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‘The more, the merrier’: John R. McCulloch and the ‘Corn Model’

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Abstract

This paper offers new textual evidence supporting the Sraffian 'corn-ratio' interpretation of David Ricardo's early theory of profits. We analyze the first edition (1825) of John Ramsay McCulloch's *Principles of Political Economy*, arguing that it provides a clear articulation of the profit rate’s physical determination. McCulloch, Ricardo’s pupil, defines profit as the excess of commodities produced over those expended in production and calculates the profit rate directly in physical quantities of corn. This finding parallels the evidence found in Torrens, ultimately reinforcing the argument that the ‘corn model’ was deeply rooted in the early classical tradition. At last, our comparative analysis contrasts this initial, clear physical framework with McCulloch’s later shift towards value-centric reasoning.

Keywords: John R. McCulloch, corn model, Sraffian interpretation, David Ricardo, rate of profit

JEL Codes: A31, B12, B30

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1 Introduction

Since the publication of the Introduction to the *Works and Correspondence of David Ricardo* (1951), the interpretation of the theory of value of Ricardo provided by Piero Sraffa has become a cornerstone in the history of economic thought. Sraffa's reading of Ricardo's early theory of profit states that the latter is determined as a ratio between two physically homogeneous quantities. This calculation takes place within the agricultural sector, which holds a special position because it produces corn, which is the primary and only wage good and the only capital advanced for production. Specifically, profit is defined as the physical surplus—the quantity of corn produced that exceeds the quantity of corn used as capital for both seed and the payment of wages. The rate of profit is then this physical surplus divided by the total physical capital advanced. Because corn serves as the essential input for all industries via workers' subsistence, and capital itself in the agricultural sector consists solely of corn, the physically determined profit rate in this sector sets the benchmark that governs profitability across the entire economy. The main contender to the view maintained by the Italian economist has been Samuel Hollander, whose alternative reading of Ricardo impetuously weighed into the academic debate in the seventies (Hollander 1973, 1995) and more recently (Hollander 2012). Successively, on the one hand the harsh debate among the two views has been joined by Terry Peach (1993), and on the other it has progressively incorporated a parallel quarrel about Torrens, started by Langer (1982) and De Vivo (1985) with the aim to back up the Sraffian side.[1]

To the best of our knowledge, no wide dispute has hitherto arisen about the possibility to consider John Ramsay McCulloch (1789-1864) among the authors showing a theory of profits that fits the Sraffian interpretation.

The first economist to point out the relevance of the work of Robert Torrens in this debate has been Langer (1982, p. 2), whose argument is introduced by a letter (28 February 1820) of Ricardo to his acolyte, J. R. McCulloch. Therein Ricardo tells his reaction to McCulloch about the adherence of Torrens to *their* doctrines:

> "I was very much pleased with Col. Torrens essay in the last Edin. Review. I do not think there is more than one proposition in it which I should be disposed to dispute. Mr. Malthus, who passed 2 or 3 hours with me last week, was fully persuaded, till I undeceived him, that *the article was written by you*; he could hardly believe that Col. Torrens agreed so completely with *the doctrines that both you and I have advanced*" (emphasis added)

Also, the article in the Edinburgh Review, which finds Ricardo's pleasure at Torrens's alignment with his own doctrines, has at times been attributed to McCulloch himself, prompting discussion in the secondary literature regarding its effective authorship (see, e.g., Peach 1993).

[1] Other important contributions have been brought to the fore by Rankin (1984), Skourtos (1991); the list claims no exhaustiveness.

Following this hint, the paper argues that the first edition (1825) of John Ramsay McCulloch's *Principles of Political Economy* offers a remarkably clear articulation of this physical determination of the profit rate, which also aligns closely with the examples provided by Torrens. This finding is especially significant given that McCulloch's later work shows a progressive shift towards value-centric reasoning when addressing profit rate determination. By focusing on the 1825 *Principles*, this study places McCulloch—whose work has been largely overlooked in this particular debate—firmly within the tradition of authors who preserved Ricardo's physical surplus approach to profit, thereby reinforcing the argument that the 'corn model' was deeply rooted in the classical tradition.

The structure of this paper is as follows: Section 2 examines the reception of McCulloch's work in the existing literature; Section 3 discusses McCulloch's *Principles* dated 1825 with the aim of demonstrating the physical determination of the rate of profit therein formulated; Section 4 considers the evolution of McCulloch's views, concentrating on the fifth edition of his *Principles*; Section 5 concludes.

2. Related literature

The central evidence for this paper's thesis is drawn from the first edition of J. R. McCulloch's *Principles of Political Economy* (1825). Before proceeding with the textual evidence it is important to contextualize the prevailing economic debates of the period in order to offer some reasons for the misinterpretation or neglect of the specific arguments McCulloch advanced about the physical determination of the rate of profit.

Around that period, the Ricardian theory of value was facing significant critiques: the central challenge concerned the role of capital and time in value creation, exemplified by Ricardo's own "difficulty" with how an oak tree or a cask of aging wine could increase in value without any additional application of labour. This increase in value, which constituted the profit for the capital owner, directly contradicted the principle that labour is the sole source of value (De Vivo 2017). It is within this debate that McCulloch employs, as still shown by De Vivo (2017), a "verbal fiction"[2]. To solve the problem of the aging wine, McCulloch "redefines" labour arguing that the agency of processes which Nature herself carried on is only another form of labour equivalent to that performed by humans. Capital is also simply defined as "accumulated labour", therefore, all forces contributing to a commodity's final value are always reducible to labour. In this way, in the first edition of the *Principles* we also find, in addition of the evidence we will provide later in the text, a definition of profits as the "wages of accumulated labour" (McCulloch 1825, p. 291).

In the literature, the scholarly assessment of McCulloch's intellectual legacy, particularly in relation to the Sraffian "corn-model" interpretation of Ricardo, has been notably influenced by Denis Patrick O'Brien's contributions. O'Brien (1970) posited that while a Ricardian understanding of agricultural profit determining the general rate of profit was "lurking in the analysis", McCulloch "never stated [it] correctly" (O'Brien 1970, Ch. XXII, Sec. III, pp. 293-

[2] In attempting to resolve the exceptions to Ricardo's rule by redefining its core terms, McCulloch creates an internally inconsistent theory that, as De Vivo argues, ultimately contributed more to the transformation and eventual "disintegration of the Ricardian school" than to its preservation.

294). In his view, McCulloch failed to sustain that agricultural profit determines the general rate of profits for the economy, since he only attempts "to deduce from the necessary equality of agricultural and other profits under competition that agriculture was the 'standard rate of profit'" or later "merely referred to agricultural profits as a 'standard' of other profits" (*ibid.*). Then, he concludes, "McCulloch did not get the theorem right, neither did he regard it as essential for his purposes – indeed Ricardo had not really used it after the Essay on Profits" (ibid.).

In support of this view, O'Brien also highlights McCulloch's preoccupation with the "proportionality issue"—his insistence on defining profits relative to the total capital advanced, rather than as an inverse share of wages. For this purpose, he mentions McCulloch's *Principles* (1825) statement that "profits depend […] on the proportion which they bear to the capital by which they are produced and not on the proportion which they bear to wages" (McCulloch ([1816] 1995), cited by O'Brien, pp. xxvii-xxviii). While McCulloch's engagement with proportionality is a significant feature of his work and it is undoubtedly heavily discussed in the chapter we will propose in the next Section, where the physical determination of profits is provided, we contend that focusing on it risks obscuring the elephant in the room: the clear, physical determination of the profit rate articulated in the 1825 edition of the *Principles*.

This interpretive issue becomes particularly evident in the textual evidence O'Brien selects to support his points. Indeed, to make his case, O'Brien does not cite anymore the 1825 edition, but the 1849 edition of the *Principles*. Here, McCulloch explores a complex scenario (O'Brien 1995, p. xxviii):

> "It may perhaps be said, that if this increased productiveness were confined to agriculture, and did not extend to most other important businesses, the price of agricultural produce would fall, while that of other produce would remain stationary; and that, in such case, the profits of agricultural industry, if estimated in money, or in any commodity other than corn, would be diminished in consequence of the rise of wages" (McCulloch 1849, p. 534).

In this scenario, agricultural productivity rises, but manufacturing productivity does not. McCulloch argues this would cause the supply of corn to increase, leading to a fall in its market price relative to other goods. He then reasons that this price drop could be so significant that it diminishes the farmer's profits when calculated in money terms. This logic, driven by relative price changes, stands in sharp contrast with what we will argue to be the 1825 "corn model". As we will show, in that early model profit is determined simply by comparing the physical quantity of corn produced to the physical quantity of corn used as capital and wage, without any reference to market prices. The price-based reasoning of 1849 is, in fact, a transitional step toward the even more complex mechanism we will see to be contained in the fifth edition dated 1864.

In contrast to O'Brien's prevailing assessment, Michalis Skourtos (1991) offers an interpretation of McCulloch that aligns more closely with the arguments presented in this paper. While the author's primary research focuses on reconstructing "corn-ratio" reasoning in a diverse group of authors including Malthus, Ramsey, and Sismondi, his analysis of "the Ricardians" (a group he identifies as comprising Trower, McCulloch, and Torrens) is pertinent

here. Skourtos (1991, pp. 219-223) suggests that the "best example of an explicit use" of the corn-model device is found in Torrens' work, an opinion similar to that of De Vivo (1985, 1996, 2001). Nevertheless, in his specific discussion of McCulloch, Skourtos acknowledges "the unquestionable use of the corn model", noting that McCulloch "wrote down clear examples based on physical homogeneity" (ibid.). Indeed, the present work aims to build upon Skourtos's recognition of McCulloch, arguing for a more central role for the latter—perhaps comparable to, or at least much closer to, Torrens—in the "corn model" tradition, particularly given the clarity of his exposition on profitability within a single, focused chapter in his 1825 edition of the *Principles*.

3. McCulloch: new (but old) evidence?

This section will expound the idea that in the first edition (1825) of one of McCulloch's principal work, namely *The Principles of Political Economy; with a sketch of the rise and progress of the science*, and particularly in Part III, Section VIII discussing the theory of profits, several clear insights regarding a *physical* determination of the rate of profit, with the *agricultural sector* being in a special position, are detectable[3]. What is fundamentally at stake is the dependence of the profit rate upon a surplus product, instead that on values[4]. In this debate, the agricultural sector occupies a special analytical position because of the homogeneity between input and output, making the measurement of physical surplus, and hence the determination of the profit rate, particularly transparent. However, as Torrens himself demonstrated, this principle is not confined to agriculture: the determination of the rate of profit by reference to a physical surplus can be generalized to the entire economy[5].

Extensive use will be made of quotations from the text, given the clarity with which McCulloch articulates his arguments on this point. The proper discussion about the rate of profit begins, then, at page 366:

> "Profits consist of the *excess* of the commodities produced by the expenditure of a *given quantity* of capital over that *quantity* of capital […]" (emphasis added)

Right after a stylized example of profit rate determination is set forth:

> "Suppose that an individual employs a capital of a 1000 *quarters* of wheat in the cultivation of a farm – 700 *quarters* being laid out in the payment of wages, and 300 in seed and other outgoings: Suppose now that the return to this capital is 1200 *quarters*: Under these circumstances, the proportion of the produce of industry, falling to the share of the labourers, will be that falling to the share of the capitalist as 7 to 5. But of the 500 quarters falling, in the first instance, to the capitalist, 200 are only profits, 300 being required to replace the quantity he had expended in seed, &c. In this case, therefore, the *rate* of profit would be said to be 20 per cent.; -

[3] If not specified, in the present paragraph citation are always taken from that Section, pp. 363-388.
[4] See on this point Fratini (2018).
[5] For a discussion of the generality of the surplus approach, and the claim that some commentators-notably Hollander-have overlooked this aspect, see De Vivo (1985, 2001). The theoretical generalization of the surplus principle is further developed by Garegnani (integrated sector) and Sraffa (standard commodity).

> meaning, that *the quantity of produce belonging to the capitalist, after all that has been laid out in its production is fully replaced, amounts to 20 per cent. of the capital employed*." (emphasis added, in the original emphasis only on 'rate')

It is evident the reference only to physical quantities of wheat used directly as capital and to pay wages, which in Classical economics is generally seen as part of the capital advanced. Langer (1982, p. 183), writing about Torrens, showed as part of the additional evidence he was pointing to the following quotation[6], and he commented that it "would appear to be the 'corn model' in its most unabashedly naïve form":

> "Profit is that net surplus which remains with the capitalist after the complete replacement of all his advances: --And the first circumstance which influences its rate is, the quality of the Soil under cultivation. If the farmer occupies land so fertile that the expenditure of a capital of 100 quarters of corn in tillage yields him a reproduction of 150 quarters, it is self-evident that the net surplus will be 50 quarters; and that, supposing no rent to be paid, the rate of agricultural profit will be fifty per cent."

It appears difficult not to see the striking analogy between what we would call the two unabashed corn models. Given McCulloch's physical determination of profit, one may wonder what relevance he attributed to market exchange in this respect. Here is the answer:

> "it is very commonly supposed, that profits depend on *exchanges*; but this is an *error*. The boot-maker, for example, who sells boots at 50s. which only cost him 40s. of outlay, does not make his 10s. of profit at the expence of his customers. He produces, in a given time, a *quantity* of boots equivalent to, or *worth* in silver, 50s. while the various expences to which he is necessarily put in the manufactures of these boots, only amount, *when rated in the same medium*, to 40s. But the very same thing will be taking place among his customers […]; and, consequently, in exchanging silver for boots, the one-party gains nothing at the expence of the other." (emphasis added, in the original on 'exchanges')

This passage illustrates McCulloch's conviction that the existence of a profit rate is fundamentally independent of market exchange; profits arise from the physical surplus generated in production rather than from gains achieved through trade. McCulloch himself encapsulates this argument succinctly in the following two lines, which serve as a concise summary of his thesis:

> "*Profits is in every case the result of more being produced in a given period, than is consumed in that period*. And the advantage that is found in exchanging one commodity for another, consists *entirely* in its enabling labour to be divided, and

[6] The quotation is from Torrens (1819, pp. 455-456), reported without the other half in which different profit rates come about when soil's fertility worsens or improves.

> commodities to be produced, in the best and most expeditious manner." (emphasis added)

It is noticeable here the similarity between the first sentence and the famous Ricardian statement: "The rate of profits and of interest must depend on the proportion of production to the consumption necessary to such production". Such quotation is reported by Sraffa (1951, p. xxxii), whose view was to take it as the nearest point Ricardo reached to explicitly stating his supposed 'rational foundation'. The second sentence reflects the influence of Adam Smith, as McCulloch explicitly acknowledges in the Introduction of the *Principles*; in particular, McCulloch credits Smith for demonstrating that the division of labour is the principal source for increasing the "productive powers of labour" or the "productiveness of industry", and that freedom of exchange is essential for enabling the circulation of commodities and the full benefits of specialization (see McCulloch 1825, pp. viii-ix, 62-65, 99, 372). Therefore, the general view of McCulloch emerges quite plainly: the physical excess of production over necessary capital outlays determines the existence of profits, while exchange boosts productivity.

Until this stage, McCulloch has largely been discussed as a "Ricardian", carrying forward the surplus-based "corn model" approach to profit. However, he also criticised Ricardo, and this critique concerns the proportionality issue already presented and emphasised by O'Brien. McCulloch targeted what he saw as Ricardo's error regarding profit, since he focused only on the proportional division of the final product between wages and profits, rather than on the productivity of the total capital invested. He states:

> "[Ricardo's wrong idea is that of] supposing it [profit] to mean the *real* value *of the entire portion of the produce of industry*, falling, in the first instance, to the share of the capitalist, without reference to the proportion which the *magnitude* of this produce bears to the *magnitude* of the capital employed in its production." (emphasis in the original, p. 367-368)

McCulloch's concern here is to prevent any confusion between two fundamentally different ways of seeing profit. He rejects defining profit based on the share of the final product the capitalist receives. Instead, he insists that the rate of profit must be a ratio determined by comparing the physical quantity of the surplus product to the total physical capital advanced. His insistence on this point, brought to the extent of challenging his mentor, leads him to conclude that "it will immediately be seen, that there are very many exceptions to Mr Ricardo's theory" (p. 368). This critique appears particularly striking given Ricardo's own pioneering use of a physical profit rate in his 1815 *Essay on Profits*, an insight McCulloch seems determined to preserve from any subsequent obscuration.[7]

Once physical origin of profit in McCulloch is at this point sustained *ad abundantiam*, the Scottish economist points out that if one wants to acquire a sharp insight upon the determinants of the profit rate, it would be appropriate to focus on *agricultural profits*, since:

[7] Nevertheless, an historical examination of the Ricardo-McCulloch relationship extends beyond the purpose of this study.

> "these profits admit of being *accurately measured*, and because agriculture is a branch of industry that must be carried on at *all times*, and under *all circumstances*." (emphasis added)

The caption 'accurately measured' that McCulloch singles out is very close to the one of Torrens quoted in De Vivo (2001, p. 700)[8]. Hence, the precision with which the agricultural profits can be estimated depends on the fact that in that branch there is the necessary homogeneity between commodities. The other reason that would back up the consideration of agriculture as a special sector is based on the fact that in order to carry on production in the economy, the products of agriculture cannot be dispensed with.

The next step, once he had discussed the existence of profits and then the sector in which they are most vividly recognized, was to talk about the setting of a general profit rate. In this case, no clear-cut reference to the agricultural profit rate as a 'benchmark' is given (p. 368):

> "It is plain, however, that it [agricultural activity] would not be carried on, if it did not yield as great a return to the capital invested in it, as other businesses; and it is equally plain, that these other businesses would not be carried on, if they yielded less return than is derived from agriculture. It necessarily follows, therefore, that the average returns obtained from agricultural industry, or agricultural profits, must be identical with the returns, or profits obtained from all other businesses."

McCulloch initially posits that competitive forces lead to a uniform rate of profit across all sectors, a condition where the agricultural profit rate does not appear to hold any distinct priority. However, the following sentence presents an example that seemingly reorients this initial stance, suggesting a determinant role for agriculture in establishing the general rate of profit (p. 369):

> "Whenever, for example, the average return to an outlay of capital or labour *worth* 100 quarters of wheat, employed in the cultivation of the soil, amounts to 110 quarters, we shall know, that L.100 employed in manufactures, must be yielding L.110 also: For, a regard to their own interest will not permit those engaged in those departments, to prosecute them for *less* profit, than is obtained in agriculture; and the competition of the agriculturists, will not permit them to obtain more." (emphasis added, in the original only on 'less')

This example distinguishes carefully between the agricultural and manufacturing sectors. The causal implication is that once the profit rate is determined in *physical* terms within agriculture (a 10% surplus of wheat), this rate then governs, in *value* terms (a 10% return in pounds sterling), the profit rate in manufactures. The use of 'worth 100 quarters of wheat' for

[8] See: "in his later *Address to the Farmers on the Low Rate of Profits in Agriculture*, where Torrens wrote that '[u]pon the supposition that the expenses of cultivation can be *accurately represented* by a given quantity of produce obtained' (i.e., on the supposition of homogeneity between capital and product)" (emphasis added on 'accurately represented'). See also Skourtos (1991, p. 221).

agricultural capital is particularly significant. While 'worth' might suggest a value-based measure, its application here—contrasted with the direct monetary valuation (L.100) for manufacturing capital in the same example—indicates McCulloch's persistent focus on physical determination in the agricultural sphere. If a purely value-based comparison for agricultural capital were intended at this point, McCulloch would have expressed prices in agriculture only in monetary units, similar to the manufacturing case. This linguistic choice suggests a deliberate distinction, preserving a physical accounting for the agricultural sector where inputs and outputs are homogeneous. This interpretation is again similar to Torrens's reasoning proposed by De Vivo (2001, p. 697): "in whatever proportion the quantity of produce obtained from the soil exceeds the quantity employed in raising it, in that proportion the value of manufactured goods will exceed the values of the food and material employed in preparing them" (Torrens, 1820, p. 362). The analogy to McCulloch's argument is compelling.

Focusing on the second half of the previous quote, it is said that a capitalist investing in manufacture cannot earn neither less, nor more profits than the ones obtained in agriculture: in the first case because it would not be rational, in the second because competition of the other sector prevents it. In other words, when the physical rate of profit is established in agriculture, it sets the benchmark for the other sectors as well, whose rate will be accounted for in value terms because of heterogeneity between capital and output, as in the already mentioned case of boots. Still, the doubt remains on why in the mid passage there appeared to be no priority to be assigned to agriculture, but the overall picture leaves, in our opinion, little doubts.

The argument continues by taking agricultural profits as a 'standard of all other profits', and a new stylized example similar to the previous one is proposed. To demonstrate how variables like wages, taxes, or industrial productivity affect profitability, McCulloch re-calculates the outcome using his initial "corn model" as a framework. This analytical method highlights a distinct pattern in his writing: although he frequently uses monetary terms when discussing the equalized profits that result from market competition, he consistently reverts to straightforward, physically-quantified examples—measured in 'quarters' of wheat —whenever he calculates profits and their variation. This reveals McCulloch's core belief that the logic of profit generation is best understood as a physical surplus, and, again, right at the end of the examples it comes the remark:

> "But profits, in the sense in which they are commonly understood, and as I now understand them, do not depend on real values, but on the *excess of the commodities produced above those expended in production*" (p. 371, emphasis added)

When dealing with an improvement of technical conditions in agriculture, the attached long comment is illuminating:

> "an increased productiveness of agricultural industry, whether it has been caused by the introduction of an improved system of agriculture, or by the repeal of restrictions on the importation of corn into a comparatively populous country, necessarily extends itself to other businesses, and has the effect to bring about a universal rise of profits: For, *as raw produce must always form the principal part of the labourer's subsistence*, and as his proportional wages must, in consequence, be mainly

> *regulated by the quantity of it* that he receives, his employers are able, after corn has fallen in price, to furnish him, at a *less cost*, with the same quantity of necessaries and conveniences he previously obtained. *The rate of profit will thus be universally increased*" (pp. 372-373, emphasis added)

The second part of the previous quote directly echoes a foundational hypothesis of the Sraffian interpretation of Ricardo's early theory of profits: namely, the conception of a wage basket composed predominantly of agricultural products.[9] The theoretical significance of this assumption, lies, again, in its capacity to render the rate of profit in agriculture determinable as a purely physical ratio (Ciccone and Trabucchi 2017). By positing corn as both the primary input (via wages) and the output in the wage-good sector, this framework allows the surplus, and thus the profit rate, to be calculated directly from physical quantities[10].
In this paragraph we therefore have a comprehensive picture of the McCulloch's viewpoint: profits arise because of the economy's capability to generate a physical surplus. The profit rate may be well defined resorting only to physical quantity, provided they refer to homogeneous items.

4. McCulloch 1825 vs. McCulloch 1864

In this section we counterpose a 'young' McCulloch to a 'late' one. In reviewing the evolution of the economist's thought on the issue, we are going to contrast the first edition dated 1825 of the book with the last one (July 1864), published some months before his death (November 1864)[11]. According to our reconstruction, the two editions provide the clearest example of how the initial adherence to the theory of the physical determination of the rate of profit progressively faded away up until the point of maximum detachment in 1864. McCulloch's intellectual trajectory reveals a progressive incorporation of value-centric considerations into his analysis of the profit rate, mirroring the intellectual evolution occurred to Torrens. Crucially, despite this evolution, some passages still reveal how the genesis of profit is contingent upon a physical surplus of commodities exceeding necessary consumption, despite the shift in favour of value reasoning.
The new definition of profits recites:

> "Profits must not, however, be confounded with the produce of industry primarily received by the capitalists. They really consist of the produce, or its *value*, remaining to those who employ capital in industrial undertakings, after all their *necessary*

[9] This hypothesis, as argued by Vianello (2002), has a distinct Smithian origin. Vianello demonstrates that Ricardo and his contemporaries inherited the idea from Adam Smith, who in his *Wealth of Nations* posited that the money wage is ultimately regulated by the price of corn because it must allow the worker to purchase a fixed quantity of it for subsistence. This Smithian framework was widely accepted at the time and seen as a legitimate simplification for analysing profits.
[10] It is remarkable that the formulation is so straightforward to hardly make room for disputes about the wage basket composition, as in Rankin (1984), who retraces the argument about this specific point between Hollander (1983) and Garegnani (1982, 1983). The fact that a major part of the basket is constituted of raw produce permits to reason in simplified terms; the weight of such a hypothesis was a burden that Ricardo felt relieved of once he moved to the labour theory of value under Malthus' pressure.
[11] Death occurred the 11th of November 1864, while the fifth edition has a preface bearing the dating July 1864.

> *payments* to others have been deducted, and after the capital wasted or used in the undertakings has been replaced." (1864, pp. 452-453, emphasis added)

The unmistakable reference to quantities spelled out earlier is now placed on values and payments. Then we have again the critique to Ricardo's view of profits, in which another remark on the definition of profits is provided:

> "if we consider profits in the light in which they are invariably considered in the real business of life,—as the produce accruing to capitalists after the capital expended by them in *payments and outgoings of all sorts* is fully replaced,—it will immediately be seen that there are innumerable exceptions to Ricardo's theory." (p. 455, emphasis added)

Soon after there is the focus on the agricultural sector:

> "It will facilitate the acquisition of precise ideas respecting the circumstances which determine the average rate of profit in different employments, as that term is commonly understood, if we confine our attention, in the first place, to those which determine profits in agriculture, both because the latter admit of being *accurately measured*, and because *they may be taken as representing profits in other businesses*." (p. 455, emphasis added)

Here it seems that the agricultural sector does represent profits because there one may accurately measure them, but the profit rate is set elsewhere. However, similarly to the 1825 edition, McCulloch soon after states that since agriculture is a branch of production that must be "carried on at all times, and under all circumstances", it necessarily implies that "the returns obtained from agricultural industry, or agricultural profits, may, in ordinary cases, be considered as identical with the returns or profits obtained from other businesses" (p. 455). To illustrate the equalization of profits, McCulloch introduces an example in his 1864 edition that bears close similarities to its 1825 counterpart:

> "Whenever, for example, the average return to an outlay of capital or labour worth £100, employed in the cultivation of the soil, amounts to £110, we may safely infer, that £100 employed in manufactures is also yielding £110." (McCulloch 1864, p. 455-456).

However, the critical difference lies in the unit of account used for agricultural capital. Whereas the 1825 edition valued capital, as we have seen before, 'worth 1000 quarters of wheat'—a direct link to a physical quantity—the 1864 version values it at 'worth £100.' This change places both agricultural and manufacturing capital on the same monetary valuations, removing the explicit physical calculation that was central to his earlier argument. However, few pages later he clarifies again that "profits, in the sense in which they are practically understood, and as we understand them, do not depend on cost, but on the excess of the commodities produced above the commodities or capital expended in their production" (McCulloch 1864, pp. 457-458).

Then we find again the same sentences as mentioned before from the *Principles* 1825 at page 372-373:

> "an increased productiveness of agricultural industry, whether it has been caused by the introduction of an improved system of agriculture, or by the repeal of restrictions on the importation of corn, most commonly extends itself to other businesses, and brings about, in the end, a universal rise of profits: for, as raw produce forms the principal part of the labourer's subsistence, and as he obtains a larger quantity in exchange for the same amount of money, after it has fallen in price, his condition is in so far improved; and a *stimulus* being, in this way, given to *population*, and the *supply of labour increased, wages are reduced, and the rate of profit proportionally raised*." (p. 458, emphasis added)

Despite subsequent developments driving the general opinion about profitability astray, in the years in which Ricardo was engaged in purporting his views about profitability (and also for some year after his sudden death) other authors close to him deeply absorbed those teachings. It is therefore not surprising at all that among them one can find John Ramsay McCulloch, perhaps his closet disciple. A disciple that maybe, given his hard training with the Ricardian orthodoxy, did not want not even his intellectual master to step away from that illuminating and brilliant intuition. This notwithstanding, later developments led McCulloch to resort much more to value considerations, thereby distancing themselves from the initial physical determination of profits.[12] In light of this reconstruction, the evolution of McCulloch's thought on this issue looks like a carbon copy of the intellectual development undertaken by Torrens on the subject (De Vivo 1996, 2001).

5. Conclusions

This paper argues that John Ramsay McCulloch provides a clear articulation of the "corn-ratio" theory of profit in his 1825 *Principles of Political Economy*. While McCulloch is often, and justifiably, analyzed for the theoretical inconsistencies found throughout his works (De Vivo 2017), our analysis demonstrates that the 1825 edition, by contrast, presents a theory of profit that is unambiguously grounded in a physical framework. McCulloch's 1825 arguments, much like the principles found in Torrens, exemplifies the corn-ratio theory Sraffa ascribed to

[12] A comparative analysis of the last topics presented in the *Principles* 1825 and 1864 reveals a discernible evolution in his theoretical framework. In the first edition, the concluding section of Part III, Section VIII, unequivocally identifies the "decreasing fertility of the soil" as the "great and constantly operating cause of a fall of profits" (McCulloch 1825, p. 388). This position strongly reflects the Ricardian concern with the physical constraints of agricultural production as the ultimate regulator of the general rate of profit, a stance consistent with early "corn model" interpretations. McCulloch's argument here is direct: "unless the power to employ capital advantageously had been diminished, profits could not have fallen" (McCulloch 1825, p. 376), where this power is fundamentally the productivity of land. Conversely, the concluding pages of Part III, Chapter VIII in the 1864 edition is by a significant discussion on the influence of "changes in the value of money" on profit rates (McCulloch, 1864, pp. 476-480). This shift in the concluding framing—from a primary focus on the physical constraint of soil fertility to a more generalized interplay of productivity, wages, taxes, and monetary factors—lends credence to the argument that McCulloch's conceptualization of profit theory evolved, incorporating a more extensive and nuanced value-based perspective in his later work.

Ricardo: the profit rate is determined as a physical ratio in agriculture, where corn serves as both input and output, and this physical rate then governs the value-based rate of profit across the rest of the economy. This is further evidenced by his definition of profit as a physical "excess of the commodities produced", his calculation of the profit rate in "quarters of wheat", and his direct insistence that profits do not depend on "exchanges". This physicalist stance, however, stands in stark contrast to his later work. As our comparative analysis demonstrated, McCulloch's intellectual trajectory shows a progressive abandonment of this direct physical determination, even though it retained some role. However, despite this evolution that has paralleled the one of Torrens, McCulloch's 1825 *Principles*, in our view, may serve as another confirmation that the corn model is, as Skourtos (1991, p. 226) argues, "deeply rooted in the classical tradition and almost always explicitly connected to Ricardo's work".

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