing its subjects and of pursuing political goals with the provision and regulation of money. Finally, there are things in the world that do not belong to anyone.

The reader may have noticed that financial instruments privately issued (**Ppcf**), therefore, are just one among the many forms that property claims may have. An additional sub-classification to keep in mind is that some privately issued financial instruments, liquid as they are, do not have monetary properties (**Ppcfn**), while others may have monetary properties and therefore they may be considered as money substitutes (**Ppcfm**). Be that as it may, they are not money proper.

Ppcf = Ppcfn + Ppcfm

However, there are two other forms of financial instruments which are issued by some political entities with some level of sovereign prerogatives: - public debt and money. Those financial instruments, for the purposes of the static model, may be considered sub-categories of the fiscal prerogatives of taxing and the monetary ones respectively.

In the static model, where the titles in the abstract side of the economy correspond to claims over goods in the real side of the economy, the prerogatives of taxation (**Pgpt**) are equivalent to the stock of public debt in a broad sense (**Dg**); and it may be sub-categorized as unfunded (**Pgptu**) or they may be consolidated in financial instruments representative of the public debt (**Pgptd**).

Pgpt = Dg

Such identity, of course, does not hold true in the dynamic model, as seen above, where the exercise of the prerogatives of taxation at a given rate determines

the stock of public debt which may be reasonably served and therefore able to keep its nominal value.

Back to the static statement, in the same way that the prerogatives of taxation have sub-categories, the monetary prerogatives of government (**Pgpm**) may be divided in diffuse powers to exercise financial repression and the like (**Pgpmd**) and be represented by money proper (**Pgpmp**); then:

Pgp = (Pgptu+Pgptd) + (Pgpmd + Pgpmp)

While only the public debt (**Pgptd**) and money proper (**Pgpmp**) are financial instruments, among the titles issued by the government, only the former are traded in capital markets.

So far we have discussed the two sides of the equation, the side of natural and social reality and the abstract side in which those realities are represented by property claims. I have noted that among the real things (both material and immaterial, both social and natural), there are some that may be used as intermediary goods for enhancing the production of other goods; and those we call capital goods (**Kg**). I have also noted that, among the many different property claims, there are some that are considered financial instruments due to their properties of certainty and liquidity, added to the fact that they are generally transacted in more organized markets, that is, capital markets. Notable exceptions to the general categorization of financial instruments as claims traded in capital markets are money proper and money substitutes; although they are the quintessential financial instruments (due to their properties), they are also traded outside financial markets, since they are the counterpart of almost every transaction but barter transactions.

The relation between capital goods and financial instruments

Having settled these premises, we are ready now to discuss a particular relation among things in the real side and in the abstract side of the equation of property representation; that is, how capital goods relate to financial instruments.

Because many capital goods (**Kg**) are not represented by financial instruments (**Ppcf**) but by other forms of property claims and some financial instruments are representative of malinvestments in which the capital invested was actually destroyed, there is no necessary identity between those two terms, that is:

Kg ≠Ppcf

The amount of money proper (**Pgpmp**) and money substitutes (**Ppcfm**) have a relation with the amount of liquidity that the economic agents want to keep at any given time. That is, the intersubjective preference for cash balances is a function of natural and social circumstances in the real side of the economy; and such preference has as its main elements the level of uncertainty about the future, the structure of production, the existence of profitable opportunities for the banks to create money substitutes, and the opportunity cost of the economic agents of holding cash (being these last two determined mainly by the interest rate).

The relation between the amount of liquid assets the economic agents would like to hold has a relation to the structure of production to the extent that more predictable expenditures, either in time or in their object, would require less cash balances by the economic agents than otherwise[8]. The structure of production, that is the sum of all capital goods (**Kg**), for analytical purposes may be divided in fixed capital (**Kf**) and working capital (**Kw**) according to the relative mobility that they may have in relation to the different processes of production which they may be applied to. But since not everything money can buy is relate to production and therefore not every reason why economic agents need to have cash balances has to do with production, it is another mistake to equate the amount of working capital (**Kw**) in the real structure of production, that is the sum of inventories of goods and the funds required to compensate the human capital required for production with the amount of money proper and money substitutes in existence at any given time; clearly all the working capital is held in the form of monetary instruments, but the amount of monetary instruments is higher than the stock of working capital in the real side of the economy:

$$\mathbf{Kg = Kw + Kf}$$

$$\mathbf{Kw < Pgpmp + Ppcfm}$$

Being the amount of cash balances (**Pgpmp+Ppcfm**) correspondent to how much the economic agents want to keep at their disposal to buy things in the real economy that they are not certain of what, when, and where they may want to buy, and being those things, mostly in the inventory of some business or other; these things are part of what I have defined as working capital (**Kw**). The consequence of that is that at any given time the liquidity in the abstract

[8] See Chapter 6 in Laidler (1993: 62).

side of the economy, that is the stock of the most liquid claims over goods in the real side of the economy is higher than the inventory of goods available for purchase and this balance is kept only by preference for holding liquidity in the economy; which by its turn is determined by the above mentioned factors such as the interest rate and the impredictability of expenses in the regular course of business, among others. Yet, there is a proportion about the inventories and liquidity; and the "depth" of its financial markets serves as a proxy for the economic strength of a society which corresponds in fact to the stock of goods and services available in the real side of its economy.

Conclusión

To conclude this first formal statement of the representative theory of capital, it is important to highlight the difference that exists between the stock of capital in the economy (**Kg**) and the nominal sum of all financial instruments privately issued (**Ppcf**). A substantial part of that difference is a consequence of the fact that the stock of capital is represented by property claims (**Pp**) from which many are not financial instruments. However, other important component of such a difference is that the holder of claims issued by the sovereign (**Pgp**), being that instruments of public debt, money proper, or others, may not correspond to the capacity of the real sector of the economy to produce the goods necessary to make good those claims without frustrating other expectations as explained by Rueff with his theory of "false rights" (Rueff, 1964: 129)[9]. In other words, to the extent that property claims correspond to goods in the real side of the economy they represent, some of the claims issued by the sovereign may be "not-representatives" (that is, they are "false rights" in Rueff's terminology) in the sense that they do not correspond to real wealth, but wealth that was already destroyed or extremely difficult to extract or produce.

[9] In Social Order, Rueff distinguishes the deficit in the public budget between cash flow problems and problems of net worth. In the case of the latter, the only way for some creditors to being paid is for them to accept instead of real wealth the "false credits" attributed to them in the budgetary process: – "En este caso, el valor actual de los créditos fiscales que proporciona al Tesoro la adquisición de una riqueza determinada es inferior al volumen del derecho que esta adquisición inscribe en su pasivo. Hasta el completo pago de la diferencia hacen su aparición falsos derechos" (page 129). Rueff has alreaday explained also that the mechanisms in private law to assure the rights of third parties limit the opportunities to the creation of "false" rights in the private domain; contrariwise, in the public domain, the structure of rights is different, and without the right to forced liquidation of public wealth, for example, claims against the state may easily become "false" claims (page 142).

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