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Capitalism in Medieval Europe: Did accounting boost the genuine capitalist spirit?

Capitalismo na Europa Medieval: a contabilidade impulsionou o genuíno espírito capitalista?

El capitalismo en la Europa Medieval: ¿impulsó la contabilidad el auténtico espíritu capitalista?

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Abstract
The purpose of this theoretical essay is to analyze whether accounting genuinely boosted medieval European capitalist practice through the double-entry method. The study is centered on the thirteenth to eighteenth centuries, with a return to antiquity. The historical-dialectic was adopted. Then, the inferences were made from Sombart's thesis (double entry bookkeeping). By contrast, Yamey disputes that position. On the other hand, Sanandaji's position is that capitalism was not born in medieval Europe but in antiquity. The evidence was founded in Guanzi, Arthaśāstra and Ciropedia. Mattessich, on the other hand, reveals the presence of principle of duality (kind of double entry bookkeeping) responsible for recording the business transactions of that time. The reflections found are that the evidence suggests that accounting contributed as much to medieval capitalist practice in Europe as to the ancient world.
Keywords: Capitalism; Double-Entry; Medieval Europe; Accounting

Resumo
O propósito deste ensaio teórico é analisar se a contabilidade impulsionou, de forma *genuína,* a prática capitalista europeia medieval por meio do método da dupla entrada. O estudo centra-se entre os séculos XIII a XVIII, com retorno à Antiguidade. O método é dialético-historial como exame dos fatos. As inferências foram feitas a partir da tese de Sombart, cuja ideia é de que o capitalismo europeu medieval só foi possível por causa da contabilidade de dupla entrada. Em contrapartida, Yamey contesta essa posição. De outra parte, para Sanandaji, o capitalismo não nasceu na Europa medieval, mas na Antiguidade. Este ensaio detectou evidências em *Guanzi*, *Arthaśāstra* e *Ciropédia*, ao apontarem marcas do capitalismo no mundo antigo. Mattessich revela que, no mundo antigo, já existia o princípio da *dualidade,* responsável pelo registro das transações negociais daquela época. As reflexões alcançadas sugerem afirmar que a contabilidade contribuiu tanto para a prática capitalista medieval na Europa quanto para o mundo antigo. Tais evidências insinuam a ausência de um espírito europeu *genuíno* tanto para o método contábil quanto para o capitalismo, na medida em que os elementos, pretensamente, genuínos foram trazidos da Ásia e do Oriente, como: a aritmética comercial e as regras de escrituração contábil.
Palavras-chave: Capitalismo; Partida-dobrada; Europa Medieval; Contabilidade

Resumen
El propósito de este ensayo teórico es analizar si la contabilidad ha impulsado la práctica capitalista europea medieval a través del método de partida doble, de una manera *genuina*. El estudio comprendió entre los siglos XIII y XVIII, con un retorno a la antigüedad. Se adoptó como examen de los hechos el método historial-dialéctico. Las inferencias se hicieron a partir de la tesis de Sombart (presencia de la partida doble). Por otro lado, Yamey cuestiona esta posición. Además, la posición de Sanandaji es que el capitalismo nació no en la Europa medieval, sino en la antigüedad. Detectó se evidencias en *Guanzi*, *Arthaśāstra* y *Ciropédia*. Mattessich, por otro lado, revela la presencia de la partida doble en el mundo antiguo (principio de *dualidad*).

Las reflexiones son que la evidencia lleva a afirmar que la contabilidad contribuyó tanto a la práctica capitalista medieval en Europa como al mundo antiguo.
Palabras clave: Capitalismo; Partida doble; Europa medieval; Contabilidad

1 Introduction

The purpose of this theoretical essay is to analyze whether accounting contributed to medieval capitalist practice in Europe. This is relevant to understand how deep the roots of current accounting are, whose accounting/capitalism dependence relationship has intensified over time. The objective is to seek historical and theoretical elements that corroborate the idea that accounting has been one of the pillars that make the idea of capitalism possible as a means of accumulating individual wealth. It is unlikely that accounting can be dissociated from capitalism. Both contributed, in the course of history, to the process of formation of capital as personal wealth (profit).

To achieve the purpose of the essay, the dialectical historical logic was adopted as an instrument for conducting the analysis of ideas and history. This means revisiting Antiquity, the High Middle Ages, the Renaissance, the beginning of the mercantilist period and the rise of the double-entry method. In order to be able to infer on accounting contributions with relative reasonableness, it is necessary to consider, throughout the historical process, some relevant assumptions.

First: these environments (Antiquity, High Middle Ages, Renaissance and Mercantilism) in which capitalism may have flourished are enveloped in different cultures, at different times, and this, in itself, creates distinct historical elements; second: for the purposes of delimiting the essay, it is necessary to consider that medieval commercial capitalism has different characteristics from modern capitalism (Netherlands, England) (Reinert & Fredona, 2017) and is very different from industrial capitalism (Bryer, 2000), although they are consistent in essence (profit as an end result); third: the incision made by different techniques in different periods can reveal the distinctions or similarities of these periods, having as reference capitalism and accounting. This essay confines itself to medieval capitalism and modern capitalism, considering them to be similar or evolving processes.

The return to the past will take place through the (dialectic) opposition between the idea defended by Sombart (1902), that accounting made capitalism in medieval Europe possible, and that counter-argued by Yamey (1949, 1964, 2004), that the common man of the Middle Ages, in fact, did not have enough knowledge to apply the double entry, so its accounting was done only with the use of the single entry. Another hypothesis considered is that accounting based on double-entry departure predates medieval Europe (Schmandt-Besserat, 1996; Mattessich, 1995, 2000; Nigam, 1986; Singhvi, 1995; Filios, 1984; Zaid, 2000; Jacobsen, 2000; Jacobsen, 1964; Sy & Tinker, 2006) and may have contributed to the development of free market capitalism in ancient peoples (Sanandaji, 2018).

Some guiding reflections for this essay can be raised: did accounting, in the medieval period, contribute to the emergence of the genuine European capitalist “spirit”? Did accounting play a similar role both in free market capitalism practiced in medieval Europe and in that of ancient peoples (East, Asia and Mesoamerica)? The discussion in this essay is given by the presence of accounting in the ancient world and in medieval Europe, providing the analysis of the emergence of the capitalist “spirit” in medieval Europe, compared with that capitalism developed by ancient peoples (Sanandaji, 2018). If Sombart's (1902) thesis is that free-market capitalism only occurred in medieval Europe because of accounting, then if capitalism also occurred among ancient peoples, was accounting a necessary condition?

The reflection would be that capitalism also occurred among ancient peoples and the presence of accounting may have been a necessary condition (Mattessich, 1995, 2000), as a control instrument to provide capitalism in the ancient world. This alternative reflection is supported by Sanandaji's (2018) defense that free market capitalism already existed in the East, Asia and Mesoamerica and that arithmetic and accounting practices, brought from the East, inspired the development of the market and arithmetic commercial in places like Italy and Spain.

Commercial arithmetic, which has always been close to accounting, also plays an important role in the construction of capitalism because of its calculus-based fundamentals. Capitalism would probably not emerge without the presence of proportional calculations. For this reason, this essay seeks, in accounting and commercial arithmetic, the key elements that can help to explain the construction of medieval capitalism.

The theoretical essay was chosen because, first, it is different from the traditional method of science in which "[...] the essay requires subjects, essayist and reader, capable of evaluating that the understanding of reality also occurs in other ways" (Meneghetti, 2011, p. 321); second, and consequently, the theoretical essay has, as a characteristic, originality (Meneghetti, 2011), which means directing its purposes towards something that allows for freer, less traditional reflections.

2 Medieval Europe: the Principle of Capitalism?

Based on the work of Sanandaji (2018) on the origin of capitalism in the ancient world, the fundamental premise established is that free market capitalism may not be a creation of the medieval European. Would that call into question the theses of Sombart (1902) and Yamey (1949, 1964, 2004)?

2.1 Sombart's Thesis

This essay makes a brief and objective analysis of the publication of Sombart: *Der Moderne Kapitalismus* (1902). His work is the first scientific piece that relates bookkeeping by double entry to the origin of medieval capitalism. Hence, its importance for this essay.

Sombart (1902, p. 208) states that “the accumulation of money is by no means a sufficient presupposition to fully achieve a capitalist enterprise”. The difference is in the specific capitalist “spirit” of the owner (Sombart, 1902). This includes the pursuit of profit, the rational meaning of economic calculation (Sombart, 1902).

"How is profit possible?" (Sombart, 1902, p. 210). Sombart, in several passages of his work, seems to have difficulties in understanding and clearly defining what profit is (pp. 195, 210, 218, 282); he does not elaborate a concept, but seeks to explain it through historical facts. One of the profit possibilities, according to Sombart (1902), was the huge profit margins charged on goods. Products from the East, which found their buyers exclusively in the higher spheres of society, such as the castles of the great nobles and the courts of princes, yielded enormous profit margins. Sombart (1920, p. 220) further states that “in addition to the sale prices, which are ten times the purchase price, we find other prices that are no more than 5, 10, 20, 30% of the purchase price, such as show the examples I compiled on the first excursion into this chapter.” Another source of wealth accumulation during this period was mineral extraction. For Sombart (1902, p. 273), “medieval capitalism, without a doubt, has one of its roots in such mining fortunes”.

However, how to control financial and commercial movements? This required a peculiar technique of human thought, the formation of which fills the last centuries of the European Middle Ages. What needed to be created was, first of all, a method for the exact arithmetic determination of each individual business case and, secondly, a method for the systematic registration of a global business enterprise (Sombart, 1902). These methods allowed the development of mathematical science during the 13th, 14th and 15th centuries and will be discussed later. The period of creation of the new business technique can be delimited between the years 1202 and 1494, with the names of Leonardo Pisano and Luca Pacioli (Sombart, 1902, pp. 391-392).

The first association between the instrumental concepts of accounting and the formation of capitalism is with Sombart (1902). He unveils the reasons that led the use of the double entry accounting instrument to the formation of capitalism, claiming that it gives accounting a decisive meaning for the development of the capitalist essence, by allowing the systematization corresponding to the capitalist enterprise to be fully achieved (Sombart, 1902).

Therefore, for Sombart (1902), the evolution of accounting systems reaches its peak in 1340 (double entry), and this was fundamental for European capitalism to achieve a meaning different from that assumed by medieval peoples and to undertake a different dynamism to European society at that time.

2.2 Yamey's Counterarguments

Yamey (1949, 1964, 2004) was one of the first to reject Sombart's views. He tries to refute the importance given to the double game, alleging ignorance of the merchants and the practical and uncomplicated dissemination of the single game. Yamey (1949) believes that the [double entry] contribution was not only small, but also not made by these features of the system or by solving the commercial problems particularly emphasized by Sombart. Thus, he also suggests, incidentally, that, in the context of solving business problems, double-entry accounting was not much superior to less elaborate accounting methods (Yamey, 1949).

In summary, Yamey contests Sombart's conclusions based on the following:

1. Yamey's research focused initially between the years 1494 and 1840 (1949) and, later, on the periods of the 17th and 18th centuries (1964, p. 124); the other part was devoted to England and particularly to English manors (1949, p. 131a, 131b);
2. Yamey claims that the double-entry method (systematized accounting) was probably created in Italy and, “by virtue of the earlier adoption of the Arabic numbering system in that country, it is more likely that it originated in one of the commercial centers of Italy. Italy” (1949, p. 102). Furthermore, he states that “Sombart gave prominence and prestige to the humble art [our italics] of accounting, giving it broad economic significance” (1964, p. 117-118);
3. It further asserts: “It is likely that the vast majority of companies used a simple form of record keeping (which may conveniently be called 'single entry') until the mid-19th century, although

exposures by the more complex method of double entry take up much more space in the texts" (1949, p. 105).

4. And Yamey quotes Charles Hutton (p. 141) who, in 1811, wrote: "It is very important that almost all business people learn a bookkeeping course of this kind [simple entry], because it is used in almost every store" (1949, p. 105).

Yamey (1964, 2004), therefore, seeks to minimize the role of the double match method in the 16th, 17th and 18th centuries, especially at the time of calculating the result through balances calculated by simple entries.

2.3 About the Arguments of Sombart and Yamey

Initially, it can be said that both authors believe that free market capitalism emerged in medieval Europe. Therefore, it is necessary to analyze the arguments of the two researchers from two different angles. The environment revisited by Sombart (1902) was that of Italy, particularly: Venice, Florence and Genoa, from the High Middle Ages onwards. Yamey (1964) also conducts, in general, his researches in this period and, in particular, in the 17th and 18th centuries, but focused on the environment of England, with an emphasis on English feudalism.

2.3.1 The Italian environment and commercial arithmetic

One of the significant works for medieval Europe, which will allow the advance of capitalism, is the Liber Abaci (1202) [Book of Abacus, or Book of Calculations], written by Leonardo Fibonacci. The first chapter begins with the presentation of the Hindu-Arabic numbers. "The nine Indian numbers are: 9 8 7 6 5 4 3 2 1. With these nine numbers and with the sign 0... any number can be written, as shown below" (Gies, 1969, p. 58). The first seven chapters deal with numbers, how to use them and how their techniques could be applied to the solution of practical problems - exchanges, conversion of weights and measures, exchange rates, partnerships and interest, the possibility of a bill of exchange, insurance maritime contracts, development of international banks and new commercial and industrial societies (Gies, 1969; Reinert & Fedrona, 2017). The other part is devoted to mathematical speculation – series and proportions, how to solve problems by Arabic false position rules, root extraction, geometry and algebra (Gies, 1969, p. 58).

The Book of Abacuses is the result of Fibonacci's learning of him from his travels to the Orient. Therefore, it is relevant to state that his work is not the result of his mathematical reflections, but of the teachings acquired in the East. For this reason, it is considered one of the most important works for medieval Europe because it allowed the European man to know mathematics different from those coming from Boethius and Diophantus (Klein, 1968). They were apprehending something that had never occurred to them: the dynamics of arithmetic and algebra, unlike that of Roman numerals (ostensibly defended by the Catholic Church), which did not allow for advanced calculations, as they were limited, as it would not even be possible to transact through documents that demand calculations of interest, exchange, insurance proportionality, etc.

Le Goff (1995) recalls that, in the previous century (XII), European intellectuals were born together with cities and linked to commercial and industrial functions (modestly artisanal). Paris was one of the main intellectual centers of medieval Europe, while Venice, Florence and Genoa had an enormous profusion of commercial and intellectual activities. This intellectual profusion made the 13th century of the century of universities and university bodies, such as that of Paris, which were composed of four faculties: "Arts, Decrees or Canon Law (Pope Honorius III prohibited him from teaching Civil Law in 1219), Medicine and Theology" (Le Goff, 1995, p. 65). This Fibonacci greed for knowledge makes sense in this European context, painted by Le Goff (1995). Unlike the Low Middle Ages, the High Middle Ages and the Renaissance mark the beginning of a revolution in the ideas that made Europe the new world founded "on the shoulders of merchants" (Hadden, 1994).

Nobles from all over Europe converged on Venice. "Even Jacob Fugger, the German merchant and banker prince, left Augsburg to study business techniques in Venice" (Swetz, 1987, pp. 10-11). In fact, the flow of German, Dutch and French merchants to Venice in search of knowledge or business was large. Swetz (1987, pp. 10-13) also recalls that Fibonacci's book and his messages were well received in the fondaci, or merchants' house, in Pisa, Genoa and Venice and promoted the Hindu-Arabic symbols, which were replacing the numerals Romans in the accounting books, and the use of the abacus, which led to the calculation applied with pen and ink. The best representation of the transition from the abacus of beads to the abacus with pen and ink, with the abandonment of physical calculation for the abstract, is expressed by the fresco *Margarita Philosophica* [Philosophical Pearl], painted by Gregor Reisch in 1503. The table abacus was one of the great evolutions produced in Italy in favor of commercial operations. It facilitated the calculations and allowed the accounting records of the nobles.

The new profitable businesses demanded peculiar techniques and demanded from human reasoning a new logic whose formation fills the last centuries of the European Middle Ages: the appearance of

commercial arithmetic, which was a mixture of algebra, rule of three, rule of five, allowed the calculation interest, exchange rate, currency correction and the calculation of insurance etc. Learning to deal with Arabic numerals sparked a “trade revolution” in Europe, when the development of the “rule of three”, for example, made new trade relations possible (Hadden, 1994, pp. 88-90).

Arithmetic and accounting were the foundations that made it possible to build capitalism (Swetz, 1989). Swetz (1989) states that, “actually, if a word could be chosen to describe the motivation of merchants over time, it would be avanzo, profit, as they gladly admitted” (p. 275). Hadden (1994) links the two functions, stating that "arithmetic itself has its history embedded in the history of commerce and calculation [...]" and that bookkeeping, through double entry, is juxtaposed to manuals of arithmetic. This mathematical knowledge, brought from the Arabs by Fibonacci, marks the beginning of a new era in medieval Europe that, associated with urbanization and the creation of universities and corporations, produced commercial and, later, industrial capitalism.

2.3.2 Abacists versus Algorists and the difference between unitary and abstract calculus

The analysis of the meaning of Abacist and Algorist currents of thought is relevant for the purposes of this theoretical essay, because they determine the difference between unitary calculus (indivisible unit) and abstract (social representation), whose impact on the accounting field is much greater and more significant than you might think. Consequently, this difference expands the accounting reports, with new plans of account, through the *staet proef* [compiled balance sheet], which mathematically evaluated the profit for the year, prepared by Simon Stevin himself (Volmer, 1996). All this further strengthened the capitalist purposes.

Yamey (1926), for dedicating much of his work to accounting developed in English manors, does not address the importance of the abacus and its consequences for accounting. Also Sombart, although he showed greater fecundity in the field of commercial mathematics, did not deepen his studies on the abacus in the modern and pre-modern context. “The abacus has been associated with arithmetic for so long that the word ‘abacus’ served as a synonym for calculation; indeed, in Italy at that time, abacus could refer to numerals, arithmetic practices, or a book on arithmetic, depending on the context of its use” (Swetz, 1989, p. 177).

Those who have devoted themselves to abacus-based commercial arithmetic are the abacists; and those who have devoted themselves to commercial arithmetic based on Hindu-Arabic numerals are the Algorists (or Cossists). “The use of nine Arabic numerals and zero in al-Khwarizmi's work became the center of a three-century ideological battle in Europe for and against the new arithmetic” (Mcleish, 1991, pp. 139-140). Traders and accountants were in favor of the new algorithmic arithmetic (Mcleish, 1991). The Abacists did not admit, for example, irrational numbers, zero (cipher) or negative numbers either (Klein, 1968, pp. 147-149; Mcleish, 1961, p. 148). Algorists saw numbers endowed with place-value notation, admitted irrational numbers, worked with zero as place-value notation, and accepted *negative numbers* as meaning “debt” and, in turn, positive numbers representing the active. Bhramagupta (628 CE) would have used them for the first time (Kline, 1961). This perception of the negative number, admitted as a "debt", as an opposite element to the asset, keeps accounting in the context of arithmetic, as if the double-entry method were part of mathematics (until Simon Stevin gives, at accounting accounts, the meaning of social representation).

Also in China, in its early days, business transactions were calculated using red (positive) and black (negative) sticks, comparable to the abacus. The calculations made, they were recorded by some accounting system. China, around the 10th century AD, underwent changes in the accounting method, from simple to double-entry entries (Mattessich, 1995, pp. 35-36).

In short, what can be seen is the transformation of European society, particularly Italian society, in the sense of seeking an adequate alternative for capitalist purposes. The mathematical structure maintained by the Abacists would not allow for the advance of the complex calculations required by the new capitalism. Differently, the algorithms produced another type of development, such as new numbers, with new proportion rules, complex calculations, etc.

As stated by Flegg, Cynthia and Moss (1985), in the translation of the work *Triparty*, by Chuquet (1484), numbers have two faces: that of negative numbers, which is accepted by Chuquet (1484) as a representation of “debt”; and that of negative solutions of equations, which is rejected by Chuquet (1484) in some cases.

This perception of the numeral, not as something quantitative (eidos) but abstract, which is foreshadowed in Chuquet (1484), reached full significance with the mathematicians Viète and Simon Stevin in the seventeenth century. This had a relevant impact on accounting and the way in which numbers are perceived in the accounting context. Mathematical commensurability and incommensurability caught up with accounting in its way of representing numbers. It is the moment when the accounting record takes on the character of representing reality as “the notion of a very rigid formal equality between the participants in a transaction” (Hadden, 1994, p. 153). Here, the number assumed the representation of reality, no longer being perceived as eidos, as an indivisible quantity.

In the 17th century, this mentality disappeared when Stevin – in addition to being a mathematician, he was also an accountant – defined negative numbers not as "debt", but as incommensurable, abstract magnitudes, and when accounting accounts (expressed by numerals) took on another meaning: the representation of the (social) fact. This theoretical essay registers this historical moment as one of the relevant ones in the modern history of the West, because it is seminal: the ratio is inaugurated, for the purposes of abstract thinking, both in the field of mathematics and in the field of accounting. Stevin is credited with inventing the income statement as proof of the accuracy of the change in the owner's equity on the balance sheet (Volmer, 1996).

Another revolution in customs came from this abstract perception of accounting accounts and the growing complexity of economic transactions. This led to the extinction of accounting orality, since "accounting methods were initially oral; accounting changed from oral to textual from 1100-1600" (Tebeaux, 2000, p. 308). Miller (1959, pp. 32-41, our translation) attributes to capitalism the eradication of illiteracy. For him, most people learned to read for utilitarian reasons and read what they believed would be beneficial to their success.

Geijsbeek (1914, p. 114), as Hadden (1994) also points out, suggests an interesting discussion about the possibility of a link between accounting and algebra in Stevin's accounting writings. For Geijsbeek (1914), mathematical abstraction coincides with representational abstraction in accounting. Hadden (1994, p. 153) also follows suit: "Stevin eliminates the owner's account by an algebraic formula. This accounting by Stevin, in turn, which reflects social and legal developments, is very clear".

It should be noted that this is not a mathematical reproduction of the Arabs, but a seminal reflection by Stevin. Until that moment, accounting and mathematics walked together, they were part of the same arithmetic textbooks. From then on, accounting textbooks are dissociated from mathematics and their own representations are created, such as the fundamental equation (A–P=PL), developed by Dumarchey, in the following century (Michaïlesco, 2010, p. 6).

The reflection that can be made is that this view of the algorithmists allowed, in addition to other arithmetic advantages, to consolidate the idea of capitalism through the instrument of credit ("debt"). This made it possible to expand business turnover in an "artificial", creative way, as was the case with the *lettera di cambio* [bill of exchange] or payment, especially on an international scale (Reinert & Fredona, 2017). Such expansion assumed, in the accounting context, the condition of dare/habere.

2.3.3 Evolution of accounting: watershed for capitalism?

The double-entry method is a specific accounting communication language as the instrument that allows the generation of accounting information. It is sometimes called systematic accounting, double-entry accounting, or bookkeeping system. It is unequivocal that the method, over time, has undergone adaptations, evolutions, but always maintaining, essentially, the same logic, defined by Mattessich (1995) as the principle of duality.

Sanandaji (2018a, 2018b) claims that free market capitalism already existed in the ancient world. However, he does not deal with the existence or development of the double-entry game in this same period. For him, either the idea of double entry departure is unimportant, or there seems to be no link between capitalism and accounting, except when referring to the modern period. Sanandaji's (2018, pp. 184-185) assertions that "the European market economy developed in Italian city-states, the same occurred with accounting methods" [emphasis added] or "[...] the method of double-entry bookkeeping evolved here", or even "[...] the Italian market model was the cradle of modern accounting", reinforce the thesis that the "Italian" double-entry method developed in medieval Europe.

In this sense, Sombart states that, in order to have the inaugural capitalism in medieval Europe, the creation of the double-game method, at the same time, was essential. Most (1966, p. 24), on the other hand, argues that if the double game were to be proved to have existed before the medieval period, this would have been fatal to Sombart's thesis.

If Sanandaji's (2018) assertions about capitalism are valid, then it is necessary to verify whether the double entry condition is also met in the ancient world. It is therefore necessary to verify that the double game existed in this environment. If so, Sombart's thesis may not fully hold up. On the other hand, it is necessary to verify the extent to which double entry managed to penetrate Europe, particularly France and Great Britain, since these countries had an accounting system known as charge/discharge (Littleton, 1926; Lemarchand, 1994).

The research carried out by Most (1976) on Roman accounting was not very fruitful: he concluded that little was left of that accounting. Says Most (1976, p. 24): "the nineteenth century controversy over double entry accounting in Rome was something the French called the dialogue des sourds - the dialogue of the deaf". But Most (1976), in his findings, got some evidence of the double entry departure into ancient Rome from the German historian Niebuhr (1835). However, according to Coronella, Antonelli and Lombrano (2017, p. 224), the hypotheses raised by Niebuhr are rejected by several authors such as Smith, (1954), De Ste Croix (1956), Jouanique (1968) and Glautier (1972).

A more fruitful path were the interpretations given by Mattessich (1987, 1995, 2000) to the archaeological finds of Schmandt-Besserat (1977, 1978, 1979, 1980, 1983, 1992a, 1992b, 1996). Mattessich (1987b, pp. 79-81) deduced that the ancient Sumerians practiced a kind of double-entry record some 5,000 years ago. This means, he says: "first of all, that those ancient peoples of the Middle East had record-keeping systems whose logical structure was basically the same as the modern double-entry" (Mattessich, 1995, p. 27).

This logical structure manifests itself empirically in economic environments such as sales and purchases, investment and debt transactions, production and other transfer processes (Mattessich, 1995). These empirical manifestations, according to Mattessich (1995), could have been made through logical structures such as a diary, by double entries, by matrix, by algebraic equations, that is, through anything that could represent input-output, or the principle of duality (Mattessich, 1995). But he clarifies: "this suggests that double entry is not simply based on the input-output relationship of a goods transfer". Its basis is the combination of three aspects that are quite different in each relationship: i) the physical transfer of goods and services is made from an entry point to an exit point; ii) a debt entitlement links a debtor to a creditor; iii) a property right connects a resource (asset) to an owner (Mattessich, 1995, p. 30)

Mattessich (1995, p. 30) states: "it is more important to recognize that the development of double entry went through several phases, each one having slightly different characteristics". However, Mattessich (1995, p. 34) is quick to point out that "I am in no way claiming that Renaissance double-entry accounting is the direct descendant of the double-entry accounting developed by the Sumerians."

Other peoples also claimed the creation of the double-entry method. Coronella et al. (2017, pp. 225-226) recall that some studies describe the invention of double-entry as being Indian (Nigam, 1986; Singhvi, 1995), Greek (Filios, 1984: 172), Arabic (Zaid, 2000, 2001, 2004), Inca (Jacobsen, 1964), or originating from some populations of Africa (Sy & Tinker, 2006) and even from the Sumerians-Babylonians (Mattessich, 1989; De Sá, 1995: 97). Indians argue that Bahi-Khata is a double-entry system (Lall Nigan, 1986), although it has been challenged by Nobes (2007) for lack of historical-documentary evidence.

As for the creation by the Romans, there are also numerous controversies about such a possibility (Coronella, Antonelli, & Lombrano, 2017). But, in the case of the Arabs, as already highlighted in this essay, the role of negative numbers as "debts" and positive numbers as "assets" strongly explains the existence of the double-entry method (Mattessich, 1995, p. 35) in seventh-century India.

In summary, Mattessich's proposal is to consider the principle of *duality*, through which double entry has somehow always existed since human society developed the "interested exchange", as called by Tinker (1985, pp. 92-93). Certainly, interested exchange, which involves the theory of value, has also gone through processes of technological improvement and its meaning of surplus profit has also adapted according to the times. Therefore, double-entry accounting was the watershed because, at all times, it made capitalism possible.

2.3.4 *Guanzi*, *Ciropedia* and *Arthaśāstra*: signs of a fruitful capitalism in Antiquity

Guanzi, two Chinese volumes written probably by Guan Zhong, in the year 600 BC, deals with politics, economics and philosophical essays. It was translated into English by W. Allyn Rickett, in two volumes (Volume 1, 2001; Volume 2, 1998). According to Rickett (2001, p. 3), "Guanzi presents to the world one of the first quantitative theories of money".

When *Guanzi* talks about the "art of fiscal management" with Duke Huan, his answer is towards the perception of the balance of the State's economic policies, considering the capitalist market forces. *Guanzi*, by asserting that the prince controls the rise and fall of grain prices, which can lead to future surpluses, is asserting this under existing capitalist conditions. *Guanzi* also points out that, if there is a year of drought or floods and people lose their main source of income, he builds palaces and pavilions, thus providing jobs for those very poor families (Rickett, 1998, p. 365). The State, in this case, is the market regulator and has relative freedom of capitalist action (economic transactions), as the prince is responsible for the balance of economic policies, which does not seem to differ, in certain cases, from the times current.

One of the relevant aspects of *Guanzi's* lessons is the country's economic stability. The lessons given by Guanzi seem to have been taken from contemporary economics manuals, such is the ease with which he deals with the circulation of money and goods, particularly since it is a question of government intervention in price controls. He claims that, having made the price of grains increase tenfold, return the grain as a loan to be paid in cash, so that 90% of the countries money supply is in the hands of the government on the rise, while 10% will remain with the people, downtown. In this way, while money is lacking and appreciating (*zhong*), goods are plentiful and cheap (*qing*); but, above the goods, paying for them, they will be in the hands of the government, which will increase the value tenfold; officials in charge of government warehouses come to sell these goods at their market price, until the price drops (Rickett, 1998, p. 392*)*

Qing Zhong Ding [Political Economy], the name given to the last chapters of the book *Guanzi*, deals with the interest rate, of moneylenders who charge 20% interest on borrowed capital, so that this extortion leads to the impoverishment of the kingdom and the weakening of the army (Rickett, 1998, p. 484). The book

also addresses markets and the relationships with profit, with surpluses and with scarcity, investigates "supply and demand analyzed from the markets, in addition to teaching children in the 'language of profit'" (Sanandaji, 2018, p . 100). Duke Huan questions *Guanzi* (1998, p. 487): “I've heard about maintaining an adequate balance [between the money supply and grain and other commodities], but may I ask about the stabilization of the national economy?”. The answer seeks to guide people to do their business rationally, observing the peculiarities of the seasons, such as silk, wood, etc., in order to acquire them cheaper. *Guanzi's* writings are devoted, in large part, to teachings about the role of the state, control over economic policies, and the idea of how to establish commercial relations, in a more advantageous way, between merchants. Note, however, the fundamental role in the development of the Chinese economy with the *silk road*, which allowed for international contacts with all of Asia and even with Europe.

In the same way that in *Guanzi* there is a reference to capitalism, so does another classic document from Antiquity. The *Cyropedia* is a classic political novel, written by the Greek Xenophon (430-355 BC) and deals with, in addition to Cyrus' education, his military adventures. These writings by Xenophon are relevant, as they address the Persian economic systems that were structured in specialized markets and private businesses (Sanandaji, 2018). Xenophon, in a certain excerpt of the *Cyropedia* (book VIII), spoke about the division of labor and its high degree of specialization in the following terms: "There are places where a man makes a living sewing shoes, others cutting them, sewing together with others, while there is another that does not perform any of these operations, just assembles the pieces” (excerpt quoted by Gray, 1931, p. 32).

This passage from Xenophon, from the 5th century BC, is very similar to that written by the Frenchman Tocqueville (1977, p. 226), in the 19th century, when he is critically acknowledging industrialization in America: “when an artisan is always and exclusively dedicated to the manufacture of a single object, he learns to perform this work with peculiar skill”. The striking similarity between the two discourses leads to the belief that the North American managerial process, probably initiated in the *Springfield* arms factory (1830), was not at all genuine. However, it is unlikely that Colonel Lee was aware of Xenophon, above all because his account of the division of labor in Persia is given in a few lines, in the context of a work dealing with conquests and wars. But it is possible that the colonel was aware of the work of Adam Smith (1779). Sanandaji (2018) recalls that Smith reproduced the same speech in the 18th century, as if it were genuine. And Sanandaji (2018, p. 89) comes to the following conclusion: “it is possible, if not likely, that Adam Smith simply plagiarized Xenophon”.

Another important document from the year 300 BC deals with the existence of the double entry method and economic issues in India. The book *Arthaśāstra*, written by Kautilya, reveals impressive details of accounting procedures and the administrative and economic conduct of that time. According to Sanandaji (2018, p. 121), the reports contained in *Arthaśāstra* reveal that the Indian economy was interventionist: “for example, the role of the king was to actively manage the production of metals, ore and control of his offices”. There is another chapter on “official embezzlement” and the first lesson is that “the Treasurer is the foundation of all administration. Thus, the treasurer deserves special vigilance” (Ramaswamy, 1994, p. 86). The veracity of the accounts is made by forty auditing questions, clearly involving *debit* and *credit* to be checked. Fraud detection follows an examination routine that can be verified through items that are very similar to current audits, such as the verification of inflated values; what is accomplished is not shown, etc. (Ramaswamy, 1994). These questions seek to demonstrate the capacity for manipulation and fraud that existed at that time. There was already a concern with the control of business activities, which was centralized in the government (Ramaswamy, 1994).

Thus, it can be inferred that, at least these three important works written in Antiquity, *Guanzi*, *Ciropedia* and *Arthaśāstra*, reveal behaviors aimed at control, at high levels of intellection and the presence of free market capitalism, or with State intervention (as is the case: Chinese and Indian). It is also significant to verify that the principle of duality, by Mattessich (1995), is present in all these capitalist societies, playing the relevant role of recording, informing and enabling complex calculations, such as costs and budgets.

2.3.5 The English and French environments from the 13th century

The environment, from the 13th century, both in England and France, is different from that experienced in Italy, from an economic, political, social or cultural point of view. Due to the influence of certain circumstances, such as the strategic position of Venice, Florence and Genoa towards the Mediterranean Sea, the *Silk Road* and then, strongly, the Spice Route, economic and cultural development took place first in Italy and only later (17th century) and in different proportions, it occurred in England, France and the Netherlands. The contact of the Venetians with culture, with mathematics, with accounting developed in China and in the Orient led to the flourishing of capitalism in Italy, long before England and France.

Lemarchand (1994) states that “this type of accounting [charge/discharge] should not be considered simply as cash accounting” (p. 135). These considerations by Lemarchand are valid for the scenario of English feudalism, which also abandons this system of bookkeeping to adopt double entry.

Littleton (1946, p. 61) suggests that the "process of 'Anglicizing' Italian record-keeping ideas" took place. There was an adaptation of the Italian method to the cultural conditions of feudal England, which

maintained an economic, social and political structure very different from that of northern Italy. I charge what is received; I credit what is given. These English rules, as noted, are almost the opposite of “Italian” rules (Littleton, 1926, p. 66). The feudal system maintained the manager as an intermediary, as the administrator of the properties of the nobles and, therefore, the debit and credit relations operate in a different way, since the intermediation established a relationship of responsibility towards the feudal lord. In essence, the principle of double entry remains, but with different meanings, because of intermediation. Littleton's (1926) explanation for this change is purely cultural.

Winjum (1971) tries to give a more conceptual-accounting view for the double entry match. The author (1977, p. 335) points out that, “for some, double entry only refers to a system in which the only criterion is the equality between debts and credits”. But there are those who imagine the opposite extreme: double entry refers to a system of records in which real and nominal accounts are integrated within a coordinated and internally consistent structure (Winjum, 1971).

Based on these extremes, Winjum (1971) establishes at least four definitions of double entry: (1) a constantly balanced bookkeeping system, in which the only criterion is equality between debts and credits; (2) adding a capital account to the first system; (3) the use of nominal accounts (income, expenses, gains and losses, etc.) in addition to the system 2 capital account, but with an irregular closing of these capital accounts. In this system, there is no periodic calculation of net income; and (4) the same as in system 3, except for the periodic closure of nominal capital accounts and for the annual calculation of net income (Winjum, 1971, p. 335).

It should be noted that the single-entry system, defended by Jones (1796), also makes entries on debit and credit, but in a different way, because there is no equality between debit and credit. Winjum (1971, p. 335) recalls that Sombart (1902) and Yamey (1949) do not refer to what type of concept they were dealing with, but it is assumed that they referred to the concept (3) or (4), which expressed the best the profit on capital. Winjum highlights four reasons to explain the role of double entry in capitalism: i) double entry bookkeeping, which was imbued with the search for profits; ii) the refinement of economic calculations; iii) systematic organization; iv) the separation between ownership and management.

The most relevant points, defended by Winjum (3) and (4), involving nominal accounts, find resistance in the arguments of Mattessich (1995, p. 35). This states that even modern double-entry accounting systems can function without separate nominal accounts (including the income or profit and loss account). Nominal accounts are just a subcategory of the owner's equity account which, if necessary, can assume the function of any nominal account (MATTESSICH, 1995). This subcategory does not change the essence of the double entry game (principle of duality) and, probably, its addition to the European medieval accounting would not have been enough to allow the development of capitalism in the West. But, despite Mattessich's notes, it must be considered that this was a new technique, not yet adopted and that it was more expansive, guaranteeing greater solidity, more security to the results of applied capital. And that's what the investor capitalist wanted.

3 Analysis and Considerations

In the face of so much historical evidence - some partial, others conclusive - divergences, hypotheses, theses and disputes, there seems to be a course of facts through which one can try to establish links that allow for a relatively consistent, albeit inconclusive, essay reflection (given the little existing research on the subject). Few works used primary sources and, even so, many are scarce in relation to the available historical universe, in particular, from medieval Europe.

This essay, unlike other studies, included the most diverse and representative views and positions on the subject, including some that rethink capitalism from the point of view of the free market since the Ancient Ages. It includes another relevant issue, little studied by accounting researchers, which is the relationship between mathematics and accounting and capitalism, in the period from the 13th to the 17th century (in the West).

The first inference to be made concerns the European “spirit”. It is reasonable to consider the existence of a European capitalist "spirit" in the medieval period, but it should be far from being considered "genuine", since, in the ancient world, this same capitalist spirit existed and had the same support instruments (for calculation and registration): commercial arithmetic and accounting. In this respect, Europe does not seem to have inaugurated capitalism, but reproduced the model of the ancients with the same instruments. It is observed that one of the causes that led to the emergence of the capitalist “spirit”, both in ancient and medieval peoples, was the self-interest (interested exchanges) (Tinker, 1985) developed in the social environment.

Another inference to be made is regarding the inauguration of the concept of surplus (profit, or surplus). It is possible that, in this case, the medieval European also did not invent profit as a result of interested exchanges. Tinker's reflection (1985, p. 91) must be considered: “There is no factor that explains how societies produce a surplus [profit]. Different natural resources can cause a surplus to arise at different stages of social development"

To some extent, Sombart's reasoning, as well as Yamey's, is acceptable if one takes into account that when they drafted their theses, both documents and important archaeological research had not yet taken place. For example, the West did not become aware of the Guanzi until 1998 (date of translation of volume 2, by Rickett; volume 1 was translated later, in 2001); the book *Arthaśāstra* was rediscovered in 1904 and republished in 1908 (Ramaswamy, 1994); Schmandt-Besserat's research also took place in the 1970s and 1990s of the 20th century. However, these surveys contain evidence that arithmetic and accounting strongly contributed to the development of capitalism (Eastern, Asian and European).

Some technical differences between the two periods (Antiquity and Middle Ages) can probably be pointed out, but they do not mean deep gaps. An example is the “sedentary merchant”, remembered by Reinert and Fredona (2017), a historical figure who did not exist in China (silk route), where the mobility of markets was strong (traveling merchant). Another technical difference is the accounting orality: until the mid-eighteenth century, England still used narratives to record commercial transactions. With the appearance of the charge/discharge bookkeeping technique and, later, with the double game, orality disappears (TEBEAUX, 2000). As for accounting, whether by single or double-entry items, it is unlikely that there have been significant differences (Mattessich, 2000), but what is certain is that, in all its representative manifestations of accounting reports, it has always been on the lookout for side of capitalism.

In summary, admitting the hypothesis of the existence of free market capitalism in the Ancient Age (East, Asia and Mesoamerica) (Sanandaji, 2018), we have the following: 1) The conclusions of Mattessich (1995, 2000) of that variations of the double-entry match (principle of *duality*) already existed among the Sumerians may be correct, insofar as an instrument that allowed the recording and control of transactions at that time would be necessary. Evidence is supported by *Guanzi*, *Cyropedia*, *Arthaśāstra* and *negative numbers* such as “debt” of Bhramagupta. 2) Arithmetic seems to be strongly associated with commercial calculation and accounting calculation for measuring capital and its growth (profit), since remote Chinese periods (black and red rods, abacus) and oriental (abacus). 3) What seems to be different between Antiquity and medieval Europe is the accounting procedure, whether through simple entry instruments (Jones, 1796; Hutton, 1807), or through double entry and its variations (nominal accounts, Winjum, 1971; or *charge/discharge*, Littleton, 1926; Lemarchand, 1994), as an influential element in the formation of capitalism. Therefore, it is likely that Yamey's ideas are not justified as a counterpoint to Sombart's thesis, nor as having medieval Europe as the creator of capitalism.

Finally, what is perceived is that accounting and the evolution of accounting methods, through the double entry method, adapted to the most diverse cultural environments (Mattessich, 1995), covering all historical periods of humanity, even before the existence of writing and with the sole purpose of recording the heritage of individuals and their relations with the capitalist (or proto-capitalist) world. The reflections obtained in this respect are that the evidence leads to claiming that the contribution of accounting to medieval European capitalist practice is indisputable, but there is no genuine "spirit" in this, especially when the hypothesis that capitalism and accounting is not admitted. emerged in medieval Europe. These reflections, traversed from Antiquity to Modernity, therefore, explain the current deepening intertwining of accounting with capitalism, whose visibility is enhanced in times of economic crisis.

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