

# The Reproduction of money material in Marx's *Capital II* (by way of a critique of Sandemose's 'gold digging')

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## Abstract

The question of the reproduction of money material is a crucial feature in the investigation of the cycle of the total social capital that Marx tackled in the context of simple reproduction analysis in Part Three of *Capital II*. However, his inquiry was left unfinished, so the problem remained ultimately unsolved. This unsettled character was first identified by Luxemburg and later by Grossman. Sandemose attempted to reconstruct the 'missing fragment' of Marx's investigation, where the analysis of the reproduction of the constant capital of gold producers should have been accomplished, alleging that its absence contributed to keep out of sight a central problem addressed there by Marx: that is, 'the problem of the excess money necessary for the passage from simple reproduction to accumulation'. Sandemose claims also to have accurately reconstructed the passage, attaining a definite solution to the problem that Marx left unanswered. This article shows that both allegations are completely unwarranted. First, it demonstrates that under simple reproduction assumptions there is actually no (net) hoard formation ('excess money'), in spite of Sandemose's claim. This also entails a critique of Marx's conclusions. As a corollary, Sandemose's thesis that the central problem Marx addressed there was that of the 'excess money' needed for accumulation proves to be untenable. Second, the article also demonstrates that Sandemose's reconstruction of Marx's 'missing fragment' is fundamentally flawed, offering at the same time a consistent alternative. By this means, the investigation initiated by Marx is finally completed. As a result, and beyond its outward polemic character, this article actually renders an ideal (i.e. in thought) simple reproduction of the

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real process of reproduction of the total social capital, where replacement of the money material is fully taken into account.

### Keywords

Marx's *Capital*, money material replacement, reproduction schemes, simple reproduction analysis, total social capital gold production

## Introduction

Marx (1992 [1885]) investigates the question of the reproduction of money material as a specific aspect concerning the (simple) reproduction of the total social capital. However, his inquiry was left unfinished, so the problem remained ultimately unsolved in Marx's text. This unsettled character was first identified by Luxemburg (2003 [1913]) and later by Grossman (2018 [1931]), while Sandemose (2006, 2010) brought the issue to the present. This article was born, in fact, out of a discussion of Sandemose's standpoint on the matter.

Sandemose (2006) engaged in an attempt to reconstruct a 'missing fragment' of Marx's investigation of the reproduction of money material, where analysis of the reproduction of the constant capital of gold producers should have been accomplished. He alleges that the absence of such fragment has contributed to keep out of sight, in most analysis of *Capital*, a central problem addressed there by Marx: that is, 'the problem of the excess money necessary for the passage from simple reproduction to accumulation' (Sandemose 2006: 528–529). Sandemose (2006) claims also that he has provided an accurate reconstruction of Marx's 'missing fragment', and therefore a definite solution to the problem of the reproduction of money material that Marx left ultimately unanswered.

This article shows that both the allegations are completely unwarranted. First, it demonstrates that under simple reproduction assumptions there is actually no (net) hoard formation ('excess money'), in spite of Sandemose's (2006) claim. This also entails a critique of Marx's (1992 [1885]) own conclusions (which Sandemose merely re-establishes): that is, that even under simple reproduction conditions there is hoard formation or accumulation of money. As a corollary, Sandemose's thesis that the central problem Marx addressed at that point of his investigation was that of the 'excess money' needed for accumulation, proves already to be untenable. Second, the article also demonstrates that Sandemose's reconstruction of Marx's (1992 [1885]) 'missing fragment' (i.e. the reproduction of the constant capital of gold producers) is fundamentally flawed, offering at the same time a consistent alternative. By this means, the investigation of the simple reproduction of the total social capital when it explicitly considers the replacement of the money material, initiated by Marx (1992 [1885]), is finally completed. As a result, beyond its outward polemic character, this article actually renders an ideal (i.e. in thought) simple reproduction of the real process of reproduction of the total social capital in which replacement of the money material is fully taken into account.<sup>1</sup>

The article is structured as follows. Section 'General placement of the problem and its investigation through analysis of the reproduction of gold producers' variable capital and

surplus value' places the question in the broader context of analysis of the investigation of the reproduction of the total social capital, tracks down the reproduction of the variable capital and surplus value of gold producers, and discusses some methodological issues concerning simple reproduction analysis that are crucial for understanding of the essential problem at stake, demonstrating that there is actually no hoard formation under simple reproduction conditions. Section 'Reproduction of gold producers' constant capital' tracks down the reproduction of the constant capital value of gold producers and unfolds the critique of Sandemose's (2006) reconstruction of Marx's 'missing fragments', disclosing by this means the internal relations that are absent in *Capital* II. Section 'Gathering the scattered pieces: simple reproduction of the total social capital as it explicitly includes the reproduction of money material' gathers the separate pieces into a single formulation basically following Marx and Sandemose's two-department presentation. Section 'The three-department representation: a final methodological remark' discusses and briefly lays down the methodological grounds for a three-department formulation. Finally, section 'Conclusion' summarizes the main results.

## **General placement of the problem and its investigation through analysis of the reproduction of gold producers' variable capital and surplus value**

In *Capital* II, Part Three, Marx (1992 [1885]) sets out to examine the cycle of the total social capital, that is, the cycles of individual capitals considered in their totality, which encompasses both capital and general commodity circulation, and accordingly, also productive and individual consumption as a whole. The main question Marx (1992 [1885]: 469) considers there is how the replacement of capital consumed in production takes place, both in value and in its natural form, out of the annual product, and how the course of this replacement is intertwined with workers and capitalists' consumption.

Marx's (1992 [1885]) investigation of the reproduction of money material is placed in this general context, and specifically within simple reproduction analysis of the global movement of the total social capital. The accumulation proper is explicitly left aside (abstracted from), in order to track down in its purest and simplest form the process of metamorphosis through which the movement takes place; a process that involves, of course, the change in both the social and natural forms of the global annual product.

Thus, even if we consider the question at stake only from this general methodological perspective, it would be rather awkward to examine at this point the problem of the 'excess money' (supposedly) necessary for 'the passage' from simple reproduction to accumulation, which Sandemose (2006: 528) declares to be the central issue that Marx has at scope there.<sup>2</sup> Indeed, if accumulation proper is analytically excluded at this stage of the investigation, the same goes for any necessary conditions for accumulation proper to take place (beyond those already comprised in simple reproduction).

However, Marx (1992 [1885]) actually contends – as Sandemose notices – that 'even simple reproduction, which excludes accumulation in the strict sense of the term, i.e.

reproduction on an expanded scale, necessarily involves the storage of money, or hoard formation' (Marx 1992 [1885]: 548). This confronts us with two questions: does simple reproduction *necessarily* involve the storage of money? And if so, where does this *necessity* come from rather than accumulation proper, which by the very premise of the analysis is excluded? In the search for an answer, I will go into a more detailed examination of both Sandemose and Marx's presentations.

This task is greatly facilitated by Sandemose's (2006) judicious decision to preserve unaltered the original assumptions under which Marx carried out his analysis. Marx's well-known numerical representation of the total annual product in its two-fold existence as value and use value is as follows

$$\begin{array}{l} \text{I} \quad 4,000c_1 + 1,000v_1 + 1,000s_1 = 6,000 \\ \text{II} \quad 2,000c_2 + 500v_2 + 500s_2 = 3,000 \end{array}$$

By this means, Marx represents the total social capital, that is, the totality of individual capitals, divided into two different departments (I and II). Each one of these departments encompasses many individual capitals, and therefore constitutes itself a social capital; but it is only a determinate fraction of the actual total social capital. Marx depicts here (as we will see later) the total social capital immanent differentiation between capitals producing the means of production (Department I) and capitals producing the means of consumption (Department II).

Following his usual method, he represents the different component parts of the total annual value of the product of each department by the corresponding proportional parts of the product itself. The letter *c* denotes the portion of the product of each department that represents the constant capital value consumed, while the value product (the newly created value) of each department is depicted – along with its immanent division between variable capital (reproduced) and surplus value – by the letters *v* and *s*. The subscripts 1 and 2 that follow these letters have been added to identify the department (I or II) to which the corresponding portion of the product belongs.

The example is based – as Sandemose (2006: 529) remarks – on the assumption of equal rate of exploitation and value composition of capital in both the departments. The numerical expressions represent sums of money that are supposed to immediately reflect the underlying value content of the corresponding portion of the social product. It is also assumed that there is enough gold functioning as money to mediate the circulation of the whole annual product of 9,000. On this grounds, Marx (1992 [1885]) identifies the determinate reciprocal relation between the total social capital of both the departments, rendering at the same time the simplest determination of individual capital – that is, the total social capital of each department – as an autonomous *fraction* of the total social capital. This relation is represented through the equation  $I(v+s) = IIc$ , which expressed in the numerical values of the example is

$$1,000v_1 + 1,000s_1 = 2,000c_2$$

It is quite easy to understand why. Let us first look at the representation of the total annual value of the product of Department I by the corresponding proportional parts of

the product itself, depicted in the former set of equations. Of the total annual value of 6,000, that is, the total commodity capital of Department I, existing under the natural form of means of production,  $4,000c_1$  is the portion that represents the constant capital consumed for its production. Consequently, this portion constitutes a part of the total capital value of this department that must be transformed through circulation ( $C' - M' - C$ ) into the objective elements of productive capital, that is, means of production. Which means that it is involved in exchanges that take place within Department I and does not directly concern the reciprocal relation between the departments. The same goes for the new value product created in Department II,  $500v_2 + 500s_2$ , representing, respectively, variable capital value and surplus value, embodied in the means of consumption. Inasmuch as under the simple reproduction premise surplus value is totally expended as capitalists' revenue, the circulation of this part of the total commodity capital of Department II occurs within this department and does not involve exchanges with Department I. On the contrary, under the simple reproduction premise, the portion of the total commodity capital of Department I representing new value product,  $1,000v_1 + 1,000s_1$ , embodied in means of production, ought to be transformed into means of consumption; while the  $2,000c_2$ , embodied in means of consumption, and representing constant capital value of Department II, in order to become productive capital, must be exchanged for means of production, that is, for the product of Department I. Therefore, the equation  $I(v+s) = IIc$  encompasses the simplest general condition of the unity of the total social capital's reproduction.

Marx (1992 [1885]: 546) investigates the reproduction of money material inserting gold production as a special segment in Department I. Arguing that besides serving as money material, gold is fit only for productive consumption, and hence qualifies solely as means of production. He assumes the total value of gold produced annually to be  $20c_{1g} + 5v_{1g} + 5s_{1g} = 30$  units of gold. The fact that gold is required for industrial purposes means that, even under simple reproduction assumptions, the annual gold production must exceed the quantity that is necessary to replace the wear and tear of circulation, that is, gold needed as money material, as Sandemose points out. Thus, the gold industry's annual product value should be analytically divided into two separate portions. In Marx's example – followed by Sandemose – these portions are assumed to be  $2/5$  demanded for industrial uses and  $3/5$  for the replacement of money worn out in circulation; proportions that are also supposed to be valid for the different parts of this product's value (Sandemose 2006: 530).

Under this premise, Marx (1992 [1885]: 546) starts to track down analytically the process of metamorphosis that mediates the reproduction of the gold producer's materialized value product:  $5v_{1g} + 5s_{1g}$ . He starts by pointing out that this is a portion of annual gold production that has to be exchanged for elements of  $IIc$ , that is, for the means of consumption necessary for the reproduction of workers and capitalists engaged in gold production. Therefore

$$5v_{1g} + 5s_{1g} = 10c_2$$

However, as Sandemose (2006: 530) also remarks, unlike the general determination governing the reproduction of  $I(v+s)$ , in this case only  $2v_{1g} + 2s_{1g}$  are meant to serve as

means of production in Department II, while  $3v_{1g} + 3s_{1g}$  are supposed to function merely as (new) *means of circulation*. He then starts to examine Marx's account of the exchange between  $5v_{1g}$  against  $5c_2$ .

Marx (1992 [1885]: 546) depicts the reproduction and circulation of gold producers' variable capital ( $5v_{1g}$ ) as a process that starts with the outlay of a corresponding amount of gold already present in circulation, that these capitalists advance as money capital in order to buy labour-power. Gold industry workers spend this money, received as salary, in the acquisition of means of consumption, that is, of an equal amount of the product of Department II ( $5c_2$ ). At this point, the capitalists of Department II have realized in (the same pieces of) money the commodity capital embodied in those means of consumption, whose value represents an equivalent part of the constant capital consumed in Department II. This money is now, therefore, in the hands of the capitalists of this department, and represents the money form of the respective portion of their constant capital value. But *here* is precisely where the problem starts. Of this  $5v_{1g}$  in money (that as noted above existed already in circulation) only  $2v_{1g}$  is bound to be spent in the acquisition of gold to be used as means of production in Department II, in order to replace the gold consumed as raw material for the production of means of consumption. The remaining  $3v_{1g}$  in money will be spent in the replacement of means of production consumed other than gold, and consequently will not return to the hands of the gold producers, finding, instead, their way into the hands of some of the remaining capitalists of Department I.

Although in any other industry capital reproduction would have become impossible, this is not the case for gold producers. Indeed, the production process has put in their hands, in place of the original  $3v_{1g}$  advanced in (previously circulating) money, an equivalent value (representing newly reproduced variable capital) embodied in gold, that is, the money material. Therefore, gold producers can reproduce the money form of their variable capital out of the natural form of their product: they merely have to take an identical amount of the (new) gold just extracted from the mine and use it as money. To this extent, gold producers reproduce the money form of their variable capital without any mediating engagement with Department II capitalists. Marx (1992 [1885]: 547) calls attention here also to the fact that all this already entails a change in the quantity of money actually or virtually in circulation.<sup>3</sup>

Yet, if by this means gold producers in Department I have managed to reproduce the money form of their variable capital, from the point of view of Department II capitalist things are not so clear. Certainly, they have sold  $5c_2$  in means of consumption to gold workers, in exchange for the money form of gold producers' variable capital: money that was paid to gold workers as salaries, out of money already present in circulation. This means that, for capitalists II, the money received constitutes the money form of their constant capital value. Therefore, in the hands of capitalists II this money is determined to function as means of circulation of capital: they ought to use the whole  $5c_2$  in money to replace the material elements of their productive capital, that is, to buy means of production. The consequence – already mentioned – would be that a portion of this money, over and above the quantity that is required to buy the gold metal that replaces the raw material (i.e. gold) consumed for the production of means of consumption, will necessarily be spent in the acquisition of means of production other than gold. Ultimately, this

would determine a shortage of means of production, and therefore the impossibility to fully replace the material elements of the total social capital's constant productive capital consumed.

This is why Marx points out that the excess money in question 'must be completely transferred from IIc to IIs . . . and the corresponding commodity value must be transferred, conversely, from IIs to IIc', which means that in Department II 'a part of the surplus-value is stored away as money hoard' (Marx 1992 [1885]: 547–548).

The investigation of the exchange between  $I_s_g$  (i.e. the surplus product of gold producers) and IIc delivers similar results. In this case, Marx (1992 [1885]: 548) observes that, regarding  $5s_{1g}$ , gold producers can always appear as buyers, throwing their surplus product directly into circulation as money, in exchange for the other portion of Department II total means of consumption, that is,  $5c_2$ . So, inasmuch as this gold, cast into circulation to cover capitalists' individual consumption, is not used as means of production in II (i.e. given the present assumptions, up to an amount of  $3s_{1g}$ ), it becomes as well 'an element of hoard formation' in that department (Marx 1992 [1885]: 548).

At this point, Marx draws the following conclusion:

It is clear – even leaving aside the Ic, which will be considered later – that even simple reproduction, which excludes accumulation in the strict sense of the term, i.e. reproduction on an expanded scale, necessarily involves the storage of money, or hoard formation. And since this is repeated anew each year, it explains the assumption from which we proceeded in considering capitalist production, namely that at the beginning of the reproduction process, the capitalists in departments I and II must each already possess a quantity of the monetary medium which corresponds to the amount of commodity exchange. There is even storage of this kind after deduction of the gold lost by the abrasion of the money in circulation. (Marx 1992 [1885]: 548–549)

It is worthwhile to analyse this passage carefully, as it contains some clues to assess Sandemose's contention that the fundamental subject of Marx's investigation in Chapter 20, section XII, of *Capital* II, is the problem of 'excess money' needed for accumulation.

To begin with, Marx holds that from the tracking down – done so far – of the exchanges that the reproduction of money material involves, it becomes evident that even simple reproduction 'necessarily' entails hoard formation. However, it should be noted that this *necessity* is actually *not* provided by the analysis: hoard formation follows directly from the *premise* on which that analysis is carried out. In other words, it is the immediate consequence of the *assumption* that the amount of gold annually produced *exceeds* the quantity that is demanded both for industrial purposes as means of production and for the replacement of the gold functioning as money that is lost every year as a result of the wear and tear of the money in circulation. Notwithstanding, to keep the analysis strictly inside the bounds of simple reproduction, the accurate assumption should have been that the amount of gold annually produced *equals* the quantity demanded for those two purposes.<sup>4</sup> No doubt, Sandemose offers a 'necessity' where it is lacking (i.e. he argues that additional money is needed for accumulation), but one that is inconsistent with the premise of simple reproduction analysis, and therefore, literally *out of place*.

However, Marx also calls our attention to another thing. That is, to the fact that the repetition, year after year, of this hoard formation, provides the *foundation* for the assumption from which the investigation of the reproduction process proceeds in the first place, namely that capitalists in both departments are, from the outset, in possession of the quantity of money needed for commodity circulation. More precisely, Marx points out that this assumption presupposes that the quantity of gold annually produced exceeds the quantity needed to satisfy the industrial demand and the replacement of the money material lost by wear and tear in circulation, that is, that there is a net storage of gold. Thus, it is quite clear that what Marx is addressing here is not the problem of the 'excess money' needed for 'the passage from simple reproduction to accumulation', as Sandemose contends, but instead, the problem of *where the sum of money needed for global commodity circulation* (and therefore for the circulation of the total social capital) *comes from*. A sum of money that, until now, was merely *presupposed* to be in existence and in the hands of the capitalists of both departments. In other words, Marx's inquiry is not about the *excess* money needed for *accumulation*, but about the money *necessary* for *simple reproduction*.<sup>5</sup>

However, even if this were conceded, Marx's own answer to the question of the origin of the necessary money for the total social capital's circulation is actually doubtful. And it is so precisely for the same reason that Sandemose's claim is: it is incongruent with the very premise of simple reproduction under which that answer is carried out. Indeed, the only valid assumption under simple reproduction premise is the one Marx (1992 [1885]) himself had already laid down in the context of the investigation of surplus value circulation in Chapter 17, section I, of *Capital* II: that the volume of the annual production of the money material (i.e. of gold production over and above the quantity demanded for industrial purposes) is exactly in conformity with the quantity of metal that is annually lost by wear and tear in circulation. Contrarily, the assumption of any *excess money* over this quantity belongs to expanded scale reproduction analysis, where accumulation proper is considered. Yet, by no means should this be understood as if the question itself is not pertinent at this point of the inquiry; it certainly is: I simply argue that a full answer is not possible. Let me expand briefly on this issue.

What can simple reproduction analysis tell us about where the sum of money *necessary* for the reproduction of the total social capital *comes from*? As I have already observed, the only valid assumption regarding the scale of gold production as money material in simple reproduction analysis is that it is equal to the quantity of gold material lost by the abrasion of the money in circulation. This means, in turn, that the total sum of money, that is presupposed to be in existence for global commodity circulation, remains *unchanged* year after year. As a consequence, nothing can be said about how *that* quantity of money (rather than any *other* quantity) was brought into existence. Still, the simple reproduction analysis of the annual reproduction of the money material positively tells us something about this money.

Indeed, the replacement, repeated anew each year, of the money material lost by abrasion in the process of circulation, shows us, after a certain number of periods, that of the totality of the value<sup>6</sup> of gold originally (presupposed to be) functioning as money, not a single atom remains. At least *formally*, every portion of the value of gold money in circulation is *new* value, thrown bit by bit into circulation by an annual production of the



material for money that does *not* exceed in a single grain the amount needed to replace the annual loss. Therefore, simple reproduction analysis of the reproduction of the money material also makes immediately evident another thing. Namely, that money necessary for global circulation, the existence of which was until now merely *presupposed*, actually comes from the annual labour set in motion by the total social capital. In other words, it becomes clear that a portion of the total annual labour of society is spent, every year, in the production of the money material, only to ensure that the total sum of money needed for commodity circulation is preserved.

By this means, although still in a formal manner, the simple reproduction analysis of the repeated process of social reproduction gives us the *foundation* of that analytical presupposition. That is, it makes clear that the quantity of money *necessary* for the *simple reproduction* of the total social capital – and not for accumulation proper as Sandemose contends – is nothing more than a portion of the privately realized annual total social labour, *fixed*, year after year, under the natural form which happens to be the bearer of the money-form of commodities. Furthermore, as long as gold production over and above what is demanded for industrial purposes can only be exchanged for a portion of the surplus product – as has partly been stated and will be fully shown later on – the value that yearly becomes fixed under the figure of the money material is itself necessarily *surplus value*. Therefore, it becomes also clear that the money *necessary* for the *simple reproduction* of the total social capital is nothing more than surplus value *accumulated*, that is, fixed as mere instrument for commodity circulation.<sup>7</sup>

At this point, it is easy to see that Sandemose's claim that 'the hoarded coins cannot be the origin of replacement gold', inasmuch as (supposedly) they 'will not *yet* enter circulation, since they have got no commodities to buy' (Sandemose 2006: 533, emphasis added), arises directly from his assumption that gold hoarding can *only* be an expression of the *excess money* necessary for accumulation proper. Moreover, it involves the bundling of two distinct things or *money-material-commodity-form-determinations*: replacement money and excess money necessary for accumulation. In other words, Sandemose cannot figure out how hoarded coins actually replace the gold functioning as money that is annually lost by wear and tear, because he sees this hoarded coins, exclusively, as excess money needed as means for the circulation of an expanded global commodity value, that is, for accumulation, which means the hoarded coins are not *yet* required.

## Reproduction of gold producers' constant capital

While reproduction of the constant capital value of the producers of means of production generally involves exchanges that take place exclusively inside the aggregate Ic (i.e.  $4,000c_1$ ), this is only partially true once gold production of the money material is included in Department I, as Sandemose (2006: 535–536) points out. Sandemose (reasonably) assumes that gold demand for industrial purposes in Department I follows the same (arbitrary) pattern that Marx assumed regarding this kind of demand in Department II, that is, that it amounts to  $2/5$  of  $Ic_{1g}$ . On this basis, if the total constant capital value of gold producers is  $20c_{1g}$ , existing in gold, and therefore, the remaining constant capital value in department I amounts to  $3,980c_1$ , existing in means of production other than gold, it then follows that the replacement in kind of this remaining constant capital value

only requires  $8c_{1g}$  (i.e.  $2/5$  of  $20c_{1g}$ ) in gold. As a consequence, gold producers would have no demand for the  $12c_{1g}$  in gold, representing the rest of their constant capital value. Yet, as well as the  $8c_{1g}$  in gold for which there is demand in Department I, they must equally transform the  $12c_{1g}$  in gold, for which there is no demand as means of production, into the corresponding elements of their productive capital. In any other particular production, the lack of demand would have meant the impossibility to reproduce the capital value advanced. But the natural form of gold producers' product is itself the money-form of commodities. Therefore, they can just throw it as money in circulation, and buy the elements that they need to reproduce their constant capital value in kind. However, as Sandemose remarks, this would imply that the rest of  $Ic$  (i.e.  $3,980c_1$ ) would be lacking the material elements for its replacement in kind, up to a value of 12 in money. Sandemose also believes that the hoarding of this sum, as was the case in Department II, is not possible here, because 'all of the material product  $I(v + s)$  has been exchanged against  $IIC'$ ' (Sandemose 2006: 535–536). Notwithstanding, he tells us also that all these difficulties can be easily overcome without disturbing simple reproduction, if we just 'add 12 in value to the aggregate  $Ic$ , so that it comes to have the original magnitude of 4012', offering, by this means, what he takes to be a 'correct version of Marx's general simple reproduction model' (Sandemose 2006: 536)

$$I \quad 4,012c_1 + 1,003v_1 + 1,003s_1$$

$$II \quad 2,000c_2 + 500v_2 + 500s_2$$

It is easy to see that this is *no* solution to the problem. Indeed, the 12 units in value thus added to the aggregate  $Ic$  mean, not only that there is an additional *supply* of means of production in Department I, which taken alone would apparently solve – as Sandemose believes – the lack of material elements for the reproduction of  $Ic$  in kind, but also that there is an additional *demand* for means of production, up to an amount equal in value to the 12 units added. As a consequence – despite Sandemose's claim – the problem remains unchanged after this addition. Let me expand on this issue.

The aggregate of  $Ic = 4,012c_1$  can be divided into two parts:  $20c_{1g}$  representing the constant capital value of gold producers, and  $3,992c_1$ , representing the constant capital value of capitalists in Department I *other* than gold producers. As it was already pointed out above, out of the  $20c_{1g}$  in gold, only  $8c_{1g}$  is demanded for industrial purposes in Department I, and therefore, exchanged for an equivalent amount of value in means of production other than gold. This means that out of the  $3,992c_1$  in means of production other than gold, only  $8c_1$  are reproduced in kind through reciprocal exchange with the  $8c_{1g}$  in gold. As a result,  $3,984c_1$  remain to be exchanged by means of production other than gold. However, gold producers force into circulation, as money, the  $12c_{1g}$  in gold that are *not* needed for industrial purposes in department I. By doing so, they manage to appropriate in kind, out of the remaining  $3,984c_1$ , another  $12c_1$  in means of production. They thus accomplish the full replacement of the constant capital consumed in gold production. From the gold producers' standpoint everything looks just fine.

Yet, what happens from the point of view of capitalists in Department I other than gold producers? We just said that, out of the remaining  $3,984c_1$ , and over and above the first  $8c_1$  already considered, another  $12c_1$  in means of production had been sold to gold

producers, in exchange for  $12c_{1g}$  in gold functioning as money. As a result, capitalists in Department I – other than gold producers – possess a remaining total *supply* of only  $3,972c_1$  in means of production available for exchange. However, the remaining *demand* for means of production within Department I amounts to a total value of 3,984. A first portion of this demand arises from the change in form of the constant capital value embodied in the aforementioned  $3,972c_1$ , existing under commodity form. While a second portion stems from the corresponding metamorphosis of the constant capital value originally embodied in the  $12c_1$  in means of production, which had been sold to gold producers in exchange for  $12c_{1g}$  in gold functioning as *money*. Indeed, once in the hands of the sellers of those means of production, this gold becomes the *money form* of the constant capital value ( $12c_1$ ) of Department I capitalists other than gold producers. That is, it becomes constant *money capital*, and therefore must be spent in the acquisition of means of production. In short, all this means that there is an excess demand for means of production. Hence, after the addition of the ‘12 in value to the aggregate Ic’, which Sandemose (2006: 536) proposes as a solution to the lack of material elements for the replacement in kind of Ic, we are exactly in the same place as before: means of production are *still* lacking, and consequently simple reproduction cannot run undisturbed.

A proper answer to this riddle can only arise from a clear understanding of the actual problem at stake. The simple reproduction of a fraction of the constant capital value of gold producers (i.e. the  $12c_{1g}$ ) – as well as the reproduction of every other fraction of their total constant capital value – entails the productive *consumption* of an equivalent mass of means of production. Therefore, gold producers need to withdraw from the market such a mass of material elements in order to replace in kind this portion of their productive capital. However, the simple reproduction of this part of the constant capital value of gold producers does not *supply* the market with any commodity that is actually in demand, at its value, either for productive or individual consumption. Instead, it casts into circulation an equivalent amount of money, that is, of the money commodity (gold) in its function as means of exchange. Thus, no product is thrown into the market that could replace the material elements withdrawn, but rather a material element that is essential for the reproduction of the *form* itself under which social reproduction takes place in capitalism: the *money material*, that is, gold.

The simple reproduction of the total social capital necessarily requires a certain amount of *money* either as a direct means of exchange or as a hoard that enables the adjustment of the quantity of such means to the varying needs of commodity circulation. Consequently, inasmuch as *gold* functions as money, there is always a specific *demand* for gold over and above what is needed for industrial purposes: gold is demanded also as a means of circulation. Inasmuch as this demand is quantitatively fixed under the simple reproduction premise, the fact that a portion of the gold functioning as money is lost every year by wear and tear in circulation means that there is an annual demand for *new* gold that is equal in amount to that portion. Therefore, once more, the only assumption that is consistent with simple reproduction analysis, is that the *total* annual volume of the demand for the money material is in strict conformity with the total quantity of money lost by abrasion. Nevertheless, we are only dealing here with the reproduction of a *fraction* of the *constant capital value* of gold producers, whereas the replacement of the money material lost every year by abrasion involves also the reproduction of a fraction of

the *value product* ( $v + s$ ) of gold producers, as was already depicted above (see section 'General placement of the problem and its investigation through analysis of the reproduction of gold producers' variable capital and surplus value'). So, in sum, the simple reproduction of the fraction of the constant capital value of gold producers that is in excess of the quantity of metal demanded for industrial purposes in Department I (i.e. the  $12c_{1g}$ ) *presupposes* a specific demand for money material that is equal to it in value.

What is the *source* of this specific demand? In the first place, the only actual source of demand in capitalism is the *value form* of the annual product, that is, the social character of the annual privately and independently performed socially necessary labour. Moreover, as we are ultimately investigating the reproduction of the total social capital, this means that the origin of this demand can be no other than a definite portion of the value of the total annual product created in each of the two departments. In the second place, to be precise, we are focusing on the reproduction of a fraction of the *constant* capital value of gold producers, which is itself a fraction of the total social capital of Department I. This tells us, further, that the source of this specific demand for money is subject also to a specific *material* determination: this demand must necessarily proceed from a portion of the value of the total annual product of Department I, embodied in means of production. Because only a portion of the total social annual product constituted by means of production can mediate, through exchange, the replacement in kind of the corresponding fraction of the constant capital value of gold producers. Finally, the source of this specific demand is subject to a third condition: this demand cannot originate in any component of the value of the total annual product of Department I embodying capital value, that is,  $I(c + v)$ . This follows from the fact that these component parts mediate, respectively, the reproduction in kind of the constant capital value and (indirectly through exchange with Department II) the material reproduction of the variable capital value of Department I. Which means that not a single atom of the value of these parts can be subtracted without compromising the normal reproduction of the capital value of Department I. Altogether, this means that the specific demand for money at stake can have only one source: the surplus value of Department I.

Therefore, two things become clear at this point. On the one hand, that the (simple) reproduction of the total social capital, inasmuch as it includes the reposition of the money material lost by wear and tear in circulation, entails an (additional) exchange *within* Department I, between  $I_c$  and  $I_s$ . On the other hand, and as a consequence of this, that in the exchange between Departments I and II, not all the surplus value of Department I is involved, as we have been assuming so far: a portion of the surplus value of Department I is *excluded* from the exchange between both the departments.<sup>8</sup>

## **Gathering the scattered pieces: simple reproduction of the total social capital as it explicitly includes the reproduction of money material**

By now, our inquiry has already laid out the fundamental determinations at stake. First, we know that in the exchange between  $I_g$  and II, there is a portion of  $I_g(v + s)$ , representing gold that is in excess of what is in demand for industrial purposes in  $I_{II}$ , which

necessarily exchanges for a portion of IIs. Because, in order to replace the quantity of money (gold) lost each year by wear and tear in circulation, capitalists in Department II must transform an equivalent part of their surplus value, originally embodied in means of consumption, into new (replacement) money hoards. In turn, Department II capitalists' demand for money material enables the reproduction of the corresponding portions of gold producers' variable capital and surplus value. If we call  $s_{2(c)}$  the portion of IIs that capitalists in Department II must set aside to replenish their hoards of money for circulation, in terms of our numerical example, this means that

$$3v_{1g} + 3s_{1g} = s_{2(c)}$$

Second, we just acknowledged that, in the exchange between  $I(v + s)$  and  $IIc$ , not all the surplus value of Department I is involved. This means that  $I(v + s)$  is larger than not only  $IIc$ , but also  $II(c + s_{2(c)})$ . That is

$$v_1 + s_1 > c_2 + s_{2(c)}$$

Indeed, a fraction of the Department I surplus value is excluded from the exchange between both the departments. This is a portion of the surplus value of Department I that capitalists ought to set apart, once realized as money, to replace the portion of their money reserve annually lost by wear and tear in circulation.

Certainly, this means they cannot spend it in exchange for the product of Department II, to attend to their personal consumption. Let us call this portion of the surplus value  $s_{1(c)}$ . As we already noted,  $s_{1(c)}$  is exchanged *within* Department I, against the portion of  $I_g c$  which represents gold that is not in demand for industrial purposes in that department. In our numerical example

$$s_{1(c)} = 12c_{1g}$$

Therefore, by subtracting  $s_{1(c)}$  from the first term of the above inequality, we arrive at the equation that expresses the condition that governs the unity of the (simple) reproduction of the total social capital, once the replacement of the money material annually lost in circulation is taken into account as

$$v_1 + s_{1(e)} = c_2 + s_{2(c)} \quad \text{where } s_{1(e)} = s_1 - s_{1(c)}$$

As soon as we acknowledge that this is the (adjusted) general condition governing the (simple) reproduction of the total social capital, it becomes evident that the numerical example that we have been working with does not comply, and must be modified. We will rearrange it preserving untouched the (last) figures representing the total annual value of Department I (i.e.  $4,012c_1 + 1,003v_1 + 1,003s_1$ ). To do so, let us first calculate the value of the constant capital of Department II, which we obtain by merely reorganizing the latter equation

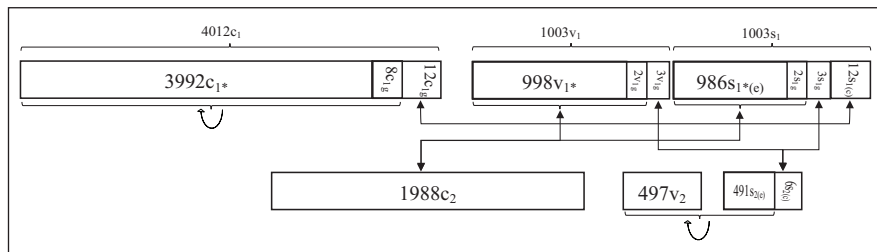
$$c_2 = v_1 + s_{1(e)} - s_{2(c)} = 1,988 \quad \text{where } v_1 = 1,003; s_{1(e)} = 1,003 - 12; s_{2(c)} = 6$$

Once we know  $c_2$ , the numerical values of the remaining components of the total value of the product of Department II follow directly from the assumption (on which all

the numerical examples where constructed) of equal value-composition of capital in both the departments. So the amended numerical example is

$$\begin{aligned} \text{I} & 4,012c_1 + 1,003v_1 + 1,003s_1 \\ \text{II} & 1,988c_2 + 497v_2 + 497s_2 \end{aligned}$$

Although at this point of our inquiry the internal reciprocal relations between the total social capital of each department have been fully disclosed, the graphical portrayal of this relations in the following figure would probably help to grasp them as a whole:



In the figure, the different components (c, v, s) of the total annual value of the product of each department are further broken down in accordance with the internal relations previously uncovered. Let us first look upon the reproduction of the various component parts of the product of Department I. The total constant capital value amounts to  $4,012c_1$ , which is divided into two parts:  $3,992c_1^*$  representing the constant capital of capitalists in Department I other than gold producers; and  $20c_{1g}$  representing the constant capital of gold producers in Department I. This  $20c_{1g}$  is divided, in turn, to reflect the qualitative internal differentiation of this portion of the material product. Only a fraction (i.e.  $8c_{1g}$ ) is required as means of production (and therefore properly qualifies as an element of Department I), while another fraction (i.e.  $12c_{1g}$ ) is demanded as (replacement) money material for commodity circulation. Indeed, whereas the reproduction of  $3,992c_1^*$  and  $8c_{1g}$  involves exchanges that take place within the aggregate Ic, the reproduction of  $12c_{1g}$  cannot take place through an exchange within this aggregate. The reason is simple: this portion of gold production is not demanded for the replacement in kind of the constant capital of Department I. However, neither can the reproduction of  $12c_{1g}$  take place through an exchange with Department II. The reason is also simple: the replacement in kind of the constant capital value  $12c_{1g}$  is obviously accomplished by the acquisition of means of production, that is, the product of Department I. In fact, as we have pointed out earlier, this part of the constant capital value of Department I is reproduced through an exchange with an equivalent part of the surplus value of Department I. This is depicted in the figure by the line between  $12c_{1g}$  and  $17s_{1(c)}$ .

Let us now focus on the total variable capital value Of department I of  $1,003v_1$ . As we can see, it is divided also into the corresponding two parts:  $998v_1^*$  representing the total variable capital of capitalists in department I other than gold producers, and  $5v_{1g}$  representing the total variable capital of gold producers in this department. This  $5v_{1g}$ , in turn, is further divided to reflect the aforementioned qualitative internal differentiation of this portion of the material product. Indeed, only a fraction of it (i.e.  $2v_{1g}$ ) is required as

means of production in Department II, while another fraction (i.e.  $3v_{1g}$ ) is required exclusively as (replacement) money material for circulation. Therefore, out of the total  $1,003v_1$ , only  $1,000v_1$  is reproduced through an exchange with IIc.

Finally, the total surplus value of Department I amounts to  $1,003s_1$ , and is divided into several parts. To begin with the last,  $12s_{1(c)}$  represents the portion that capitalists in Department I must set apart to reconstitute their money hoards, that is, to replace the money material lost in circulation. This is a part of the surplus value that is exchanged within Department I and against  $12c_{1g}$ . Next to it,  $3s_{1g}$  is a portion of the surplus product of Department I representing gold that is not in demand for industrial purposes in Department II. Therefore, this portion cannot enter an exchange with IIc. However, it should necessarily exchange for the product of Department II, inasmuch as it represents the surplus value that capitalists spend for their personal consumption. In turn, the  $2s_{1g}$  beside them is a portion of the surplus product of Department I representing gold that is in demand for industrial purposes in Department II, and that consequently enters the exchange with IIc. To finish with, the remaining  $986s_{1*}$  is the portion of the surplus product of Department I, constituted by means of production other than gold, which does not need to be set apart for replacement of the money material lost by wear and tear. This is a portion of the surplus value of Department I that is available for personal consumption expenditure, and therefore enters the exchange with IIc.

Altogether, this means that  $1,000v_1 + 986s_{1*} + 2s_{1g}$  are reciprocally exchanged for  $1,988c_2$ , while  $3v_{1g} + 3s_{1g}$  is exchanged for  $6s_{2(c)}$ , as depicted by the corresponding lines in the figure. The portions  $s_{1(e)}$  and  $s_{2(e)}$  of each department's surplus value represent the portions spent in them for capitalists' personal consumption. Of course, the portions of the product of Department II not mentioned are exchanged within that department.

## The three-department representation: a final methodological remark

So far, we have been unfolding our inquiry under the premise, set by Marx and followed without further comments by Sandemose, that the production of gold as money material should be included in Department I. The reason is that as well as 'metal production in general' (Marx 1992 [1885]: 546), gold functions as a means of production, and not as a means of consumption. But we might ask whether the reproduction of the money material should not be placed rather as a separate department, that is, as Department III. To be sure, the fact that we could accomplish the reproduction in thought of the (general determinations of the) real process of (simple) reproduction of the total social capital, explicitly considering the replacement of the money material, on the basis of a two-department classification, shows us already that this classification is ultimately not an insurmountable obstacle for the cognition of capital internal relations. However, it might not be the simplest path.

Marx's investigation of the process of (simple) reproduction of the total social capital is based on the identification of a fundamental distinction within the total annual product in which the total social capital is embodied; distinction that stems, directly, from capital's qualitative difference between constant and variable capital. Namely, the distinction between (capitals producing) means of production and (capitals producing) means of consumption,

that is, between Departments I and II. The essential internal difference between constant and variable capital, uncovered during the examination of the valorization process of (the individual) capital, is disclosed at this stage, also, as the most abstract determination of the reciprocal relation among different parts of the totality of individual capitals. As a result, individual capitals are (for the first time) authentically posited as autonomous *fractions* of the total social capital, that is, of that totality of individual capitals as such. The total social capital is thus *immanently* divided into those two well-known departments, and the cognition of the essential determinations of its process of reproduction is rendered possible through analysis of the necessary reciprocal relations between both of them.

However, once we explicitly consider the reproduction of money material, it becomes rather obvious that this internal difference between constant and variable capital, and the resulting distinction, within the social product, between (capitals producing) means of production and (capitals producing) means of consumption, does not provide us with a proper basis to reproduce in thought the real movement of the total social capital. Because, while this movement should necessarily entail the full unity between social production and consumption, the money material is rather *excluded* both from productive and individual consumption. Indeed, through the consumption of the money material, neither constant capital, nor variable capital in kind, nor the capitalist itself as an individual, is reproduced. The money material produced by capital is consumed, instead, as a means (instrument) for capital and commodity *circulation*. It is demanded for the replacement of the money that is necessary for circulation, but is annually lost by wear and tear in the same process. In other words, productive and individual consumption do not encompass the totality of capitalist consumption. Therefore, the qualitative differentiation, within the total social capital, as well as within the total annual product in which it is embodied, between (capitals producing) means of production and (capitals producing) means of consumption, that is, between Departments I and II, is not sufficient to adequately grasp how the process of reproduction – both in value and in kind – of the different parts of the total social capital take place, and how this process is intertwined with the whole process of consumption of the annual social product. An additional distinction becomes necessary.

Actually, that distinction has been implicitly introduced in the two-department analysis by identifying a specific portion of annual gold production as a portion for which there was no demand for industrial uses and that was required only as money. Yet, it might as well be brought to the fore by explicitly acknowledging a triple qualitative differentiation within the total social annual product, between means of production, means of consumption and means of circulation (money material); that is, between Departments I, II, and III.<sup>9</sup> The schematic representation of the total annual value of the product of each department and its different component parts might be formulated as follows

$$\begin{aligned}c_1 + v_1 + s_{1(e)} + s_{1(c)} &= \text{I} \\c_2 + v_2 + s_{2(e)} + s_{2(c)} &= \text{II} \\c_3 + v_3 + s_{3(e)} + s_{3(c)} &= \text{III}\end{aligned}$$

In this formulation, Department III represents exclusively the portion of the total social capital that is engaged in the production of money material, which means that



gold production for industrial purposes is included as a portion of Department I, but is not explicitly distinguished as such. In turn, the annual demand for the total product of each department is

$$I = c_1 + c_2 + c_3$$

$$II = v_1 + s_{1(e)} + v_2 + s_{2(e)} + v_3 + s_{3(e)}$$

$$III = s_{1(c)} + s_{2(c)} + s_{3(c)}$$

Therefore, the resulting conditions of (simple) reproduction are

$$v_1 + s_{1(e)} = c_2$$

$$s_{1(c)} = c_3$$

$$s_{2(c)} = v_3 + s_{3(e)}$$

As we can see, far from the intricacies entailed by the two department analyses unfolded above, the determinate exchanges between the different parts of the social product that mediate the (simple) reproduction of the total social capital emerge here in the purest and most patent form. All these relations were already examined in detail for the two-department presentation, so I will not go further into them again under this alternative formulation: the essential content disclosed remains absolutely unaltered.

## Conclusion

Let us summarize now the main points laid down in this survey. First, that Marx's assertion that even in simple reproduction there is hoard formation follows directly from the assumption – on which his example is premised – that the amount of gold produced each year exceeds the quantity demanded for industrial purposes and as money material, taken collectively; whereas the accurate assumption in the context of simple reproduction analysis is rather the strict correspondence between the quantity of gold annually produced and the two sources of demand. Second, that even if in Marx's presentation the actual necessity that determines hoard formation in simple reproduction is lacking, Sandemose's attempt to provide one by pointing out to the 'excess money' needed for 'the passage' from simple reproduction to accumulation is utterly incongruent with the simple reproduction premise and consequently out of place. Third, that – on the contrary – the real problem addressed by Marx is the question of where the money *necessary* for *simple* reproduction comes from. Fourth, that simple reproduction analysis provides – formally – the actual *foundation* of the analytical *presupposition* of the existence of a certain quantity of money necessary for circulation in the hands of the capitalist class. Fifth, that Sandemose's unwarranted claim that gold hoarding cannot be the source of replacement gold is based on his own (false) assumption that gold hoarding can only express the need of 'excess money' for accumulation proper. Sixth, that Sandemose's addition of 12 units in value to Department I constant capital is *no* solution to the problem of the lack of material elements for the replacement in kind of this department constant capital. Seventh, that a proper answer to this riddle can only stem from a clear understanding of the problem: the simple reproduction of a fraction of the constant capital of gold producers, while entailing the *consumption*

of an equivalent mass of means of production, does not correspondingly *supply* the market with means of production nor means of consumption; instead, it provides a material element that is essential for the reproduction of the *form* itself under which social production is organized in capitalism: the money material. Eight, that the source of the demand for the money material cast into circulation by the (simple) reproduction of the constant capital value of gold producers is necessarily (a portion of) the surplus value of Department I. Ninth, that, as a consequence of the latter, the (simple) reproduction of the money material actually entails an (additional) exchange *within* Department I between Ic and Is, which means that a portion of the surplus value of Department I is *excluded* from the exchange with Department II.

When the pieces of this puzzle are put together and the problem is examined as a whole, the fundamental equation expressing the condition that governs the unity of the (simple) reproduction of the total social capital, as it explicitly includes the reproduction of the money material, is obtained as  $v_1 + s_{1(c)} = c_2 + s_{2(c)}$ . In turn, this allows us to adjust the numerical example used so it would fit the conditions of simple reproduction, and to graphically portray all the relations at stake. Finally, further methodological aspects regarding simple reproduction analysis of the total social capital's reproduction process are discussed, and after considering the actual grounds of an alternative three-department presentation, the unity of the relations uncovered is also expressed again under this pure and simple formulation.

In sum, by means of a thorough critique of Sandemose's (2006) attempt to reconstruct Marx's (1992 [1885]) missing passages concerning the reproduction of money material, this article offers a solution to the problem of reproducing in thought the real movement of the total social capital's (simple) reproduction once it explicitly includes the replacement of the money material annually lost by wear and tear in circulation.

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## Notes

1. The reader might sincerely ask why should all this somewhat esoteric subject be of any relevance today, when gold no longer functions as a means of circulation in everyday exchanges, and there is therefore no question whatsoever about a need to replace the gold material lost in circulation by wear and tear, which is one of the assumptions that underlie Marx's analysis. Even if a full answer to these likely concerns were not possible here, a few comments would certainly be in place. Throughout this article, we will engage in the reproduction in thought of the total social capital real process of reproduction. The reader should be aware that this fact tends to be concealed by certain simplifying assumptions (i.e. simple reproduction), keeping in mind that those assumptions are only *means* for the scientific *inquiry* of that process, and should not be misunderstood as if the problem was rather about the selection of elements for the construction of economic 'models'. Certainly, outdated assumptions, like the need to replace the money material lost by wear and tear in circulation, contribute to that kind of misapprehension, because it seems that we are not looking into the real process of capital reproduction, but something else. However, the crucial question is always the uncovering of capital internal relations, and the relevance of Marx's analysis to the understanding of the present should be judged accordingly. Of course, wear and tear of the money material

in circulation is not a relevant question today. But it is equally manifest that gold still fulfils money functions as part of the international reserves of central banks, and of the privately constituted money hoards of individuals. This means that the production of money material is still necessary for capital accumulation. The simple reproduction analysis of the reproduction of the total social capital, when it includes the replacement of the money material lost in circulation, albeit outdated in a strict sense, already allows us to unravel the essential relations that mediate the reproduction of the total social capital under accumulation proper, when a portion of society's labour capacity is allocated to the production of the money material demanded for the expansion of the constituted gold hoards that accumulation proper implies. This should be no surprise: accumulation proper always encompasses a process of simple reproduction. Also, this analysis might be a great point of departure to understand the reproduction of the total social capital when it explicitly considers the portion that is disbursed for the pure circulation of commodities, which includes replacement of the means of circulation annually consumed that are neither means of production nor means of consumption. Finally, the textual references and polemic character are only an external wrapping and should not mislead the reader: the unfolding of the general determinations of the total social capital's process of reproduction is by no means a 'textual issue'. Simple reproduction analysis constitutes a moment in the ideal reproduction of the real movement of capital: it certainly must be transcended, but it cannot be cast aside.

2. On Marx's dialectical method see Caligaris and Starosta (2014); Iñigo Carrera (2013, 2015); Starosta (2017).
3. To be precise, what we can actually say at this point is that there is new gold *entering* circulation as money, up to a quantity that equals  $3v_{lg}$  in gold, for which  $Ic$  has no need as means of production. The actual change in the *total* quantity of money in circulation would depend also on the quantity of gold material fulfilling money functions that vanishes from circulation as a result of wear and tear of the money pieces.
4. Actually, this is precisely what Marx himself assumes when trying to answer *where does the money needed for the circulation of the surplus-value come from*, by placing the problem in its purest and simplest form, that is, under simple reproduction assumptions, in Chapter 17, section I, of *Capital II* (Marx 1992 [1885]: 399–418).
5. Marx had already placed the question in the context of his investigation of the circulation of surplus value, although as a 'general problem' not meant to be answered there, nor relevant to the question at stake at that point: 'where does the sum of money needed in a country for the circulation of commodities come from?' (Marx 1992 [1885]: 407).
6. It is out of the scope of this article to enter into any considerations whatsoever regarding the problem of productive and unproductive labour with respect to gold functioning as money in circulation.
7. It should be noted that this is exactly the same methodological approach that Marx himself used in his first presentation of simple reproduction analysis of accumulation in *Capital I*. There, strictly under the premise of simple reproduction, and through observation of the capitalists' repeated expenditure for their personal consumption of the surplus value appropriated (expenditure that sooner or later equals in value the magnitude of the capital value originally advanced), Marx shows that the capital value advanced by the capitalists is ultimately nothing more than capitalized surplus value, that is, accumulated capital (Marx 1992 [1867]: 711–715).
8. Grossman (2018 [1931]) certainly acknowledges the fundamental relations that prevail within and between both departments when the reproduction of money material is explicitly taken into account, namely that the part of the product of gold producers that embodies variable capital and surplus value is not exchanged against the constant capital of Department II but

against the surplus value of this department; and that the portion of gold producers' product that embodies constant capital value is necessarily exchanged, not against the portion of the product of Department I that represents constant capital value, but against the surplus value of this department. In Marx's *Capital* II, only the first of these two relations is disclosed, while the second one, that is, the so-called 'missing fragment', was either lost or never elaborated by Marx; in any case, it is fair to say that Grossman's text undoubtedly grasps the missing essential relations at stake. Beyond its merits, however, his work has a fundamental flaw that it is worth to note though. While initially assuming that the amount of money lost annually by wear and tear in circulation is equal to  $25_g$ , Grossman suddenly holds that the total gold production is equal to  $30_g$ , by adding to the initial  $25_g$  a surplus value of  $5_g$ ; this renders his formal representation of the total social capital incongruent, because whereas in the case of the fractions that produce means of production and means of consumption the value of the product of each department correctly includes the respective surplus value, in the case of the fraction that produces the money material (gold) this surplus value is abstracted from at the beginning, and added afterwards. By this procedure, Grossman creates the *illusion* of the strict correspondence of annual gold production with the quantity of money lost each year by abrasion, since gold producers' subsector is listed with an amount of  $25_g$  (which is exactly what he assumes to be the loss by the abrasion of the money in circulation), and on the basis of this mystification, all of a sudden an excess quantity of gold appears when the (previously subtracted) surplus value is finally considered. This is the entire trick underpinning Grossman's 'demonstration' of Marx's (1992 [1885]) contention that even in simple reproduction there is hoard formation. In other words, Grossman is definitely wrong in his conclusion: that is, that even simple reproduction implies an accumulation of money. In his own critique to Grossman (2018 [1931]), yet, Sandemose (2006, 2010) actually fails to acknowledge the exchange *within* Department I, that is, between Ic and Is, which was clearly disclosed in the former's work.

9. Therefore, Luxemburg's (2003 [1913]) stance for the inclusion of the production of money material as a separate department in the reproduction 'schemes' is essentially correct – albeit ultimately inconsequential, as I have already demonstrated above – when it comes to the actual analysis of the relations that prevail between departments once the reproduction of the money material is explicitly considered. However, the 'dubious results' that she thought to be the necessary consequence of not considering the production of the money material as a separate department are originated rather, not only in her own failure to discover the relations that are missing in Marx's *Capital* II, but also in the fact that she is utterly surprised by Marx's own (partial) original discovery of the necessary changes that the explicit consideration of the reproduction of the money material implies regarding the relation between Departments I and II, and forcefully (and mistakenly) rejects it as essentially false (Luxemburg 2003 [1913]: 73–74). As it is otherwise obvious, on this basis she could not possibly solve the problem. Grossman (2018 [1931]), on the other hand, in spite of his virulent critique of Luxemburg's three-department scheme and his praise of the twofold partition, includes only gold production for the replacement of the money material in Department I (inaccurately contending that this is what Marx does himself), which is not substantially different from considering gold production as a separate sector; so all his injurious criticism of Luxemburg's tenets about this question, in the end, boils down to nothing.

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### Author biography

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