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# Capital's *Pons Asinorum*: the Rate of Turnover in Karl Marx's Analysis of Capitalist Valorisation

Marco Veronese Passarella\* and Hervé Baron†

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## Introduction

The chief means of reducing the time of circulation is improved communications. The last fifty years have brought about a revolution in this field, comparable only with the industrial revolution of the latter half of the 18<sup>th</sup> century.

Friedrich Engels, in Karl Marx (1885)

It is said that the expression '*pons asinorum*' (humpbacked bridge or 'bridge of asses') was coined by scholastic philosophers in order to define the act of providing intuitive evidence for syllogisms (or for other abstract logical relationships) whose understanding was supposed to be necessary for the neophytes to prosecute their theological studies. In geometry, that definition has been used by Roger Bacon to indicate highly disputed questions, such as the non-deducibility of the fifth postulate of (the first book of) *The Elements* of Euclid. Within common language, that expression still designates a 'switch' which is quite problematic, but which is also necessary to achieve a given desired target. As we will argue, it is in this sense that we could regard the communication sector, the industrial logistics, the commercial net, and especially the developments in the banking-financial system, as the tumbledown 'bridge of asses' of today's economies.

Yet, the strategic function of those sectors – the most part of which has generally been regarded as 'unproductive services' (as opposed to the 'productive' manufacturing sector) by the economists – is not an exclusive feature of today's advanced capitalistic economies. On the contrary, it has been a constant of capitalism since its dawn. In the history of economic thought of the last two centuries, there is indeed a vast crop of writings concerning the role of the communication system, as well as dealing with the function of the banking-financial sector and the commercial nets, within the whole process of social re-production. Among those contributions, Karl Marx's manuscripts composing Volume Two ('V2' hereafter) of *Capital* stand out both for their analytical and 'visionary' powers. This sounds rather odd whether one considers that a large part of V2 has been neglected for a long time by historians of economic ideas and even by the exegetes of Marx's writings. Apart from the chapters on the 'metamorphoses of capital' and the well-known 'reproduction schemes', the V2 of *Capital* is indeed the least-known of the three books composing the great unfinished work of Marx. It is therefore not surprising that there are only few scientific works dealing with the turnover of capital and its impact on the valorisation (and accumulation) process.

In this regard, we have to mention, first, the early contributions of Hourwich (1894), Lexis (1895) and Schmidt (1889). While challenging the 'apparent inconsistency' of the Marxian-Ricardian labour-theory of value with the 'tendency of profits to equality',

Hourwich focused on the positive impact of the ‘rapidity of rotation’ of capital on surplus-value and profits as being ‘the outcome of improved machinery, [the] shortening [of] the period of production, and along with it the time spent in circulation’ (Hourwich 1894, p. 247, 249-50). Lexis focused on the same topic, though stressing that ‘as a rule, individual capitalists get no offset for the decline in the rate from the increase in the [rate of turnover and hence in the annual mass] of capital [...]. Only a few great capitalists are able to maintain accumulation in the manner described by Marx’ (Lexis 1895, p. 15). An identical result can be implicitly gathered from the work of Schmidt (1889), according to whom the rate of profit was ‘steadily sinking’, whatever the historical trend in the rate of turnover of capital.

Besides these pioneering contributions, we have to mention also a number of recent works dealing with the role of the turnover of capital from different perspectives. Morishima (1973, ch. 13) provided a ‘Marx-Von Neumann model’ allowing him to treat the time of turnover of capital as a variable which is endogenously set by capitalist firms’ decisions (thereby removing Marx’s simplifying hypothesis that the time of turnover is an exogenous variable). Desai (1979, p. 64-65) observed that ‘the rate of profit is calculated [by Marx] on total capital advanced fixed as well as circulating [...]. Thus the rate of profit is not a mark-up above costs but above the total capacity advanced. Different spheres will use capitals of different durability – of different rates of turnover’ which contribute to make the prices of production different from the labour values of commodities. Duménil (1975, p. 210) stressed that Engels’ editorial work on V2 of *Capital* led to a substantial misunderstanding of Marx’s analysis of the turnover (and the circuit) of capital, owing to the different viewpoints of the two authors. An empirical analysis of the turnover of capital has been provided by Webber and Rigby (1986): they found that, in Canadian manufacturing throughout 1950-1981, ‘turnover times were reduced slightly’, whereas ‘the rate of profit was falling consistently’. Yet, Fichtenbaum (1988, p. 221) complained that in ‘most of [the empirical studies on the profit rate] the issue of turnover has been ignored’, let alone that of ‘the cyclical role of turnover’. Accordingly, he tried to ‘empirically incorporate estimates of turnover into Marx’ definition of the rate of profit’, in order to show that turnover plays an important role in explaining the business cycle and cyclical crises in the US throughout 1949-1981. Notice that Lapavitsas (2000) argued that Marx’s analysis of the turnover is ‘fallacious’, as ‘there is an overlapping of the two parts of [capital’s] circulation time with each other and with production time. [...] [T]urnover time of an individual capital is less than the sum of its circulation and production times. This is in sharp contrast with the turnover time of an individual dollar of capital value, which is the simple sum of these times’<sup>1</sup>. More recently, Dos Santos (2011) focused on the possible impact of the

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<sup>1</sup> In our opinion, this disagreement depends on the different levels of abstraction of the analyses proposed by Marx and Lapavitsas, respectively. However, a thorough discussion about Lapavitsas’ criticism is beyond the scope of this paper.

rate of turnover on realization and capital accumulation through extension of ‘consumption credit’. Finally, an analysis of the role of the rate of turnover from a perspective that is similar to the one underpinning this paper can be found in Foley (1986)<sup>2</sup>.

Against this background, the aim of this article is twofold: first, to bridge the gap in the existing literature dealing with the economic thought of Marx; second, to provide a rigorous re-definition of several of the chief Marxian concepts on the basis of the role played by the turnover of capital within Marx’s analysis of capitalism. As we are going to show, the new manuscripts from the *MEGA*<sup>2</sup> philological edition of Marx’s writings may provide some useful insights. More precisely, the *MEGA*<sup>2</sup> calls attention to the ambivalences concerning some basic Marxian notions. These very ambivalences make different interpretations of Marx’s work possible. Thus, to a certain degree at least, the *MEGA*<sup>2</sup> edition leads to a ‘deconstruction’ of traditional interpretations of *Capital*<sup>3</sup>. Accordingly, the rest of the article is organized as follows. Section 1 deals with some of the philological issues raised by the editorial work of Friedrich Engels on the original manuscripts of (what later became) V2 of *Capital*. Section 2 compares the concept of the mass of surplus-value as it was defined by Marx in Volume One and Volume Three (‘V1’ and ‘V3’ hereafter) of *Capital* to the formulation provided by Engels in Chapter 4 of V3. Section 3 introduces the concept of the ‘rate of turnover’ (or the ‘rotation coefficient’ as Marx called it in V2, chapters 1 to 4) of capital, as it was defined by Marx in V2 of *Capital*. Sections 4 and 5 shed light on the neglected Marxian notion of the ‘time of turnover’ of capital and deal with the ‘costs of circulation’, respectively. In Section 6 we refine the notion of the rate of turnover and we introduce a new linked concept – namely, the ‘temporal composition of capital’. As we will argue, this should allow Marxian scholars to consider a further element in the *vexata quaestio* of the law of the tendential fall of the general rate of profit – and its counter-tendencies – within a (financially advanced) capitalistic economy. Some further remarks are provided in the final part of the paper.

### **1. Engels’ editorial work on Volume 2 of *Capital***

As is well known, Engels’ editorial work on V2 of *Capital* relied not only on seven out of eight preliminary manuscripts but also on some other drafts of different lengths<sup>4</sup> which were part of Marx’s original devise<sup>5</sup>. It is starting from those manuscripts that

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<sup>2</sup> Incidentally, we became aware of this work just after the writing of the first draft of our paper.

<sup>3</sup> This remarks the relevance of the *MEGA*<sup>2</sup> project. This latter has generally been neglected in the international academic debate, in spite of the fact that it could change the historiographical ground underpinning the current Marxian debate.

<sup>4</sup> On this point, see mainly Hecker (2009, p. 18).

<sup>5</sup> In this regard, it deserves to be noted that the new material made available by the *MEGA*<sup>2</sup> philological edition confirms Marx’s assertion that he wrote all the preliminary drafts of the three books

Engels had been aiming to finish the work that Marx left undone. However, the very work of editing of the Marx's rough drafts involved a (somewhat unavoidable) discretionary process of selection and 'translation'. This is the reason why the traditional interpretation of *Capital* seems to be more in the spirit of the editor (viz. Engels) than in the spirit of the author (Marx). In this regard, notice that Engels' editorial work on V2 is reported in the *MEGA*<sup>2</sup> (Volume II/12) under three different indexes, notably, 'The arrangement comparison', 'The provenance index' and 'The discrepancy index' (Hecker 2009, p 19). It is shown that, not merely the *structure*, but even the *subject* of Marx's original manuscripts have been changed by Engels. Moreover, sections, chapters and paragraphs have often been obtained as syntheses of different Marx's manuscripts.

Focusing on the structure of V2, Marx's original formulation was split into three different chapters (or parts). More precisely, the 'Metamorphoses of Capital' and the related 'Circuit' were discussed in chapter 1, the 'Turnover of Capital' was discussed in chapter 2, and the 'Circulation and Reproduction of the Total Social Capital' was introduced in chapter 3. Although Marx used this arrangement from *Manuscript I* onward, the concepts and structures of each single chapter, as well as their theoretical setting, remained essentially unfinished. For instance, the paragraph titled (by Engels) 'The Time of Production' has been initially placed – by Marx – in the analysis of the circuit of capital, before he relocated it into the analysis of the turnover of capital. As we will argue, this must be regarded as a development in Marx's understanding of the physiology of the capitalistic system. The point is that the distinction between the pure 'working period' and the whole 'time of production' is linked to the concept of the 'time of turnover' of the *individual capitals*. Consequently, that distinction should logically follow the study of *capital as a whole* embedded in the analysis of the capitalistic circuit. Notice that, in this case, Engels maintained the final structure set by Marx. However, he modified the terminology used in the original manuscripts. The most important change concerns the notion of the 'circulation capital' (as distinguished

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of *Capital* before the publication of V1 (see Hecker 2002, p. 57). More precisely, the so-called *Manuscript I* of V2 was written in the first half of 1865, whereas, starting from March 1867, Marx had been writing some fragments of V2 and V3 of *Capital*, and some collected excerpts as well. This material is now called the *Manuscript III*, due to the numeration used by Marx for labelling his drafts. Still, in October 1867 Marx wrote the so-called 'fragment used for Manuscript IV'. Thereafter, Marx re-started writing V2, but he stopped at the section labelled 'The concept of turnover'. This document is now known as the *Manuscript IV*. After a break, he re-started working since December 1868. *Manuscript II* was ready in the second half of 1870. The subsequent manuscripts – namely, the *Manuscript V* (April 1877) and the *Manuscript VI* (after October 1877 and before July 1878) – are rather short (only 17 pages). The same goes for Manuscript VII (dated back to July 2<sup>nd</sup> 1878 and amounting to 7 pages only). Finally, the so-called *Manuscript VIII* was labelled 'the 1878 Manuscript' by Engels. However, according to a number of scholars, this manuscript should be dated back to a period between the last quarter of 1880 and the first half of 1881 (see, for instance, Hecker 2002, p. 59). As for the manuscripts comprising V3, we refer the reader to the Philological Appendix (see, particularly, note 31) at the end of the paper.

to the ‘production capital’), which is a recurring key word in what later became the second part of V2. This concept refers to the two different forms – namely, ‘money capital’ and ‘commodity capital’ – which are assumed by capital in the sphere of circulation<sup>6</sup>. Yet, such a definition is an ‘invention’ of Engels: although it appears ten times in the published edition of V2, the term has never been used by Marx in his manuscripts (as already noted in Hecker 2009, where, however, ‘circulation capital’ is wrongly labelled as ‘circulating capital’).

To sum up, it is plain that the editorial work of Engels on V2 has not been restricted, as he claimed, to «minor changes» in Marx’s original drafts. Rather, Engels’ contribution must be considered as part of the Marxian work, especially if one refers to the published writings at least<sup>7</sup>. It is starting from this awareness that we will try to reconstruct one of the least known and most under-estimated contributions of Marx’s analysis: the concept of the ‘turnover of capital’ and the linked notion of the ‘(annual) mass of surplus-value’, are both provided by Marx in V2 (in their definitive definition at least).

## 2. The mass of surplus-value in Volume 1 and Volume 3 of *Capital*

The Marxian notion of the ‘mass of surplus-value’ is somewhat slippery. The reason is that it has been used by Marx in different contexts and, outwardly at least, with different meanings. More precisely, in Chapter 9 of V1 of *Capital* Marx defines, for the first time, the mass of surplus-value as the product between the whole variable capital advanced by capitalist firms<sup>8</sup> in the  $i$ -th industry and the related rate of surplus-value (see Marx 1867, p. 320 ss.)<sup>9</sup>. In simple algebraic terms, if  $s_i$  is the rate of surplus-value (or rate of exploitation) in the  $i$ -th sector,  $V_i$  is the variable capital invested in the  $i$ -th sector, and  $k$  the number of sectors, then the mass of surplus-value created in the  $i$ -th industry is equal to  $S_i = s_i V_i$ , for any  $i = 1, 2, \dots, k$ . Furthermore, if we break down the amount of variable capital in its single components (namely, the number of living

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<sup>6</sup> Notice that the ‘circulation capital’ (*Zirkulationskapital*) must not be confused either with ‘circulating capital’ (as opposed to ‘fixed capital’) or with ‘variable capital’ (as opposed to ‘constant capital’). On this point, see also note 9.

<sup>7</sup> This issue has been stressed, among others, by Duménil (1975). For an analysis of the editorial work of Engels on V3 of *Capital* we again refer the reader to the Philological Appendix.

<sup>8</sup> We prefer to use the label ‘capitalist firm’ instead of ‘capitalist’ in order to stress that Marx’s analysis always refers to impersonal forces and ‘functions’, and not to single individuals. In the *Preface* of V1, Marx made it clear that he «[does] not by any means depict the capitalist and the landowner in rosy colours. But [that] individuals are dealt with here only in so far as they are the personifications of economic categories, the bearers [*Träger*] of particular class-relations and interests» (Marx 1867, p. 92).

<sup>9</sup> Following the standard Marxian nomenclature, we mean by ‘variable capital’ that part of total capital corresponding to the wage-bill paid to workers employed in the  $i$ -th sector. By contrast, the label ‘constant capital’ refers to the sum of ‘fixed capital’ (that is, capital invested in fixed assets such as land, buildings, vehicles, plant and equipment, etc.) and ‘circulating capital’ (raw materials, intermediate goods, etc.) net of the wage-bill. All magnitudes are measured in units of labour-time.



labour time units spent in the  $i$ -th industry,  $L_i$ , and the unit value of the labour-force,  $v_i$ ), then we obtain:

$$(1) \quad S_i = s_i L_i v_i = L_i (1 - v_i) \quad \text{as: } s_i = S_i / V_i = (1 - v_i) / v_i$$

Equation (1) shows that the mass of surplus-value created in the  $i$ -th sector is equal to the quantity (say, the number of hours) of living labour exceeding the time necessary to reproduce the wage-bill received by workers employed in that sector. It corresponds to the mass of gross profit *produced* by capitalist firms operating in the  $i$ -th industry at the end of each productive cycle.

The above definition of the mass of surplus-value corresponds to the one actually provided (and then implicitly employed) by Marx in his explanation of the origin of value and surplus-value from the exploitation of the living labour in the process of production, as it is contained in V1 of *Capital*. Yet, in V3 of *Capital* it is possible to find a further, different, definition of the mass of surplus-value. Notice, in this regard, that, while the early three chapters of V3 deal with the so-called ‘transformation (of labour-values into prices of production) problem’, Chapter 4 deals with the analysis of the effect of the ‘turnover of capital’ on the rate of surplus-value and the general rate of profit. The reason is that:

the time required for the turnover has the effect that the whole capital cannot be simultaneously employed in production. One part [...] therefore always lies fallow, whether in the form of money capital, stocks of raw materials, finished but still unsold commodity capital, or outstanding debts that are not yet due for payment. The capital that is in active production, active in the production and appropriation of surplus-value, is always reduced by this amount, and the surplus-value that is produced and appropriated is reduced in the same proportion. The shorter the turnover time, the smaller is this idle portion of capital compared with the whole; the greater therefore is the surplus-value appropriated, other condition being equal. ([Engels in] Marx 1894, p. 163)

Therefore, according to the text of Chapter 4, the reduction in the time of turnover of capital gives rise to an increase in the *mass* of surplus-value generated *throughout a given period of time*. Moreover, since the rate of profit is calculated as the ratio between the mass of surplus-value and the total capital employed in the production process, it follows that every reduction in the turnover period involves a proportional increase in the rate of profit. Consequently, for a given rate of surplus-value and a given working day<sup>10</sup>, the two rates of profit accruing on two capitals characterized by the same ‘organic composition’ will be inversely proportional to the respective turnover times. More precisely – as it is clarified in Chapter 4 – the impact on the creation of surplus-value (and hence profit) of a reduction in the time of turnover of capital is linked to the

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<sup>10</sup> Notice that the whole amount of living labour-time units spent in the  $i$ -th industry ( $L_i$ ) can be regarded as the product between the number of workers hired in the  $i$ -th industry (call it  $N_i$ ) and their working day (call it  $g_i$ ), that is:  $L_i = g_i N_i$ . However, for the sake of simplicity, we will assume hereafter that  $g_i = g$  (for any  $i, = 1, 2, 3, \dots, k$ ).

higher valorisation of the *variable part* of capital per unit of time. In other words, the higher the turnover of variable capital, the higher will be the mass of surplus-value generated in a given period of time.

Yet, here comes an important issue: indeed, in his *Preface* to V3 of *Capital*, Engels points out that, with regard to the original manuscript of Marx, «[t]here was no more to Chapter 4 than the title» ([Engels in] Marx 1894, p. 94). Therefore, it ‘was left to’ Engels himself to write that chapter, arguably in the wake of the other manuscripts left by Marx. Notice that Chapter 4 is of great importance, because it clarifies that the expression of the rate of profit should be modified on the basis of the impact of the turnover of capital on the mass of surplus-value. However, as we will show, the expression of the mass of surplus-value provided by Engels in Chapter 4 of V3 corresponds neither to the formula used by Marx in the early three chapters of the same book nor to the formula used in V1 of *Capital*. In Engels’ equation, the ‘rate of turnover of capital’ is explicitly included, whereas Marx never includes it in his equations. Thus, some questions arise: what is the reason why the two expressions seem not to fit together? Is it possible to regard the expression used by Marx in V1 and in the early three chapters of V3 as a *particular* case of the *general* expression provided by Engels in Chapter 4 of V3? As we are going to show, the answers to these questions should be researched in the words with which Engels introduces ‘his’ Chapter 4, by referring the reader to the analysis undertaken by Marx in V2 (see [Engels in] Marx 1894, p. 163 ss.). Thus, it is the very second section of V2 – that is to say, the least-known and the harshest part gleaned from the crop of manuscripts of *Capital* – that we will focus on in the next sections.

### **3. The rate of turnover in Volume 2 of *Capital***

In section 2 we stressed that, according to the text of Chapter 4 of V3 of *Capital*, every reduction in the time of turnover of capital involves a proportional increase in the annual mass of surplus-value and, hence, in the rate of profit. More precisely, under a regime of simple reproduction, the mass of surplus-value appropriated by each single capitalist firm in a year is equal to «the mass of surplus value appropriated in one turnover period of the variable capital, multiplied by the number of such turnovers in a year» ([Engels in] Marx 1894, pp. 166-167). We also pointed out that Chapter 4 of V3 has been written by Engels. By contrast, in the rest of V3 and in V1 of *Capital* Marx never explicitly talks about the turnover of capital. However, a thorough look at the whole crop of Marxian manuscripts reveals that it is just in later-called ‘Chapter 16’ of V2 that Marx provides a complete definition of the concept of the annual mass of surplus-value. It is in this volume, unlike in V1 and V3, that the mass of surplus-value is explicitly defined as the product between the surplus-value that is generated in a single turnover period (of variable capital) and the number of annual turnovers (see Marx 1885, Ch. 16, pp. 369-393). Significantly, this formulation corresponds precisely to the

expression used by Engels in his personal contribution to V3, Chapter 4.

Besides, in the selfsame pages Marx re-defines the annual rate of surplus-value as *either* the ratio between the annual mass of surplus-value and the variable capital employed in a single turnover period *or* the product between the single-period rate of surplus-value (labelled the ‘real rate of surplus-value’ by Marx 1885, p. 305) and the number of annual turnovers. This makes clear that the annual rate of surplus-value is equal to the single-period rate of surplus-value just in the particular case in which the turnover period of capital coincides with one year. Obviously, if the turnover period is lower than one year, then the same capital may be re-invested several times over the year and, therefore, the annual rate of surplus-value will be higher than the single-period rate; if, by contrast, the turnover period is longer than one year, then the annual rate of surplus-value is lower than the single-period rate. The capital advanced will cover just a fraction of the turnover period. In Marx’s own words, the point is that:

[t]he earlier or later transformation of the replacement value into money, and hence into the form in which the variable capital is advanced, is evidently a circumstance quite immaterial to the production of surplus-value. The latter depends on the magnitude of the variable capital applied, and on the level of exploitation of labour. But the circumstance mentioned above does modify the size of the money capital that has to be advanced in order to set in motion a definite amount of labour-power in the course of the year, and in this way it does affect the annual rate of surplus-value. (Marx, 1885, p. 387)

On the one hand, given the amount of surplus-value generated within each productive cycle, the increase in the speed of turnover (that is, the reduction in the turnover time) involves an increase in the annual rate of the surplus-value. On the other hand, the more rapid the (variable) capital turnover, the higher will be the annual mass of surplus-value, given the rate of surplus-value<sup>11</sup>. In simple algebraic terms, if we call  $S'_i$  the mass of surplus-value extracted in one year<sup>12</sup>,  $S_i$  the amount of surplus-value realized by capitalist firms at the end of each single turnover period in the  $i$ -th industry, and  $n_i$  the number of annual turnovers of capital, then the annual mass of surplus-value amounts to:

$$(2) \quad S'_i = n_i S_i = n_i s_i V_i$$

and the annual rate of surplus-value of the  $i$ -th industry is given by:

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<sup>11</sup> According to Marx, the difference in the times of turnover assumes an even higher importance if one considers the whole social capital, instead of examining each single capital alone. We will come back to this point over the next sections.

<sup>12</sup> From here onwards, by reversing the algebraic symbolism employed by Marx (and Engels), we will use a prime in the superscript to indicate those magnitudes which refer to one year, as opposed to magnitudes which refer to a single turnover of capital.

$$(3) \quad s'_i = \frac{S'_i}{V_i} = n_i s_i$$

Equation (3) defines the annual rate of surplus-value (even) when the whole productive cycle (and hence the time of turnover) does not correspond to one year. But what about the annual rate of profit? In order to answer this question, notice that in V3 of *Capital* Marx calculates the rate of profit as the ratio between the surplus-value created in a single turnover and the whole amount of capital, namely, as the ratio between the single-period rate of surplus-value and the organic composition of capital. In formal terms, if we call  $r_i$  the single-period rate of profit of the  $i$ -th industry, we can write:

$$(4) \quad r_i = \frac{\frac{s_i}{C_i + 1}}{\frac{S_i}{V_i}} = \frac{s_i}{q_i + 1}$$

where  $q_i$  is the well-known ‘organic composition’ of capital, expressed in labour-value unit terms<sup>13</sup>. By replacing the single-period rate of surplus-value in equation (4) with the annual rate of surplus-value indicated in equation (3), we obtain:

$$(5) \quad r'_i = \frac{\frac{s'_i}{q_i + 1}}{\frac{S_i}{V_i}} = n_i \cdot \frac{s_i}{q_i + 1}$$

Equation (5) provides the annual rate of profit realized by the  $i$ -th industry under a simple reproduction regime in a non-fully competitive economy, and corresponds to the formula actually used by Engels in Chapter 4 of V3. Although it has never been explicitly provided by Marx, it can easily be derived by crossing the formula of the single-period general rate of profit provided by Marx in V3 with the formula of the annual rate of surplus-value provided in V2. Notice, however, that, according to Marx, competition among capitals leads to the ‘equalisation’ (or ‘perequation’) of the sectoral rates of profit, in the long-run at least. Consequently, the formula provided by equation (5) must be further modified in order to consider the effect of competitions between capitals on the *general* annual rate of profit, that is:

$$(5bis) \quad r' = \hat{n} \cdot \frac{s}{q + 1} \quad \text{with } \hat{n} = \frac{\sum_{i=1}^k n_i V_i}{\sum_{i=1}^k V_i}, \quad s = \frac{\sum_{i=1}^k S_i}{\sum_{i=1}^k V_i}, \quad \text{and } q = \frac{\sum_{i=1}^k C_i}{\sum_{i=1}^k V_i}$$

where  $\hat{n}$  is the average rate of turnover,  $q$  is the overall value composition of capital, and  $s$  is the overall rate of surplus-value at the end of *one single turnover of capital* (irrespective of the specific time required by each sector). Notice, in this regard, that: i. the average rate of turnover can be obtained as the weighted mean of the sectoral rates;

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<sup>13</sup> Whether or not capital could be measured in ‘labour-value’ terms within equation (4) gave rise to the ‘transformation’ controversy which followed the publication of V3 and which still enlivens the debate among Marxian scholars. However, a thorough analysis of this issue is beyond of the scope of our paper.

ii. the rate of surplus-value,  $s$ , corresponds to the overall rate *in a given period of time* only if all sectors share the same turnover time. Obviously, this could happen just by chance. Consequently, we think that equation (5bis), instead of equation (5), should be regarded as the general expression of the rate of profit (under a simple reproduction regime) that Marx would have provided if he could complete V3 of *Capital*<sup>14</sup>.

#### 4. Time of production, time of circulation and time of turnover

Hitherto, we have been focusing on the Marxian definition of the rate of turnover of capital without analyzing the main components of the time-length of turnover. We are going to bridge this gap. For Marx, the time-length of turnover covers the total cycle (or circuit) of capital from the circulation sphere to the production sphere, and from this latter again to that of circulation. Accordingly, it is possible to split the whole logical-time sequence into: the ‘time of production’ of the commodities; and the two phases (notably, C - M, M' - C', from the viewpoint of the commodity capital; and M - C, C' - M' from the viewpoint of the money capital) which compose the ‘time of circulation’.

##### 4.1 The time of production

The time-length of production includes, first of all, the *stricto sensu* ‘working time’, namely, the period of time during which the workers employed in the production process provide ‘living labour’. It is during this period that the anticipated variable capital valorises. However, not all the time of production is also working time. The former also includes possible periods in which the productive process is interrupted. Think of the breaks, delays and other periods during which, as in the case of the stock of raw materials, the means of production «are held in reserve as conditions of the process, and thus already represent productive capital, but are not yet engaged in the production process» (Marx 1885, p. 200-201). Moreover, the productive process «may itself involve interruptions of the labour process and hence of working time, intervals in which the object of labour is exposed to the action of physical process, without further addition of human labour» (Marx 1885, p. 201). This means that the time of production is usually higher than the working time, that is to say the time of production usually exceeds the time that is necessary for the creation of the surplus-value to take place. In

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<sup>14</sup> Some authors, such as Fichtenbaum (1988, p. 223), attributes equation (5) to Marx. As we argued, we think that it should be rather regarded as an Engels’ contribution. Other authors derive the rate of turnover from the annual profit rate equation. For instance, Desai (1979, p. 65) defines it as the ratio of the fixed capital to the constant capital. Foley (1986, p. 92) defines it as ‘the ratio of the flow of capital advanced to the stock of capital tied up in the production circuit’, that is:  $\tilde{n} = (C + V)/K$ . Interestingly enough, Foley (1986)’s definition is consistent with our equation (5bis), as:  $r' = \tilde{n}s/(q + 1) = [(C + V)/K]s/(q + 1) = s/K$ . For the derivation of the formula of the annual rate of profit under an enlarged reproduction regime (within a simplified two-sector economy), we refer the reader to the Analytical Appendixes.

Marx's own words, the general rule is that:

Working time is always production time, i.e. time during which capital is confined to the production sphere. But is not true, conversely, that the entire time for which capital exists in the production process is necessarily therefore working time. (Marx 1885, p. 316)

Consequently, the lower the spread between the time of production and the working time, the greater will be the capital valorisation in a given period of time. This is the reason why capitalist firms always try to avoid (or to reduce) interruptions in time of production.

#### *4.2 The time of circulation*

The time of circulation includes both the time that capital needs to turn from the 'commodity' form into the 'money' form (i.e. the time of sale of the produced commodities) and the time that capital needs to turn from the 'money' form into the 'commodity' form (i.e. the time of purchase of productive factors). It is about simple 'metamorphoses' of the capital's 'form of value' which does not affect the process of valorisation. Notice that the time of circulation and the time of production are mutually exclusive as, «[d]uring its circulation time, capital does not function as productive capital, and therefore produces neither commodities nor surplus-value» (Marx 1885, p. 203). The expansion and the contraction of the period of circulation is the negative limit of the expansion and the contraction of the production time. In other words, the time of circulation constitutes a constraint to the creation of surplus-value. This is the reason why (manufacturing) capitalist firms always try to reduce the time of circulation as much as they can.

As we mentioned, from the 'commodity capital' viewpoint, the circulation time can be split into the time of sale (which is necessary to convert output-commodities into an equivalent amount of money) and the time of purchase (which is necessary to allow capitalist firms to turn their money capital into input-commodities, particularly labour-force). According to Marx, the sale of the produced commodities and, hence, the monetary realization of the created value constitute the preponderant part of the time of circulation. The movement  $C' - M'$  would be, therefore, the most important phase of the process of circulation – at least, in the short-run. It represents the time required for the social 'monetary validation' of the potential surplus-value that has been (already) created in the production sphere<sup>15</sup>. The extent of this period depends on a number of different factors, such as «the distance of the market where the commodities are sold from their place of production» (Marx 1885, p. 327), and hence the efficiency of the

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<sup>15</sup> On this point, we refer the reader to Bellofiore (2005, p. 133).

commercial net and the effective demand level<sup>16</sup>. Turning to the time of purchase, it is the length of time that capitalist firms need in order to turn their monetary resources (that is, the initial finance required to start the production-process) into a *productive* capital – that is to say, the required quantity of labour-force and the other required means of production. In this regard, it is worth noting that ‘the remittance of money’ requires a period of time that must be added to the period of shipment of commodities. Even though the innovations in the means of payment can reduce this period of time (think of modern electronic systems of payment), the time of financing is doomed to increase during the periods of crisis and financial instability. As Marx noted in the *Grundrisse*, by quoting Henry Thornton, «Guineas are *hoarded* in times of distrust» (Marx 1857-58, p. 816, italics in the original). We will come back to this issue in the next sections. Still, the greater the distance of raw materials from the place of production, the greater will be the quantity of raw materials purchased, and hence the longer the period of time during which the capital will stay in the form of ‘latent capital’. Finally, a longer distance entails a greater «mass of capital that must be advanced at one stroke, and [a longer] time for which it must be advanced, the scale of production being otherwise the same» (Marx 1885, pp. 331-332).

#### 4.3 The total time of turnover

To sum up, the time-length of turnover is the sum of the time of production (including both the working time and pauses and interruptions in the process of production) and the time of circulation (i.e. the time of purchase of inputs plus the time of sale of the output). In algebraic terms, the total time of turnover of the  $i$ -th industry is therefore:

$$(6) \quad t_i^R = t_i^P + t_i^C \quad \text{where: } t_i^P > 0, t_i^C \geq 0$$

The longer the time of circulation, given the time-length of production, the longer will be the whole period of turnover of capital. By contrast, the lowest theoretical limit of the period of turnover is given by the minimum time of production allowed by the historically-determined technology level.

Finally, notice that the time of circulation,  $t^C$ , can be further split into the time of realization (i.e. the time-length of delay in selling the commodities, call it  $t^S$ ) and the time of financing (i.e. the time-delay in re-investing money capital, call it  $t^F$ , with  $t^C = t^S + t^F$ ) (see Foley 1986). Analogously, the time of production can be split into working time (that is,  $L$ ) and the break time (call it,  $t^B$ , with  $t^P = L + t^B$ ). However, for the sake of simplicity, we will not discuss these further distinctions in this paper.

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<sup>16</sup> In Marx’s own words: «Since elements of productive capital are constantly being withdrawn from the market and all that is put into the market is an equivalent in money, the effective demand rises» (Marx 1867, p 390).

## 5. The costs of circulation

As Marx observed, the circulation of capital entails the support of costs (the ‘costs of circulation’) that reduce the profitability of the amount of capital invested. This means, *inter alia*, that the reduction in the time of circulation through technological or institutional innovations is worthwhile only if their cost is lower than the revenue due to the higher (i.e. faster) valorisation of capital. In this regard, Marx distinguishes the ‘pure costs of circulation’ from the expenses for the maintenance of the stock of commodities.

### 5.1 *The costs of commodity maintenance*

These costs can originate from those productive processes which continue in the circulation sphere and «whose productive character is thus merely hidden by the circulation form» (Marx 1885, p. 214). Therefore, these costs, which

make commodities dearer without increasing their use-value are *faux frais* of production from the social point of view, for the individual capitalist [firm] they can constitute sources of enrichment. On the other hand, in so far as what they add to the price of the commodity merely distributes these circulation costs equally, they do not thereby cease to be unproductive in character. (Marx 1885, pp. 214-215)

All the expenses linked to the stock of commodities constitute an example of costs of maintenance. The accumulation of large stocks of unsold commodities could be, in turn, the result of the lack of demand. If commodities are produced to order, the lack of demand entails a slow-down, or even a stop, in the productive process, until new orders will come. By contrast – as Marx observes – if the production process cannot be interrupted, the inventories of capitalist firms will increase. Obviously, the period over which capital stays in the form of stock of commodities represents a negative standstill of the process of production (unless it is the result of a free choice of the capitalist firm). The point is that, the later the output is sold (that is, the later the commodity capital is turned into a sum of money), the lower will be, *ceteris paribus*, the speed of turnover of capital. Also notice that the increase in inventories, be they either unsold commodities or raw materials, makes capitalist firms incur additional costs. As these costs are not linked to the production process, they must be numbered among the costs of circulation. However, the expenses of commodity maintenance affect the unit price set by the single capitalist firm. This is the reason why these costs cannot be regarded as *pure* costs of circulation. Insofar as a given quantity of labour-power and other means of production are employed in the maintenance of inventories, these resources are subtracted to the production process. Maintenance expenditures represent, therefore, an ‘opportunity cost’ for the *single capitalist firm*. As such, this cost will be added to the final price of



commodities<sup>17</sup>. By contrast, for the *capitalist class* (i.e. the ‘functionaries of capital’, such as managers, dealers, bankers, etc.), considered as a whole, maintenance costs are none other than unproductive expenses<sup>18</sup>.

### 5.2 *The pure costs of circulation: purchase, sale and financing*

Turning to the ‘pure’ costs of circulation, the period of time which is necessary for the transformation of capital from money to commodities, and then from commodities to money, is ‘time of sale’ and ‘time of purchase’ for the individual firm (see Marx 1885, p. 207 ss.). If one supposes that commodities are traded at their labour-value, then it is plain to see that the time of trading entails only a change in the form of value. But even if one assumes that the commodities are exchanged at a unit price that does not corresponds to the unit labour-value, the whole mass of value created in the production process is unaffected by this circumstance. This is about a zero-sum game, that does not change the aggregate value of commodities. Plainly, the two metamorphoses, M - C and C' - M', involve time-consuming transactions. For instance, a change in contractual conditions «costs time and labour-power, not [in order] to create value, but rather to bring about the conversion of the value from one form into the other, and so the reciprocal attempt to use this opportunity to appropriate an excess quantity of value does not change anything» (Marx 1885, pp. 207-208). If the producers were not capitalist firms but, say, direct producers or artisans, they would then deduct the time of trading from their working time. This is the reason why, as Marx observes, they have always tried «to defer such operations to feast days» (Marx 1885, p. 208). By contrast, a capitalist firm can devolve that function to other commercial firms for which «buying and selling is a major function. Since [the capitalist firm] appropriates the product of many people, on a larger social scale, so [it] has also to sell on such a scale, and the later to transform money back again into the elements of production» (Marx 1885, pp. 208-209). However, once again the time of trading does not add any value to the produced commodities, in spite of the illusion generated by their function of commercial capital. In fact, it is plain that:

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<sup>17</sup> Notice that the maintenance costs are linked to the need to preserve the ‘use value’ of commodity capital. As we will see, this is another feature that makes them different from the ‘pure costs of circulation’. In Marx’s own words, «their actual object is not the formal transformation of value, but the conservation of the value which exists in the commodity as a product, a use-value, and hence can be conserved only by conserving the product, the use-value itself. The use-value is not increased or raised; on the contrary, it declines. But its decline is restricted, and is it itself conserved. The value that is advanced and exists in the commodity is also not increased here. But new labour, both objectified and living, is added to it» (Marx 1885, p. 217).

<sup>18</sup> «The capital expended in these costs (including the labour it commands) belongs to the *faux frais* of capitalist production. [...] and from the standpoint of the capitalist class as a whole it forms a deduction of surplus-value» (Marx 1885, p. 226).

if we have a function which, although in and for itself unproductive, is nevertheless a necessary moment of reproduction, then when this is transformed, through the division of labour, from the secondary activity of many into the exclusive activity of a few, into their special business, this does not change the character of the function itself. *One* merchant (considered here merely as the agent of the formal transformation of commodities, as mere buyer and seller) may, by way of his operations, shorten the buying and selling time for *many* producers. He should then be considered as a machine that reduces the expenditure of useless energy, or helps to set free production time. (Marx 1885, p. 209)

In order to understand this point, let us assume – as Marx does – that the function of trading is devolved to a wage-earner. This latter will, as every other wage-earner, work ‘for free’ a given part of its ‘own’ working time. Yet, his surplus-labour does not produce any (surplus-)value, and neither does his time of necessary work, although this latter allows the wage-earner to claim a portion of the social product. As the surplus-labour is not remunerated, the costs of circulation will decrease as the difference between the whole working day and the length of time of necessary labour (i.e. the working time actually paid to the wage-earner) increases. In other words, the more the amount of unpaid surplus-labour, the lower the pure costs of circulation sustained by the *i*-th capitalist firm.

Finally, notice that, among the pure costs of circulation, Marx includes also the costs of financing. According to Marx, the big corporation that chooses to satisfy its own needs of liquidity (by means of borrowing from the banking system) will not usually affect the time-length of turnover of capital. However, this is true only during ‘normal times’. As we have already noted, Marx is perfectly aware that, ‘in times of distrust’, the access to finance, and hence the building up of that part of money capital which exceeds the current internal funds of the capitalist firm (and which is necessary to start the process of production), is doomed to become sharply reduced. Hence, although Marx has never explicitly referred to it, the conditions of financing and the ‘state of confidence’ of financial markets are other factors which should be assumed to affect the speed of turnover (and therefore the annual profitability) of a given amount of capital<sup>19</sup>. In any case, even the big corporation that borrows from banks will sustain some additional costs in terms of passive interests paid out for loans, fees, commissions and other financial burdens. These are ‘pure’ costs of circulation which do not add any value to the produced commodities. They represent a mere subtraction from the productive capital or, in other words, a ‘tax on profit’<sup>20</sup>.

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<sup>19</sup> Marx (1894) talks extensively about ‘confidence’ in what later became the fifth part of V3. See in particular: ch. 22, pp. 480-492; ch. 25, pp. 525-442; ch. 26, pp. 543-565; ch. 31, pp. 626-636; ch. 34, pp. 680-698; and ch. 35, pp. 699-727.

<sup>20</sup> The major part of the costs of circulation are subject to the general law according to which they do not add any value to the produced commodities. An important exception to this general rule, as Marx points out, is represented by the *costs of transportation*. More precisely, «[w]ithin the circuit of capital and the commodity metamorphoses that form a section of it, the metabolism of social labour takes place»

## 6. The temporal composition of capital

In section 3 we defined the rate of turnover of capital in general terms: we defined it as the number of times in which a given amount of (variable) capital is re-invested in the production process over one year. In section 4 we showed that, according to Marx, the time-length of turnover of capital can be split into the time of production and the time of circulation. Consequently, the annual rate of turnover can be expressed as follows:

$$(7) \quad n_i = \frac{1}{t_i^R} = \frac{1}{t_i^P (1 + \tau_i)} \quad \text{where: } \tau_i = \frac{t_i^C}{t_i^P} \text{ and } t_i^P > 0, t_i^C \geq 0$$

where  $\tau_i$  is the ratio of circulation-time to production-time of the  $i$ -th industry<sup>21</sup>.

As a result, if we assume that the time-length of production required by each specific sector is set by the available technology<sup>22</sup>, then it is the time of circulation that determines the rate of turnover of capital of the single firm in the short-run. This point is portrayed in Diagram 1. The diagram also shows that the theoretical upper limit of the rate of turnover is approximately fixed by the inverse of the length of working time (if one supposes that the process of production entails, at least, just a few break times). The circulation time, in turn, «depends on improved [...] communication [as well as on improved banking-financial net] in the long run, and in the short run (over the course of the business cycle) on the ability to sell or realize the commodities which have been produced» (Fichtenbaum 1988, p. 222, who refers to Marx 1885, p. 317). Significantly,

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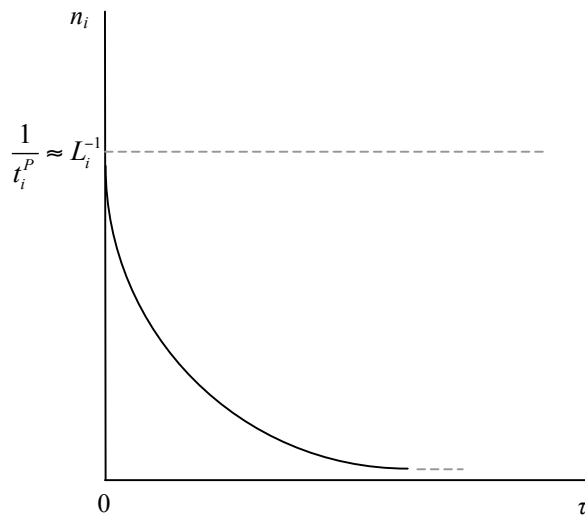
(Marx 1885, p. 226). Such a change usually entails the transfer of commodities in space. In this regard, the industry of transportation involves a number of circulation costs whose specific phenomenal form cannot be inferred from the *general law of circulation*. Although transportation does not affect the physical properties of commodities, their use-value arises only in the act of final consumption. This latter usually requires the transportation of commodities from one place to another (for instance, from the factory to the market). In this sense, cost of transporting a unit of output can be regarded as an additional process of production. As a result, the industry of transportation is subject to the *general law of production*, according to which the productivity of labour is inversely related to the (potential) value of commodities. However, as Marx notes, there are some «modifying» circumstances to take into account. The most important one is that, because of the development of the capitalistic economies, the cost of transporting a unit of output tends to reduce over time. This is the result of both the progress in the system of communication and the increasing degree of concentration within the industry of transportation. These factors increase the portion of social (both ‘living’ and ‘objectified’) labour spent in the transportation of commodities. To sum up: on one hand, the transportation must be regarded as «an independent branch of production, and hence a particular sphere for the investment of productive capital; on the other hand, it is distinguished by its appearance as the continuation of a production process within the circulation process and for the circulation process» (Marx 1885, p. 229).

<sup>21</sup> It is Marx himself who stresses the relevance of this ratio, as he makes clear that the amount of the additional capital which is necessary to assure the continuity of the production process (over the period of circulation) is determined by the ratio of the time of circulation to the time of turnover (see Marx 1885, p. 342), that is:  $\tau' = t^C/t^R = \tau/(1 + \tau)$ .

<sup>22</sup> This is clearly stated by Marx (1894, p. 70). See also Fichtenbaum (1988, p. 222).

the few scholars who have analysed the role of the turnover of capital focused just on its *short-run real* determiners<sup>23</sup> – that is to say, on the possible decrease in the rate of turnover owing to the lack of ‘effective’ demand. This is an important issue because it allows Marx to account for the real causes of the business cycle. However, we think that the analysis of both the *financial* and the *long-run* determiners of the circulation time is not less important if one wants to understand the dynamics of a ‘financialized’ capitalistic economy from a Marxian perspective. The point is that the circulation time is affected not only by the efficiency of the commercial and communication systems (where capital appears in its commodity form), but also by developments in the financial-banking net (where capital assumes its monetary form). The higher the impact of this net on the speed with which a given capital can be re-invested in the same production process (or moved to another, more profitable, business) then the higher will be the related rate of turnover of capital<sup>24</sup>.

**Diagram 1.** The impact of a change in the circulation to production time ratio on the rate of turnover of capital (in the short run).



Moreover, by using equation (7) in equation (5), we obtain:

$$(8) \quad r'_i = \frac{1}{t_i^P (1 + \tau_i)} \cdot \frac{s_i}{q_i + 1} = \frac{s_i}{t_i^P (1 + \tau_i)(1 + q_i)}$$

<sup>23</sup> In the wake of the Marshallian tradition, we use the term ‘short run’ to define a logical time-period, as opposed both to the ‘long run’ (as the other logical time period) and the ‘short period’ (as an historical-time dimension). However, in the wake of Marx – and unlike Marshall – we identify the long run with the theoretical condition of reproduction of the economy (and not necessarily with the logical period in which there are no fixed factors).

<sup>24</sup> In today’s economies, the impact of the developments in the banking-financial net on corporate profits is further strengthened by the improvement in the realization phase, through the so-called ‘consumer credit’. On this point, see Dos Santos (2011).

Finally, if we conventionally set the time-length of production of the sector ‘0’ as the time *numéraire* of the whole system, then equation (8) becomes:

$$(8bis) \quad r'_i = \frac{\hat{s}_i}{\theta_i(1+\tau_i)(1+q_i)} \quad \text{where } \theta_i = \frac{t_i^P}{t_0^P}, \text{ and } \hat{s}_i = \frac{s_i}{t_0^P}$$

where  $\hat{s}_i$  is the normalized rate of surplus-value (viz. the percentage of surplus-value per unit of turnover time of industry ‘0’). Finally, the equation of the annual rate of profit of industry ‘0’ reduces to:

$$(8tris) \quad r'_0 = \frac{\hat{s}_0}{(1+\tau_0)(1+q_0)}$$

We propose to label the product  $\theta_i(1+\tau_i)$  in equation (8bis) the ‘temporal composition’ of capital invested by capitalist firms in the *i*-th industry. Given the sectoral organic composition of capital and the single-period rate of surplus-value, it is this product that determines the annual rate of profit of the *i*-th industry *compared to other industries*. Yet, as we mentioned in section (3), the free competition among capitals will lead – according to Marx – to the long-run equalisation of the annual sectoral rates of profit. In this case, equation (8tris) can be re-read as the equation of the annual general rate of profit, where the *total* time of production of the economy is conventionally taken equal to one,  $q_0$  is the organic composition of capital of the whole economy,  $\tau_0$  is the *average* temporal composition of capitals (calculated as the weighted mean of the sectoral average temporal compositions), and  $s_0$  is the overall rate of surplus-value.

To sum up, some results can be gathered from the preceding analysis:

- i. the higher (lower) the temporal composition of capital of the *i*-th industry compared to that of other sectors, the lower (higher) will be the extracted annual mass of surplus-value compared to that of other sectors;
- ii. the annual rate of surplus-value extracted by both the *i*-th industry and the whole capitalist class increases (decreases) as the temporal composition of capital decreases (increases);
- iii. the general annual rate of profit of the whole economy increases (decreases) as the average temporal composition of capitals decreases (increases)<sup>25</sup>;

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<sup>25</sup> In Marx’s own words, «[w]hen the social surplus-value is distributed between the capitals invested in different branches of industry, differences in the various times for which the capital is advanced (for example, varying lifespans in the case of fixed capital) and different organic compositions of capital (thus also the different circulations of constant and variable capital) have similar effects in the equalization of the general rate of profit and the transformation of values into prices of production» (Marx, 1885, p. 294).

- iv. therefore, insofar as the temporal composition of capital is accounted for, the impact on the annual general rate of profit of those sectors which affect the rate of turnover of capital, and which are usually regarded as ‘unproductive’<sup>26</sup>, becomes ambiguous<sup>27</sup>.

As we have already mentioned, the short-run trend in the (average) temporal composition of capital is mainly the result of the trend in the time-length of circulation. This latter, in turn, is not only affected by the demand level and the efficiency of communication and commercial nets, but also by the state of the finance-banking system. By contrast, in the long-run the reduction in both the time required by the production process and the time-length of circulation (or, which is the same, the cut in the costs of circulation) can be regarded as an additional ‘countertendency’ to the *tendential fall of the (general) rate of profit*<sup>28</sup>. Consequently, for a given rate of surplus-value, the prime purpose of the capitalist firm will be to adopt every measure which is necessary to cut the two components of the time-length of turnover. In this regard, «[t]he main means whereby the production time is reduced is an increase in the productivity of labour, which is commonly known as industrial progress» ([Engels in] Marx 1894, p. 163). However, once again it is the duration of the circulation-period that plays the crucial role. As Engels observed, the main means

of cutting circulation time has been improved communications. And the last fifty years have brought a revolution in this respect that is comparable only with the industrial revolution of the

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<sup>26</sup> As for the *vexata quaestio* of Marx’s concept of ‘productive’ (and ‘unproductive’) labour, the related amount of literature is too vast to be quoted. In our opinion, one of the most interesting positions is the one expressed by Rubin (1928), and partially recalled and improved by Savran and Tonak (1999). According to these authors, labour can produce either use-values or commodities (namely, ‘values’). Labour that produces commodities, in turn, can be applied either to the ‘petty commodity production’ (i.e. the ‘simple mercantile production’) or to the ‘wage-labour production’. Within the latter, the wage can be exchanged against either income or capital. In the exchange against capital, workers can be employed within either the circulation sphere or the production sphere (including transportation, commodity maintenance, the distribution and retail trade – viz. all those functions that are conceived «as the continuation of a production process within the circulation process and for the circulation process» (Marx 1885, p. 229)). It is only when labour is exchanged against capital within the production sphere that we are in presence of productive labour (for capital), that is, labour producing surplus-value. Notice that both Rubin (1928) and Savran and Tonak (1999) adopt Engels’ most-disputed concept of the ‘simple mercantile production’, though, in our opinion, this does not affect their main conclusions. For a criticism of the above position, see Garbero (1985).

<sup>27</sup> For the derivation of point (iv), which can be regarded as a corollary of point (iii), we refer the reader to the Analytical Appendixes.

<sup>28</sup> Actually, as both Marx’s original manuscript edited by *MEGA*<sup>2</sup> and Roth (2009, p. 34, note 24) show, Marx never expressed the explicit purpose to deal with a *general law* of the rate of profit to fall in the long run. Moreover, in the original manuscripts of V3, Marx provided several examples of economic settings under which the rate of profit would increase. However, the analysis of this issue goes beyond the aims of this paper.

second half of the last century. On land the Macadamized road has been replaced by the railway, while at sea the slow and irregular sailing ship has been driven into the background by the rapid and regular steamer line; the whole earth has been girded by telegraph cables. ([Engels in] Marx 1894, p. 164)

From the telegraph cables of the nineteenth century up to the undersea cables of modern stock exchange markets – which allow investors to shift capitals worldwide in real time through high-frequency trading – the leap has not been that big.

### Concluding remarks

To sum up, the aim of this article has been twofold: first, to bridge a gap in the literature dealing with the economic thought of Marx; second, to provide a re-definition of several Marxian concepts on the basis of the role played by the rate of turnover of capital. In this regard, we find that by a combination of a re-reading of the standard version of Marx's *Capital* with the new evidence from the *MEGA*<sup>2</sup> edition, we can arrive at the following results: i. the work of Friedrich Engels on the original manuscripts of the V2 of *Capital* must be regarded as more than a simple editing of Marxian manuscripts, because his (Engel's) work directly affected the analytical core of Marx's theory, such as the analysis of the role of the turnover of capital; ii. neither the formula provided by Marx in V3 of *Capital* nor the one provided by Engels in Chapter 4 of the same volume can be regarded as the *general* equation of the annual rate of profit; iii. rather, the usual Marxian formulation should be modified, in the spirit of Marx, not only to explicitly include the impact of the rate of turnover of capital (as Engels does in Chapter 4 of V3), but also to consider both the long-run equalization of the rate of profit and the re-investment of capitalist firms (that is, the expanded reproduction of capital); iv. the rate of turnover and therefore the profitability of capital are crucially affected by the conditions of the banking-financial sector, through its effect on the investment activity; v. insofar as the development of the banking-financial sector (which is usually regarded as an unproductive sector) allows 'industrial' capitalist firms to increase the speed (or reduce the cost) of turnover of capital, the final effect of an increase in the share of (unproductive) labour units employed in the banking-financial sector on the general rate of profit could be either negative or positive; vi. this very effect should be regarded as a further (temporary) 'countertendency' to the well-known (but controversial) Marxian law of the tendential fall of the rate of profit<sup>29</sup>. This is the reason why we think that Marx would perhaps have regarded the process of financialization of the last three decades as the *pons asinorum* that capitalist firms have eventually gone through to sustain the profitability of capital.

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<sup>29</sup> This implication has been stressed in the pioneering contribution of Hourwich, according to whom '[i]ncreased rapidity of rotation [...] may reduce commissions and selling expenses sufficiently to make up for the fall of the gross profits, or surplus-value' (Hourwich 1894, p. 247). The standard formulation of the law of the fall of the rate of profit is provided in Marx (1894, pp. 317-338).

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## Analytical Appendixes

### a) The single-period general rate of profit in a two-sector economy

Let us consider an abstract capitalistic economy split into two different industries or sectors: the productive sector, marked by the subscript  $p$ ; and the unproductive sector (whose output value equals the cost of production and hence does not contain any surplus-value), marked by the subscript  $u$ . We could identify the productive sector with the manufacturing industry, and the unproductive sector with the banking-financial

industry. For the sake of simplicity, let us assume that the two sectors are characterized by the same time of turnover. Against this background, we can easily determine the general rate of profit,  $r$ , of the economy at the end of each single turnover time, that is:

$$(A.1) \quad r = \frac{S}{C+V} = \frac{S_p}{(C_p + C_u) + (V_p + V_u)}$$

where  $S_p$  is the single-period surplus-value (expressed in units of labour) extracted in the manufacturing sector,  $V_{p,u}$  is the variable capital invested in each industry (that is, the sectoral wage-bill expressed in units of labour), and  $C_{p,u}$  is the constant capital invested in each industry (that is, the sectoral value of the employed factor of productions, except for labour-power, all expressed in units of labour). As usual, the absence of any subscript denotes those magnitudes which refer to the whole economy.

*b) The annual general rate of profit under a simple reproduction regime*

In formal terms, the Marxian ‘simple reproduction’ scheme corresponds to the simple capitalization regime addressed in financial mathematics. When the surplus-value obtained at the end of each turnover period is not re-invested in the subsequent cycle (but, say, it is turned into ‘consumption’ of the capitalist class), the annual rate of profit of the whole capitalist sector is simply equal to the single-period profit rate times the rate of turnover of capital<sup>30</sup>, that is:

$$(A.2) \quad r' = n \cdot r = n \cdot \frac{S_p}{C_p + C_u + V_p + V_u}$$

from which, by putting  $\omega = V_u / V_p = v_u L_u / v_p L_p$ ,  $q = (C_p + C_u) / V_p$  and  $s = S_p / V_p$ , we get:

$$(A.3) \quad r' = \frac{ns}{q + \omega + 1}$$

where  $s$  is the overall single-period rate of surplus-value,  $q$  is the organic composition (in value terms) of capital and  $\omega$  is the ‘unproductive’ to ‘productive’ variable capital ratio in our two-sector economy. This ratio shows that the higher the amount of capital anticipated to employ unproductive workers compared to capital anticipated to hire productive workers, the lower will be the rate of profit. Such a conclusion recalls the old battle of Classical economists (except for Malthus) against unproductive activities.

Notice, however, that, insofar as it is recognized that the amount of resources employed in the banking-financial sectors can positively affect the rate of turnover, the

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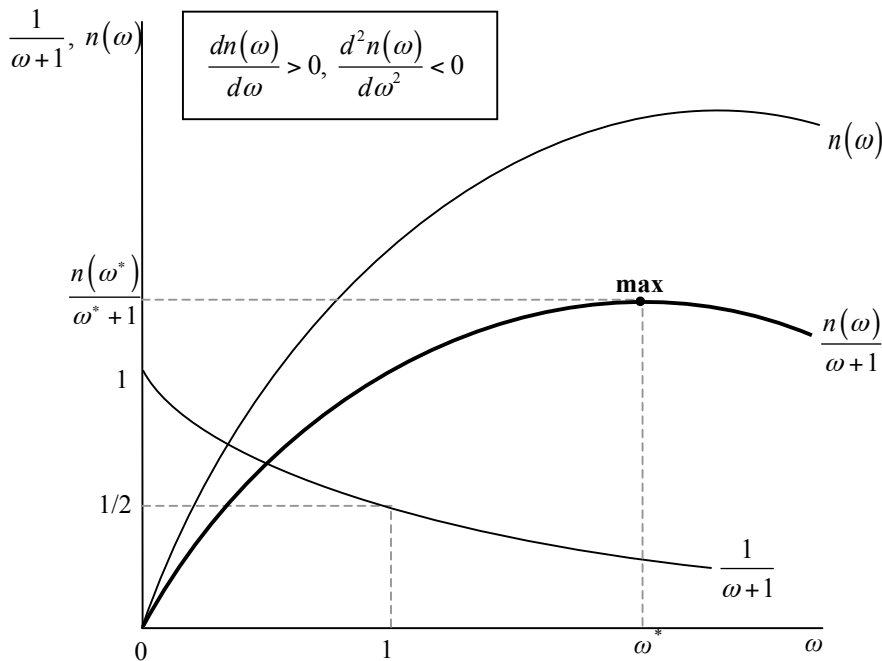
<sup>30</sup> If one were to assume that the two sectors are marked by different rates of turnover, then  $n$  could be regarded as the *average* rate of turnover. On this point, we refer the reader to equation (5bis).

final effect of an increase (decrease) in  $\omega$  is ambiguous, as it depends on the specific form of the function  $n = n(\omega)$ .

c) *The optimal share of unproductive labour units*

Let us consider a pure-labour production process, where  $q = 0$ . The annual rate of profit of the economy, corresponding to the annual rate of surplus-value, is therefore equal to  $ns/(\omega + 1)$ . Furthermore, since  $r = s$  and  $r_u = r_p$ , it follows that  $v_u = v_p = v$  and  $\omega = L_u/L_p$ . To put it differently,  $\omega$  equals the ratio of unproductive to productive labour units.

**Diagram 2.** Determination of the optimal share of unproductive labour units. Notice that  $n(\omega)$  is portrayed as a parabola where the coefficient of the square term is negative, the intercept is nil and the elasticity is  $> 1$ .



For the sake of graphical representation, let us assume that  $n$  is a continuous and differentiable function of  $\omega$ . Then it seems to be reasonable to assume that the *absolute* impact on the rate of turnover of an increase in the (relative) number of unproductive labour units (employed in the banking-financial industry) is positive, whereas its *marginal* impact is negative. The reason for this is that the higher the degree of development of the banking-financial sector (approximately measured by  $\omega$ ), the higher will be the speed (or, which is the same, the lower will be the costs) at which manufacturing firms (or their owners/shareholders) could re-invest the initial capital. At the same time, beyond a given historically-determined threshold at least, inefficiencies are expected to increase as the (relative) dimension of the banking-financial sector increases. Given these hypotheses, we can portray the two ‘multipliers’ of the rate of surplus-value,  $n$  and  $1/(\omega + 1)$ , through a simple diagram (see Diagram 2). The share of

unproductive labour units which maximize capitalist firms' profit,  $\omega^*$ , is positive. More precisely, it is given by the higher combination of the two multipliers of the single-period surplus value (see the bold line in Diagram 2). As a result, the potential maximum annual rate of surplus-value depends (also) on the impact of  $\omega$  on the rate of turnover, and the same goes for the general rate of profit.

*d) The annual general rate of profit under an expanded reproduction regime*

Turning to the Marxian 'expanded reproduction' scheme, it is easy to verify that it corresponds to the compound capitalization regime. For the sake of simplicity, let us suppose that capitalist firms re-invest in each productive cycle a constant share (call it  $\beta$ ) of profits realized in the previous period. Let us assume also a steady (overall) rate of exploitation,  $s$ , over time as well. The general formula of the mass of annual surplus-value is therefore:

$$(A.4) \quad S'' = s \cdot V_p + s \cdot \left[ V_p \cdot (1 + \beta \cdot s) \right] + s \cdot \left[ V_p \cdot (1 + \beta \cdot s) \cdot (1 + \beta \cdot s) \right] + \dots =$$

$$= s V_p \sum_{t=1}^n (1 + \beta s)^{t-1}$$

Equation (A.4) shows that, insofar as a constant share of the surplus-value is re-invested in the subsequent productive cycle, the system records an increasing accumulation of capital. Notice that if, by contrast, we assume that capitalist firms do not invest any portion of profits earned at the end of each single cycle (namely, if we put  $\beta = 0$ ), then equation (A.4) reduces to:

$$(A.5) \quad S'' = S' = S \cdot n = s V_p n$$

Finally, given  $s > 0$  and  $\beta > 0$ , the annual general rate of profit becomes:

$$(A.6) \quad r'' = \frac{S''}{C_p + C_u + V_p + V_u} = \frac{s V_p}{C_p + C_u + V_p + V_u} \cdot \sum_{t=1}^n (1 + \beta s)^{t-1}$$

Equation (A.6) shows that within the expanded reproduction scheme (viz. in a growing economy) the annual rate of profit is 'approximately' equal to (in fact, a bit more than)  $n$  times the single-period rate of profit, owing to the accumulation process (see Foley 1987, p. 92). Plainly, if we assume that the rate of re-investment of capitalist firms is nil (that is,  $\beta = 0$ ), then equation (A.8) reduces to equation (A.2).

### Philological Appendix

Engels' editorial work on Marx's manuscripts composing V3 of *Capital* was thorough,

but, to some extent at least, ambiguous<sup>31</sup>. On the one hand, Engels explicitly claims that he only made some minor revisions in the spirit of Marx. On the other hand, there is evidence that he made several changes which have not been clearly pointed out, aiming to make the text more understandable. However, the two aims (philological accuracy and readability) were mutually inconsistent. As the *MEGA*<sup>2</sup> clearly shows, no paragraph of V3 has remained as Marx wrote it. As with Engels' editing of V2, the changes that Engels made in V3 concerned titles, headings and the structure of the manuscripts as well. In addition, Engels made a meticulous sub-division of the Marxian text: while the original manuscript (1864-65) comprised seven chapters, each with a few paragraphs, Engels split it into seven parts, further divided into fifty-two chapters and several paragraphs. As a result, Engel's arrangement of the text, along with the new headings used, has deeply influenced the understanding of V3 over time. More precisely, the 'first draft' nature of the Marxian work has been widely misunderstood. The most part of Marx's original manuscripts is indeed *open-ended* and *undecided*. By contrast, Engels provided (at least some contributions towards) the (possible) solutions to the questions raised by Marx; but, sometimes, Engels neglected the existence of the original questions. This is particularly remarkable with regard to the credit theory developed by Marx in V3. Notice also that Marx was not happy with his presentation of 1864/65, in which he started from the relationship between the surplus-value and the profit. Consequently, he wrote at least four additional drafts of that presentation in 1867/68, where he started from 'cost, price and profit'. As previously mentioned, one of the subjects which remained *open-ended* was that of 'credit and interest', tackled in the fifth chapter. Notice that this chapter includes several excerpts representing a sort of collection of ideas and insights that needed further elaboration. Notice also that not only did Marx add such excerpts (to the original manuscript) at a later date, but also that he never returned to these subjects ever again. Against this background, the analysis of 'credit' was the last topic in the analysis of interest-bearing capital within Marx's original manuscript. By contrast, under Engels's final arrangement of V3, the analysis of interest-bearing capital turned into an introduction to the analysis of credit. Therefore, a fundamental question arises: was the analysis of the credit system part of Marx's original plan of V3 of *Capital*? On this point, the interpretations provided by scholars diverge. Some of them are prone to answer negatively<sup>32</sup>. These scholars stress that in the 1864/65 manuscripts Marx repeatedly states his intention to disregard the analysis of the credit system. They point out also that Engels often provides his personal interpretation of Marx's statements. For instance, Marx introduces what later become the paragraph entitled 'Credit. Fictitious Capital' as follows:

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<sup>31</sup> The manuscripts later included in V3 are: one rough draft of V3, dated 1864/65; some treatises on surplus value and profits, dated 1867/68; some draft of the beginning of V3 dated 1867/68; and two comment on differential rent, dated 1876.

<sup>32</sup> See, for instance, Heinrich (1996-7), pp. 460-463.

Die Analyse des Creditwesens und der Instrumente, die es sich schafft, wie des Creditgeldes u.s.w., liegt ausserhalb unsres Plans [An analysis of the credit system and of the instruments which it creates for its own use, like credit-money etc., lies beyond our plan]. (MEGA<sup>2</sup>, II/4.2, p. 469)

By contrast, Engels' translation is:

It lies outside the scope of our plan to give a detailed analysis of the credit system and the instruments [that] this creates (credit money, etc.). (Marx, 1894, p. 525)

Therefore, it was Engels who added the adjective 'detailed' (*eingehende*). As a result, the *qualitative* distinction between the different levels of abstraction of Marx's analysis appears obscured. This, in turn, would have allowed Engels to include in V3 any issues mentioned, however sporadically, by Marx, without regard for its specific level of abstraction.

Yet, according to other scholars, there would be a second possible interpretation of Marx's theory of credit, mostly found in Marx's correspondence. For instance, at the end of April 1868, Marx stated that both credit and interest-bearing capital should be included in the fifth chapter of V3. In November 1868 he talked about the fifth chapter as «*the* chapter of credit». Later, in the summer of 1880, Marx confirmed this emphasis in an interview that was released to *The New York Sun*<sup>33</sup>. The same scholars also point out the relevance of the articles written by Marx (mainly for the *New York Tribune*) in the 1850s and 1860s. These articles should be regarded as a further elaboration of Marx's theory of credit<sup>34</sup>. However, within Marx's manuscripts of V3 at least, the question of the role of credit and its impact on the valorization process is still open.

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<sup>33</sup> The question is discussed in Roth (2009), p. 37.

<sup>34</sup> See again Roth (2009), p. 39.