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Work More or Work Harder? The Duration and Intensity of Work in Marx's *Capital*

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ABSTRACT: The relationship between the duration of work (working time) and its intensity is a rather neglected issue in economic theory, both neoclassical and heterodox. Marx's analysis of this subject remains highly original and accurate. Furthermore, a dissenting minority of neoclassical labor economists have — consciously or unconsciously — followed his theses. The main points of the Marxian analysis are: a) the existence of an inverse relationship between working time and labor intensity; and b) a long-run time horizon for the determination of the level of labor intensity and thus the constitution of its social norm. These points are vindicated both analytically and in terms of modern ergonomic studies. The Marxian objective and materialist methodology is superior to both the neoclassical subjectivism of individual preferences and certain voluntarist neo-Marxist views that consider class struggle as almost unconstrained.

THE ISSUES SURROUNDING THE DURATION and intensity of work have been a rather neglected domain in economic theory. This is not curious for neoclassical theory, since it has a tendency from its very constitution to downplay the significance of labor. Of course, the labor market is a critical element in neoclassical general equilibrium analysis. But neoclassical analysis also downgrades labor from its role as the principal productive force — which it holds in both classical and Marxist political economy — to simply one productive factor among others. Because Marxist political economy establishes labor as not only the main creator of social wealth but also as an object of exploitation, neolassical economics views the subject

with suspicion, for obvious reasons. Thus, the topics of working time and labor intensity are not often found in typical neoclassical works, even in the sub-discipline of labor economics. And when they do appear, they are approached through the usual methodological individualist lens: workers make choices on the basis of their individual preferences regarding the time during which (and possibly the intensity with which) they are willing to work. Thus, "subjective" factors (*i.e.*, factors pertaining to individual will and choices) determine the length of working time.

However, curiously enough, the relationship between work time and intensity has also not been studied adequately within Marxist political economy. For the latter, the significance of labor is beyond dispute. The labor theory of value is founded on the primacy of labor among other productive forces, since labor is posited as the substance of value. Moreover, labor time is considered as the fundamental determinant of the measure of value. Last but not least, labor's exploitation is crucially affected by the length and the intensity of work. To put it in a nutshell, wealth creation (and thus value creation) depend on the expenditure of human effort, and the latter is characterized crucially by its duration and its intensity.

Thus, at the more abstract level, the importance of the duration and the intensity of work are duly acknowledged. Marx's theory of surplus value — and particularly the distinction between absolute and relative surplus value — hinges upon this recognition. But apart from this more abstract level of theorization in Marx's analysis, in later Marxist works the analysis of the relationship between the duration and the intensity of labor has been largely neglected. Usually, the intensity of labor is abstracted away, and only work time is considered. Of course, it can be granted that at a higher level of abstraction one of the two determinants of labor performed (its intensity) can be considered as given and constant in order to construct formal models that restrict attention to working time. This is a logical abstraction, since working time plays a much more prominent role in the *modus operandi* of the capitalist system. But at a lower level of abstraction, the previously abstracted element has to be considered. More concrete analyses and models must incorporate the role of labor intensity, and must therefore be equipped with an understanding of the relationship between the duration and the intensity of labor.

Another problem typically appears in many contemporary radical and Marxist analyses of working time. As Nyland (1986) accurately shows, there is a strong tendency to consider working time as almost solely dependent on class struggle. That is, when attention is paid to the duration and intensity of labor, these are treated as almost totally determined by the balance of power between social classes, operating without any objective constraint. In other words, class struggle appears as a "black box," which cannot be analyzed formally since it depends on historically specific factors and in which class consciousness (with all its "subjectivity") plays a decisive role. Thus, the determination of working time (and intensity) passes through this "black box" of class struggle.

This paper aims to bring forth the way working time is related to labor intensity according to Marx, and particularly to pinpoint several important conclusions of his analysis that remain extremely relevant until today. At a second level, the paper aims to prove that several older and newer neoclassical authors — consciously or unconsciously — replicate, albeit in a weaker form, some of Marx's conclusions.

The paper's main point is that the Marxian analysis of this subject is highly original and remains accurate; and also opens interesting and still rather unexplored fields of inquiry for political economy. Second, that the Marxian methodology, which ascribes primacy to objective factors determining the duration and the intensity of labor, is correct. These objective factors constrain class struggle in the sense that they set the ground on which the latter is conducted.

In substantive terms, we argue that Marx has correctly identified an inverse relationship between working time and labor intensity. This relationship is strictly related to the maximization of output. Moreover, Marx correctly posited that the effect of the duration on the intensity of work should not be calculated on a daily basis, but rather within a much longer time frame covering the whole work-life span. Both conclusions have, we believe, interesting repercussions for a number of other issues.

The outline of the paper is the following. Section I analyzes how Marx theorized the relationship between working time and labor intensity in *Capital*, and how their inverse interrelationship relates to the maximization of the extraction of surplus value and the accumulation of capital. Section II analyzes the objective and the subjective

factors that affect the duration and intensity of work, and how these should be examined. Finally, the last section concludes.

I. WORK-TIME AND WORK INTENSITY IN *CAPITAL*

To begin with, in his study of the relationship between the duration and the intensity of work Marx argues that these two variables are interrelated. Therefore, changes in the magnitude of the one affect the magnitude of the other. Thus, he is interested in the concurrent evolution of these two variables. Moreover, he focuses on the maximum possible magnitudes that these two variables can jointly take. The reason for this emphasis is obvious: their maximization would lead, under certain conditions, to the maximization of surplus value and profit, the main drivers of capitalist accumulation. Logically, each individual capitalist (for his own enterprise) but also capital in general (for the whole economy) would seek to maximize these two variables jointly. However, as Marx observes, this maximization drive faces serious constraints: an increase in one variable would lead to a decrease in the maximum possible magnitude of the other (with technological conditions given):

> The first effect of shortening the working day results from the self-evident law that the efficiency of labour-power is in inverse ratio to the duration of its expenditure. Hence, within certain limits, what is lost by shortening the duration of labour is gained by increasing the degree of power exerted. (Marx, 1990, 535.)

And also:

> The more the productivity of labour increases, the more the working day can be shortened, and the more the working day is shortened, the more the intensity of labour can increase. (Marx, 1990, 667.)

These mutual constraints are based, above all, on objective material conditions and particularly the biological limits of the human organism. Marx does not primarily focus on aspects like the willingness of the worker to work (or to shirk), or the employer's pressures in this regard, but rather on the inverse time–intensity relationship as a result of the material nature and the biological limitations of humans, limitations that are independent of "consciousness" factors.

Marx offers several examples to prove that changes in the duration and the intensity of work are historically related (see Marx, 1990, ch. 15, paragraph 3c, 533–542) and, also, that they move in opposite directions. However, he does not establish a constant relation of cause and effect between them. At different historical periods the change in the duration of labor can be the cause of a change in its intensity, or *vice versa.* Thus, whether the one or the other takes the role of cause, the change of their configuration depends on historical contingency. The following passage is characteristic of this view:

> All the usual arguments against the shortening of the working day depend on the assumption that the phenomenon occurs under the condition presupposed here. But in reality the very opposite is the case: a shortening of the working day either follows upon, or immediately precedes a change in the productivity and the intensity of labour. (Marx, 1990, 663.)

We should expect that neither of the two variables will have priority over the other as cause over effect, since they represent the two different forms of the consumption of labor power. In their historical evolution both variables have changed positions from cause to effect. Marx describes many examples where the reduction of working time has led to an increase in labor intensity, but he also describes a situation where the capitalists' need for higher intensity of labor forced them to accept a reduction of working time (Marx, 1990, 542).

Finally, Marx advances another crucial argument. He argues that this optimal — for the capitalist system — configuration of the duration and intensity of work does not apply to a single working day, but rather concerns a more extended time frame. Certainly, the intensity of labor varies during a given working day, as many modern studies argue (see below). However, what matters for the capitalist system is not the maximum possible intensity of work within a day, but rather the maximum average intensity of work that can be sustained over a longer time period. As we will argue in the following sections, with a given length of working time, there will be some maximum to labor intensity that can be sustained in the long run, even if a higher intensity is possible within a single day. Hence, what matters is the specific maximum intensity of work that can be sustained in the long run.

Accumulation of Fatigue and Variation of Labour Intensity

Marx's view of the work time–intensity interaction is not limited to the intra-day variation of intensity. He assumes that labor intensity remains steady within a single day of work, and examines the effect of working time on a long-term basis.

> Nevertheless, the reader will clearly see that we are dealing here, not with temporary paroxysms of labour but with labour repeated day after day with unvarying uniformity. Hence, a point must be inevitably reached where extension of the working day and intensification of labour become mutually exclusive so that the lengthening of the working day becomes compatible only with a lower degree of intensity, and inversely, a higher degree of intensity only with a shortening of the working day. (Marx, 1976, 533.)[1]

Marx doesn't accept that labor intensity stays constant throughout a working day. He seems, though, to abstract from this effect in order to focus on the day-after-day repeated process of labor. It is the daily repeated nature of work that makes mutually exclusive a high intensity and a long working time. The phenomenon of the inverse relation between these variables is attributed mainly to the effect of day-after-day accumulation of exhaustion, and for this reason it cannot be examined inside the narrow borders of a single working day.

Several modern neoclassical economists (Barzel, 1973; Ehrenberg, 1971; Feldstein, 1967) who have studied the relationship between working time and labor intensity follow a similar path to Marx's. The study of this relation within the neoclassical framework is of special interest, since this is not a popular field for neoclassical analysis. This investigation has led to some complications of the standard neoclassical model of the labor market (see for example, Contensou and Vranceanu, 2000). Following the pioneering work of Robbins (1929) and Chapman (1909), this stream of writers relates workers' performance to the exhaustion caused from working and not to factors affecting their will, such as the wage. In their view, the increase of working time has a negative effect on productivity. The hourly product of labor throughout the workday is not constant but diminishing, not because of the probable interaction with other production

1 Similar references describing the inverse relationship between working time and labor intensity can be found in various parts of *Capital* (for example, Marx, 1976, 426, 427).

factors but due to the dependence of intensity on the length of the workday. Their main explanation for decreasing labor productivity is the physical or mental exhaustion of the worker because of the labor process (also called the "exertion effect").

This approach is based solely on objective-type effects, through the mechanism of human exertion. It does not take into account the subjective aspects of the time–intensity relation. Labor intensity is examined as determined mainly from working time, from the exhaustion and fatigue that the work inflicts on the workers. From this point of view, it is additional confirmation of the significance of the human capabilities as a factor determining the relation between working time and the intensity of labor, a thesis quite similar to Marx's.

On the other hand, a significant difference exists between Marx and the above-mentioned authors. The latter examine the effect of working time on labor intensity within the narrow limits of a single working day; they are not able to capture the cumulative effects of labor, from one day to the following ones. They assume that there is a daily impact of working time on labor intensity. As the workday proceeds, the daily accumulated fatigue makes the workers work less intensively. The intensity of the next working hour is lower than that of the previous hour. However, the following day, workers start their work with the same initial intensity as the day before, unaffected by the previous day's effort. In this analysis, the impact of one working day on the labor intensity of the following is not grasped, because the interaction between working time and intensity is examined within a single day.

Marx adopts a different point of view. He assumes that within a single working day a worker might be able to achieve a stable and high intensity for as long as s/he wants. But this pattern could not be repeated in subsequent days. Since work is not a "temporary paroxysm," but has to be repeated, a different phenomenon becomes dominant. It is the transfer of fatigue from one day to another and the accumulation it postulates. The overconsumption of labor power is feasible for one day or two, but cannot be sustained for a longer period. This suggests that the time in which the effect of working time on intensity is examined should not be a single working day, but a longer period, allowing the accumulation of fatigue to take place. This argument has an important consequence. It allows for the possibility of an increase of the total product caused by a decrease of working time, or the opposite.

If, for example, there is an increase in working time from eight to nine hours, this, on the "single day" approach, will affect only the intensity of the ninth hour of work. Since the intensity of the previous eight hours will not be affected, the total product will rise. In general, every increase in working time will always lead to an increase in total product, unless the marginal product of the extra (ninth in our example) hour is negative. A negative marginal product implies that the extra hour of work will not produce any more output but will also destroy some of what was already being produced. This assumption is far from reality, and very few writers make it.

According to Marx, an increase from eight to nine hours will affect the intensity of all of the nine hours worked and not only of the last one, through the mechanism of transfer and accumulation of fatigue. The accumulation of fatigue will make workers unable to sustain the previous day's intensity, from the first to the last working hour. This theoretical model incorporates the possibility of a decrease of the total product after an increase of working time and the opposite (an increase in total product following a time decrease), the case mostly described by Marx.

It is clear from the above that Marx posits a functional relationship between the maximum, jointly sustainable, magnitudes of work time and intensity. For each magnitude of the variable working time there exists one maximum magnitude of the variable work intensity that is sustainable for this working time. Any intensity higher from this maximum intensity is simply not sustainable, due to the workers' exertion, even if they accept it and try to sustain it. Conversely, for each level of labor intensity there exists one maximum working time for which this intensity is sustainable. Any extension of the working time beyond this maximum would make the correlated intensity not sustainable. The relationship among maximum jointly sustainable magnitudes of work time and intensity is graphically represented in Figure 1 by the curve AB.[2]

Each point on the curve AB indicates the maximum sustainable intensity for the corresponding working time. Each point "inside" this

2 The mathematical function expressed in Figure 1 (curves AB and CD) suggests a diminishing rate of decline of intensity towards working time, *i.e.*, negative first and positive second derivative of intensity with respect to time. This is only one among the possible formalizations, since the second derivative can also be negative or zero. We use this form since it is corroborated by ergonometric experiments (see below).

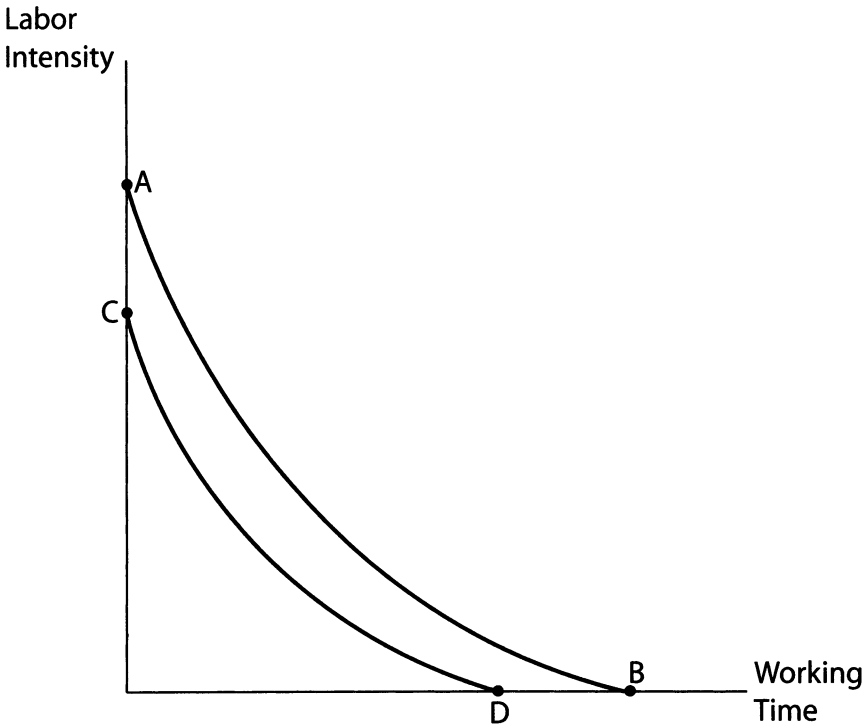

Figure 1: The relationship between maximum sustainable values of work time and work intensity

curve indicates a combination of working time and intensity that is smaller than the (joint) maximum, and each point "outside" the curve corresponds to non-sustainable combinations. Curve CD is the result of a downward shift of the initial curve AB, caused by class struggle or other subjective factors, as will be discussed below.

II. OBJECTIVE AND SUBJECTIVE FACTORS AFFECTING THE LENGTH AND INTENSITY OF WORK

The relationship between the jointly maximum possible values of working time and labor intensity (represented in Figure 1, curve AB) can be characterized as "objective," since it is founded on biological features and does not take into account influences from factors like human will or decision ("subjective factors"). We maintain that this is the basic relationship Marx described in *Capital.* The existence of

this relationship is confirmed by modern ergonometric experiments (see Birk, Bonjer and Von der Sluys, 1961; Bonjer, 1968; Rodgers *et al.*, 1986; Hsin and Mao, 2002). These experiments are methodologically quite close to the conditions of the labor process described in *Capital.* Labor is assumed to have a constant intensity throughout the working day. In these ergonometric experiments, conducted in a laboratory environment, it is proved that an inverse relationship exists between working time and labor intensity. Each magnitude of labor intensity corresponds to one maximum magnitude of working time for which this intensity can be sustained, without exhausting the human organism. The reverse holds as well. Each magnitude of working time corresponds to one maximum magnitude of labor intensity that can be sustained during the work process. The exact mathematical relationship (function) between the (jointly) maximum values of working time and labor intensity has been extracted by the above researchers and implies a curve like the one presented in Figure 1 (curve AB). These experiments verify the thesis that Marx and other economists (such as Chapman and Robbins) maintained; namely that a decrease in working time would lead to an increase in labor intensity and this would leave the total product unaffected or even increase it.

Still, one important aspect is whether this inverse relationship is present in the actual work process, since other factors may influence labor intensity and remove it from its maximum possible values.

There is an extensive neoclassical literature (*e.g.*, Leibenstein, 1979; Akerlof, 1982) concerning the effects of various parameters (correlated with human consciousness or will) on the intensity and effectiveness of the work that is done. For these writers, it is not working time but rather the workers' discretion and decision-making that determines the intensity of labor. In this approach the (reduced) working time can be used only as a supplementary motive (and one that is of less importance) for the worker to increase labor intensity, in a way similar to the "efficiency wage" mechanism.[3] This approach usually ignores the effect of working time on workers' capacity to work. It views the determination of labor intensity from the point of individual utility and its maximization, a fundamental premise of neoclassical theory. By assumption, it reduces the importance of working time in the determination of labor intensity.

3 This is why it is called the "efficiency wage–hours model" by some authors (*e.g.*, Beyer and Sorensen, 1991).

Translating the results of this tradition in terms of the time–intensity curve AB (Figure 1), its proponents argue that the worker is not operating near the frontier of maximum expenditure of labor power (that is, the curve AB in diagram 1) but in a combination of lesser intensity and working time, inside the curve. In this case an increase of work time may not lead to a decrease in intensity, since the possibility of a simultaneous increase in both variables exists. In this case the subjective factors determining labor intensity become dominant.

Marx examines this issue. After observing that a shortening of the working day raises the efficiency of labor-power, he refers to two different cases. The first is the case of motives: "Moreover, the capitalist ensures by his method of payment that the worker really does expend more labour-power" (Marx, 1990, 663).

Capital provides motives to the workers ("especially by piece wages"), to make them use their ability, offered by the reduced working time, to work harder. Nevertheless, Marx doesn't focus on this method (of motives), but on the organization of the labor process in factories, where an intense connection between workers and machines exists. He argues that the dependence of the worker on the machine, in combination with the role of the supervisors, has already imposed a rigid discipline. He quotes as examples experiments made in various factories where "without changing of the technical terms of production" a reduction of working time led to an increase of the product, hence of the intensity of work. His conclusion is that

> the shortening of the working day creates, to begin with, the subjective condition for the condensation of labour, i.e. it makes it possible for the worker to set more labour-power in motion within a given time. As soon as that shortening becomes compulsory, machinery becomes in the hands of capital the objective means, systematically employed, for squeezing out more labour in a given time. (Marx, 1990, 536.)

He remarks of course that this kind of intensification refers to a "special class of worker — the machine worker" (*ibid.*).

The conclusion, following his extended description of the methods of intensification (Marx, 1990, 533–542), is that, at least for the kind of workers Marx described, the inverse relationship between working time and labor intensity is not only theoretical, but actually

present in the real labor process. Every reduction of working time not only gives the capability for an increase in intensity, but finally leads to this increase. In general, Marx's thesis on this aspect is clearly that the inverse relationship is materialized in the labor process. His position is that under the capitalist organization of the labor process it is the time of working that basically determines the intensity of labor and not the (present but not dominant) worker's discretion.

In other parts of *Capital*, Marx refers to a "normal social rate of intensity" (Marx, 1990, 661), implying a social process for intensity determination. Marx doesn't analyze the way through which this determination occurs. Green (2001) refers to labor intensity norms, which are socially determined, in the same way that the value of labor power is determined by social forces. According to Green (2001), these norms are determined by the notion of "permanent effort" — the amount of effort that can be spent in work without degrading the physical or mental health of the workers. Since it is a social norm, it is subject of course to social determination and conflict in the workplace. Still, the norm of "permanent effort" defined by Green is highly correlated with the capabilities of the human organism. According to Golden (1996), the collectively determined norm in the workplace is connected to the work time. When work time increases, the norm is reduced to prevent workers from over-exhaustion.

We suggest that since we are dealing with an element of the labor process social determination of labor intensity should accrue in a manner similar to Marx's determination of the mean productivity of labor. For similar jobs, there will be an intensity prevailing in most factories, allowing variations from one establishment to another. It is acceptable to assume that in this social determination process, the comparison to similar groups of workers, the ability of moving to a different job and also the class struggle do play an important role.

However, it cannot be deduced from *Capital*, nor would we support the idea, that this social determination of labor intensity is free to produce any possible outcome. One reason for this is that class struggle cannot decisively challenge the determinant role of capital in the labor process without challenging the foundations of capitalism as a whole. In periods of relatively smooth capitalist operation the first and dominant role belongs to the capitalists. Moreover, class struggle is conducted on the ground of material interests, such as the

increase of surplus value for the capitalists and the protection and the reward of the labor-power for the workers. The reasons for the latter to try to reduce the intensity of labor are more intense when working time is long; therefore, working-class pressure for reduced intensity of labor is greater when working time is longer.

According to Marx, the significant factor determining the relation between working time and labor intensity is the material nature of the human organism and the consequent limits this nature poses. This Marxian thesis is specially underlined by Nyland (1986). He points to Marx's opinion that after the legislative reduction of working time, the class battlefield moved onto the terrain of the intensity of labor. Intra-capitalist competition would raise the intensity of labor and this would yield to a further time reduction. Nyland (1986) strongly criticizes many Marxists who "have misunderstood the nature of (Marx's) argument." He criticizes them for focusing only on the role of class struggle in working-time determination. "Marx would have disagreed," he says, since the core of Marx's theory of working time is the relationship between human capacities and human will.

Many Marxists who have attempted to explain the downward movement in standard times have, however, tended to de-emphasize or ignore the human-limits aspect of the theory. This failure has removed much of the material basis from Marx's argument (Nyland, 1986).

Marx founded the time–intensity relationship on this material contradiction between working time and labor intensity. He focused not on workers' will but on their objective capabilities. He stretched this line of thinking and he maintained that this material relationship determines working time:

> Capital's tendency, as soon as a prolongation of the hours of labour is once for all forbidden, is to compensate for this by systematically raising the intensity of labour, and converting every improvement in machinery into a more perfect means for soaking up labour-power. There cannot be the slightest doubt that this process must soon lead once again to a critical point at which a further reduction in the hours of labour will be inevitable. (Marx, 1990, 542.)

Following this analysis we argue that the social determination of labor intensity through the class struggle or any other process (involving "efficiency wage" motivations, etc.) is expected to follow

the secular inverse relationship described in Figure 1, since this constitutes the material base for its social determination.

More specifically, class struggle in any form (conscious and formal or spontaneous and informal) and other forms of social determination of labor intensity are expected to shift the time–intensity curve towards a direction indicating less intensity for the same working time, as the curve CD in Figure 1 indicates. But we suggest that, despite the downward movement, the shape (and the slope) of the curve will not decisively change. This means that the tradeoff between working time and labor intensity remains practically the same, but at lower absolute levels. An increase in working time, for example, will lead to the same decrease in intensity as along the AB maximum possible values curve, although the absolute value of intensity is now smaller due to the class struggle. Formally, the derivative of intensity with respect to working time remains the same.

We argue that this will occur because any social determination of the intensity of labor for a given working time has to be based upon the biological time–intensity relation. The notion of "permanent effort" (proposed by Green, 2001) may indicate a rate of exploitation that is lower than the maximum possible level (*i.e.*, the one found on the AB curve). If the class balance is given for a specific time period and, as a result, the rate of exploitation is given as well, any increase in working time should lead to a decrease in labor intensity. The tradeoff between time and intensity is still based on the biological relation mentioned above (represented by the AB curve), although the absolute level of intensity can be lower, due to class struggle or other social factors. In other words, class struggle is conducted upon the objective base of the biological limits of human nature. It affects mostly the absolute values of working time and labor intensity but cannot decisively change the nature of the tradeoff between these variables. This topic of course requires further investigation in order to determine the specific role of class struggle in the time–intensity relationship, as well the role of other factors such as the wage level.

Another important issue is the extension of the above relationship to the work process of mental workers. There are reports showing that overworked mental workers suffer from exhaustion that leads to serious degradation of their working capability (see for example Bosch, 2000; Sparks, *et al.*, 1997). This degradation is very similar to the one proved for manual workers. In this light, a similar relationship to the

one holding for manual workers should be expected for mental workers as well, but the documentation requires further research in a much more difficult field, since the measurement of mental work intensity requires solving difficult methodological and practical problems.

Before concluding, it is important to point out that a relationship between working time and labor intensity like the one described above includes the possibility of an increase in total product after a working time decrease, since the decrease in working time can be accompanied by a larger increase in labor intensity. This possibility depends on the specific (quantitative) relation between the two variables, making the quantification of this relationship especially interesting and the economic consequences indisputably important.

III. CONCLUSIONS

Marx insisted on the existence of a strict relationship between working time and labor intensity. He mainly based this interaction on a material base: the natural limits of human body and mind, which cannot be varied without limit. This contradiction between the two forms of consumption of labor-power has been noticed and described by many other later authors coming from different standpoints within economics and political economy.

There is a common point among many economists today that the inverse relation between time and intensity should not be neglected when we study the labor process. Beside this, differences of perspectives of course exist. One major difference is the "daily basis" examination of this relation by many modern authors. Marx's view was broader, allowing the examination of the accumulation of fatigue not only inside the narrow limits of a single working day, but in a larger time interval. This approach allows for the possibility that a working time increase could lead to an aggregate product decrease. This will occur if the decline of the (mean) intensity is greater than the increase in working time. The opposite direction is also important. A working-time decrease could lead to a total product increase, if the subsequent intensity increase is greater than the time decrease. The last is the case that Marx described as a fact in the factory labor process of his day.

The economic consequences of this sort of interaction between working time and labor intensity are very semantic. Under the assumption that capitalists can control (to a satisfying degree) the intensity

of labor and minimize worker shirking, this can result in a surplus-value–maximizing, optimum combination of working time and labor intensity. The verification of the existence of such a combination remains, of course, an issue for further research, but the possibility is open under this formulation of the interaction.

Some economists might find this process rather deterministic, where the only factor determining the intensity of labor is working time. This line of critique, directed against existence of a strict relationship between working time and labor intensity, is not unexpected (see Barzel, 1973). Marx himself has spoken for a social process of intensity determination that leads to a normal rate of intensity prevailing in a specific place and time. We argue that the inverse relationship between time and intensity that is analytically described by Marx is the material ground upon which this social process of determination takes place. Capitalists cannot avoid the limits that human nature poses in their permanent effort to extract more labor in a given time. Workers and their counteractions also take into account the overconsumption of their labor power that is well described by the time–intensity relation.

In this perspective, class struggle plays a crucial role: it changes things but its transformative power is neither unlimited nor unconstrained. It operates within objective material limits. In eras of revolutionary conditions, it can surpass these limits to a certain extent, but even then it cannot neglect them. The workers' assault on heaven always requires a firm footing on the ground. In this sense, class struggle certainly has an effect on the intensity and duration of work. In periods of workers' militancy, it is logical that the relationship is shifted downwards (*e.g.*, to the CD curve in Figure 1). In periods of workers' movement weakness, it is also probable that the capitalists will push the time–intensity frontier towards its maximum level (curve AB).

The analytical specification of the objective conditions on the basis of which working time and labor intensity are being determined provides a solid ground for proceeding further. Since the actual determination of time and intensity cannot occur outside class struggle, formal modeling of how class struggle operates on the basis of the objective conditions regarding the time–intensity relationship is an interesting field for further research. Its investigation will prob-

ably shed more light on the historical evolution of both labor intensity and working time.

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