COMMENTS

On heterogeneous labour and the labour theory of value

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I. Introduction

In an article in this journal (Bowles and Gintis, 1977, pp. 173–192) and in a subsequent exchange with Professor Morishima, Bowles and Gintis attempted to establish the compatibility of the traditional propositions relating surplus value to profits with the existence of heterogeneous labour. Had they been successful, theirs would have been a most important breakthrough; they would have managed to remove one of the oldest and most basic criticisms levied against the labour theory of value since the time of Böhm-Bawerk. It is the contention of the present article that Bowles and Gintis, despite many interesting elements in their analysis, did not achieve their stated aim. By means of a certain generalisation of their formulation, which will be proposed here, an attempt will be made to reassess the importance of the problem of heterogeneity of labour and of differential rates of exploitation. In the course of this discussion it will first be shown that Marx, whom Bowles and Gintis criticise as having neglected what they describe as 'labour segmentation', was, on the contrary, very much conscious of discrimination among workers practised by capitalists.

II. Marx and labour segmentation

Marx and all Marxists after him have, of course, always been familiar with the heterogeneity of specific, useful, labour, i.e. labour which produces use-value. It is only with respect to exchange-value-producing or abstract labour that they have proclaimed its homogeneity.[1] But this distinction does not preoccupy Bowles and Gintis unduly.

[1] It might be useful to recall the meaning of the concept, peculiar to Marx, of 'abstract labour'. Marx defined abstract labour in the context of commodity production and exchange, as labour stripped of any specific productive characteristic, i.e. labour which turns out some commodity without specifying what kind of commodity (a chair, a table, etc.). Exchange, by equating the various commodities, provided they are taken in certain definite quantities each, is seen by Marx as also setting aside the various specific characteristics of commodities and as taking into account their exchange value only. From this he derives his famous correlation between a certain quantity of abstract labour, measured in hours of work, and the corresponding amount of exchange value. With its specific productive characteristics set aside, abstract labour can, in principle, be nothing else but homogeneous labour. He then deals with skilled and unskilled labour as subdivisions of abstract labour, with unskilled as the basic category and skilled labour as a simple multiple of a certain amount of unskilled labour.

They concentrate on 'labour segmentation', which they understand as unequal treatment—from the point of view of wages, quality of jobs and conditions of work—of worker groups distinguished from each other by some extra-economic characteristics (race, sex, nationality, etc.). The problem of racial discrimination in the United States obviously looms heavily in the background of their analysis.

Right though they may be to feel preoccupied by such problems, Bowles and Gintis are nevertheless wrong to suggest that Marx is repsonsible for originating a tradition of theoretical neglect. They quote a passage from the *Manifesto* to the effect that the rise of the bourgeoisie tends to put an end to all feudal, patriarchal relations and they infer a forecast of a historical trend of increasing homogenisation of labour under capitalism. But even if one could quote other passages amenable to similar interpretation, one would have to set against such a 'tendencial law of increasing homogenisation of labour' a series of very important 'counter-acting forces' recognised by Marx. His distinction of the three forms of relative surplus population (Marx, 1967, Chapter 25), his distinction between worse and better paid strata of the working class (Chapter 25, sections 5(b) and (d)), even his use of the phrase 'the aristocracy of the working-class' (1967, Chapter 25, p. 66—a phrase used by Marx and Engels as early as 1850, see their Review in the *Nueues Rheinische Zeitung—Collected Works*, Vol. 10, 1978, p. 514) are all cases in point. In these various differentiations of the lot of labour under capitalism, Marx perceived the very opposite of increasing homogenisation of labour: he saw the rise of labour segmentation not on a traditionalist, feudal, but on a purely capitalist basis. Nor was this perception of his accidental. Although he did not theorise about them exhaustively, he undoubtedly spotted mechanisms whereby capitalism would atavistically re-introduce and use for its own exploitative purposes, forms of organisation of labour rendered obsolete by the very development of capitalist production. And although he used the term 'division of labour', in his discussion of the labour of women and children, he was talking in fact about labour segmentation.

Although then, technically speaking, the old system of division of labour is thrown overboard by machinery, it hangs on in the factory, as a traditional habit handed down from Manufacture and is afterwards systematically remoulded and established on a more hideous form by capital, as a means of exploiting labour-power. The life-long speciality of serving one and the same tool, now becomes the life-long speciality of serving one and the same machine (Marx, 1967, p. 422).

And further on, in his comments on Modern Industry, he continues:

At the same time, the capitalistic form of that industry reproduces the same division of labour in a still more monstrous shape; in the factory proper, by converting the workman into a living appendage of the machine; and everywhere outside the factory, partly by the sporadic use of machinery and machine workers, partly by re-establishing the division of labour on a fresh basis by the general introduction of the labour of women and children, and of cheap unskilled labour (p. 484).

This 'division of labour', freshly re-established by the general introduction of the labour of women and children is, in fact, a case of labour segmentation and provides a most significant instance of dehomogenisation of labour as a result of mechanisation, hence of the development of capitalist production. It should, therefore, be sufficient for the rejection of any claim about increasing labour homogenisation as a well established feature of Marx's forecasts about capitalism.

This does not mean that he anticipated the full ramifications of labour segmentation under modern US capitalism. He must, however, be acknowledged as the originator of the study of 'sexism' (women's labour) while 'ageism' (if I may be permitted by this

neologism to indicate the overexploitation of children's labour) which he studied exhaustively, is by now a historical memory in the countries of advanced capitalism. With regard to racism, on the other hand, his vision was slightly blurred by the persistence, up to his days, of negro slavery. Slaves were not proletarians, and, therefore, strictly speaking, not a segment of the working class. Marx, however, did not fail to see that, in a sense, they did constitute such a segment, and that their condition acted as a deadweight in the struggle of the working class for an improved life (in the special American case, for an eight-hour day) (Marx, 1967, p. 301). His statement: 'Labour cannot emancipate itself in the white skin where in the black it is branded' (p. 301), clearly anticipated Bowles' and Gintis' remark about the tactical usefulness of labour segmentation for the bourgeoisie, utilising divisions among workers in order to raise the overall rate of exploitation.

Let us now return to the labour of women and children—the main case of labour segmentation in *Capital*. The thing that sets this labour apart is, for Marx, not mainly any difference in skill or in the kind of work they performed—although such differences often did exist—but simply the fact that they were 'cheap labour' (pp. 262–263 and 499–500), compared to the men, who would have to be paid higher wages for the *same work*. This is a description of pure labour segmentation which, as Marx saw 'at the same time raises the degree of exploitation' (p. 395). He also saw that for such segmentation to be implemented, the extra-economic relationships of family dependence of women and children had also to be utilised.

Machinery also revolutionises out and out the contract between the labourer and the capitalist, which formally fixes their mutual relations ... previously, the workman sold his own labour-power, which he disposed of nominally as a free agent. Now he sells wife and child. He has become a slave-dealer. The demand for children's labour often resembles in form the enquiries for negro slaves ... (pp. 395–396).

It follows that most of the points made by Bowles and Gintis with regard to labour segmentation—segmentation itself, differential treatment of the segments, increase of degree of exploitation as a result, the development of capitalism as the source, utilisation of extra-economic family or racial relations for capitalist purposes—have already been anticipated by Marx. The author of *Capital*, however, went further than establishing a mere morphology of segmentation—or a static analysis of it, which is the most that Bowles and Gintis do. He actually suggested a dynamic model in which he tried to combine concretely the macroeconomic processes of capital accumulation; unemployment and population increase with the microeconomic problem of labour segmentation. Briefly, his analysis can be summarised as follows.

Capitalist exploitation, and hence employment demand for labour, tends to gravitate to those segments of the working class which are the most heavily exploitable. The average rate of profit considered satisfactory at a certain period can only be guaranteed by the over-exploitation of such segments. This leads to increased demand for the services of 'cheap labour', while over-full employment of 'cheap' labourers is made a condition for the unemployment of the better paid workers. Thus unemployment can coexist with a booming economy, giving another instance of the permanence of the 'reserve army'.

In Marx's view this priority of exploitation went to children and young persons generally. Such persons were drained of their strength while still at a tender age, after which they were treated as useless and left to perish. Teeming working class families would constantly replenish the reservoir, however, so that the age structure of the

working class acquired a shape peculiar to the needs of capital. An economic process would become a law of population. As Marx said,

> In the automatic factories, as in all the great workshops, where machinery enters as a factor, . . . large numbers of boys are employed up to the age of maturity. When this term is once reached, only a very small number continue to find employment in the same branches of industry, while the majority are regularly discharged. This majority forms an element of the floating surplus-population, growing with the extension of those branches of industry. Part of them emigrates, following in fact capital that has emigrated. One consequence is that the female population grows more rapidly than the male, *teste* England. That the natural increase of the number of labourers does not satisfy the requirements of the accumulation of capital, and yet all the time is in excess of them, is a contradiction inherent to the movements of capital itself. It wants larger numbers of youthful labourers, a smaller number of adults . . .
> . . . In order to conform to these circumstances, the absolute increase of this section of the proletariat must take place under conditions that shall swell their numbers, although the individual elements are used up rapidly. Hence rapid renewal of the generations of labourers (this law does not hold for the other classes of the population). This social need is met by early marriages, a necessary consequence of the conditions in which the labourers of modern industry live, and by the premium that the exploitation of children sets on their production (pp. 641–642).

Whatever one may think about the realism of this analysis in our present-day conditions, it could hardly be denied that it constitutes a very advanced attempt at combining the aggregate demands of accumulation with the micro-economics of labour segmentation and with its demographic implications.

Marx is, therefore, not only knowledgeable in an area where Bowles and Gintis have criticised him as having been crude; he is superior to them in ambition and more advanced in intentions. It is only fair to add that his own treatment of the problem lends support to their broad assessment of labour segmentation as a catalyst of exploitation.

III. Heterogeneous labour and rates of exploitation

The concrete knowledge of labour segmentation displayed by Marx in various specific cases found no echo in his labour theory of value, for which he treated labour as homogeneous. In itself this is not necessarily a contradiction. Bowles and Gintis (1978, p. 313) themselves insist that segmentation, based on extra-economic criteria (race, sex), may be applied against workers supplying labour which technically is identical. Such labour, although unequally rewarded would in the production process perform in identical manner. It could, therefore, be treated as 'creating' (to use Marx's idiom, despite its uncomfortable metaphysical overtones, as a shorthand expression) equal amounts of value in equal time. Labour would be both segmented, in the value or price of its labour-power, and homogeneous, in its 'value-creating' capacity.

However, such reconciliation is not intended for and certainly does not come to grips with, genuine labour heterogeneity, which arises only when we admit different types of labour (say, skilled and unskilled) with different 'value-creating' power each. It is for this case that the necessity of reducing all labour to one common type becomes imperative, if we do not wish to abandon altogether the labour theory of value.

Bowles and Gintis do not accept this dilemma. Failing to take proper account of the fact that labour segmentation does not automatically lead to labour heterogeneity, they claim to be able to sidestep the need of reducing all labour to one common type. This they do by representing the unit-value of a commodity by a vector, each element of which stands for hours of work supplied by a different working-class segment. The values of the various commodities in the economy are then to be represented by the

columns of an $n \times m$ matrix labelled Λ the elements of which are calculated according to the Morishima formula, $\Lambda = L(I - C)^{-1}$, where C is a technology matrix and L an $n \times m$ matrix of labour coefficients for the production of the m commodities.

Given this formalisation, Bowles and Gintis proceed to offer theorems which, according to them, vindicate the main conclusions of the labour theory of value regarding exploitation. The theorems are based on definitions of separate rates of exploitation given for each segment of the working class. Some of these rates may be negative but the authors claim to be able to deal adequately with this. According to Morishima, one of the most serious difficulties to which heterogeneity leads the labour theory of value is the dependence of the sign of exploitation-rates on the weights attached to the various kinds of heterogeneous labour. Morishima's definition of sectoral exploitation rates is:

$$f_r = (\Theta_r - \Theta \Lambda B_r)/\Theta \Lambda B_r \tag{1}$$

where B_r stands for the rth column of an $m \times n$ matrix of wage goods, each column of the matrix representing the wage-good basket consumed by a certain category of workers, and $\Theta \geqslant$, $\neq 0$, is an **n**-vector of weights of aggregation for the various types of heterogeneous labour which appear in the columns of Λ.

A moment's contemplation of this formula (with the elements of Θ allowed to acquire any positive values) shows that its sign is indeed dependent on the weights-vector Θ.[1] Morishima, then, proceeds to argue that Θ may either be totally arbitrary or made equal to market-determined wage relativities. Bowles and Gintis, by contrast, argue that their definitions of sectoral rates of exploitation are independent of coefficients (weights vectors) for the various kinds of labour, since in their approach no reduction to a common labour type is required. This does not rule out negative exploitation rates but at least limits them to those cases where some group of workers may be overrewarded by comparison to the—allegedly unweighted—labour they contribute to production. This appears to close the door to the theoretical arbitrariness of negative exploitation rates, insisted upon by Morishima. A natural socioeconomic explanation seems to be provided for such rates. The question of independence from a weighting-system of kinds of labour in the Bowles and Gintis definition is thus of primary importance.

Bowles and Gintis have proposed two definitions for the sectoral rates of exploitation, which from their symbols, e_r and σ_r, I call 'the e_r-definition' and the 'σ_r-definition', (the former described by its author as a 'rate of exploitation in common labour hours'). They have not attempted to unify these two definitions in one general formula but of their definitions, one, (σ_r), clearly fails as a definition of the rate of exploitation. Let us express the σ_r-definition as:

$$\sigma_r = (y_r - \Lambda_r By)/\Lambda_r By \tag{2}$$

where $\mathbf{y} = L\mathbf{x}$ is a vector of total employment, representing total labour currently

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[1] For a fuller discussion of this formula see Morishima (1973), pp. 192–193. With respect to the exchange between Morishima (1978) and Bowles and Gintis (1978) the position adopted in the present paper is that Morishima's arithmetical counterexample to Bowles and Gintis' crucial Theorem 2 (in Bowles and Gintis, 1977) was successful and that Theorem 2 was wrong. Bowles and Gintis have refused to accept this, on the grounds that Morishima's example violated one of the conditions of their model (that the final output vector is non-zero, non-negative). But this condition was never stated by Bowles and Gintis either in their Lemma 6 or in their Theorem 2, so it could not have been violated by Morishima's counterexample. The proposition of Bowles' and Gintis' Theorem 2 would have been correct only if the assumption of non-negative output had been introduced explicitly in the statement of the theorem.

performed (it corresponds, therefore, to the $s+v$ of standard Marxist notation) with $\mathbf{x}=(x_1, x_2, \ldots, x_m)$ a non-negative gross output vector and Λ_r a row-vector of the matrix defined above in (1). The elements of Λ_r represent quantities of labour of the same type used in the production of the various commodities. The implication of this formula is that it expresses surplus-value as the difference between total labour contributed by a certain segment, r, of the working class ($\mathbf{y}_r$) and the total amount of labour of that particular segment embodied into wage-goods which the working class as a whole consumes.

Group r may consume a part of its own product or no part of it; it would probably consume a lesser amount of it than the rest of the working class and it would consume parts of the product of other groups, in proportions not stated in (2). It is hard to see how surplus-value, defined in this mixed manner, which involves simultaneously the consumption of a group and that of the whole class, can evaluate the degree of exploitation of any single group.[1] Moreover, in one special case the σ_r-definition breaks down completely. If labour were employed exclusively in the production of luxuries, then $\Lambda_r B\mathbf{y}=0$ (as workers do not consume luxury-goods), and the rate of exploitation would become infinity, even if luxury-goods producers were very well paid in comparison with other workers.

Let us now proceed to examine the claim that the e_r- and σ_r-definitions of the rate of exploitation are independent of conversion coefficients. The e_r-definition, which comes closest to the standard Marxian case and contains a reasonable exploitation concept, subtracts from total labour contributed to production by a certain working-class group, say group r, the total amount of its own and other groups' labour, received in payment by group r in the form of wage-goods. This can be written as:

$$e_r \equiv (1 - \mathbf{u}\Lambda B_r)/\mathbf{u}\Lambda B_r \qquad (3)$$

where $\mathbf{u}=(1, 1, \ldots, 1)$. Comparing (3) with Morishima's formula (1) above we see immediately that the former is only a special case of the latter, with $\Theta=\mathbf{u}$, so that behind the rate of exploitation e_r, a weighting system, $\mathbf{u}$, is already assumed. In addition, this weighting system, by assigning equal weights to the various kinds of labour is equivalent to abolishing labour heterogeneity, the main problem Bowles and Gintis set out to deal with.

In the σ_r-definition, on the other hand, no weighting coefficients appear explicitly, which leads Bowles and Gintis to maintain that it is, in fact, independent of such coefficients. However, this definition can be shown to be a special case of a general definition of the rate of exploitation, defined as:

$$\mathbf{g} \equiv (\Theta\mathbf{y} - \Theta\Lambda B\mathbf{y})/\Theta\Lambda B\mathbf{y} \qquad (4)$$

In (4) $\Theta(\mathbf{y} - \Lambda B\mathbf{y})$ is a weighted sum of the surplus value extracted from the various segments of the working class, a heterogeneous-labour-surplus-value. $\Theta\Lambda B\mathbf{y}$ corresponds to Marx's variable capital, so that $\mathbf{g}$ corresponds to s/v, the standard definition of the rate of exploitation. Θ and $\mathbf{y}$ both operate as non-zero, non-negative vectors, being for the rest completely unspecified. If, now, we restrict Θ to be a vector with zero everywhere except the rth place, where it has 1, we transform (4) into:

$$\mathbf{g}' = (\mathbf{y}_r - \Lambda B\mathbf{y})/\Lambda_r B\mathbf{y} \qquad (5)$$

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[1] Bowles and Gintis are aware that their σ_r-definition makes no sense as an 'own rate of exploitation'. They simply use it as a building-block for more general theorems. See Bowles and Gintis (1977) p. 187.

which is the same as (2) above, the σ_r-definition of the rate of exploitation as given by
Bowles and Gintis. Looked at from this point of view, the σ_r-definition is not indepen-
dent of conversion coefficients at all; special assumptions about the vector Θ are implicit
in it. The same can be argued about the e_r-definition, also derivable from (4) by speci-
fying $\Theta = \mathbf{u} = (1, 1, \ldots, 1)$ to n elements and $\mathbf{y}$ equal to a vector with zeros everywhere
except the rth place, so that

$$\mathbf{g}'' = (1 - \mathbf{u} \wedge B_r)/\mathbf{u} \wedge B_r \qquad (6)$$

Once again the e_r-definition can be shown to depend on special assumptions about
weighting ratios.

In the step from (4) to (6) above, $\mathbf{y} = L\mathbf{x}$ has been used as a special weights vector
to select from among the columns of B_r one at a time. Postulating $\mathbf{y} = (0, 0, 1, \ldots, 0)$
may, of course, be inconsistent with $\mathbf{x} \geqslant 0$, $\neq 0$ (a feasible output vector).[1] But if we
are to use the e_r-definition in order to evaluate the rate of exploitation of successive
working-class groups (say groups 1, 2, 3, ... and hence e_1, e_2, e_3, ...) we shall have
to take $\mathbf{y}_1 = (1, 0, 0, \ldots, 0)$, $\mathbf{y}_2 = (0, 1, 0, \ldots, 0)$, $\mathbf{y}_3 = (0, 0, 1, 0, \ldots, 0)$ and so on.
Each time we do this, we assume that a certain working class group in the total employ-
ment vector $\mathbf{y}$ has switched discontinuously from a total to zero employment and this
may not be possible to do without indeed making some elements of $\mathbf{x}$ negative.

In passing from (4) to (6) we have also assumed that $\Theta = \mathbf{u} = (1, 1, \ldots, 1)$ which
multiplied by $\mathbf{y}' = (0, 0, 1, \ldots, 0)$ gives the first term in the numerator of
$e_r = (1 - \mathbf{u} \wedge B_r)/\mathbf{u} \wedge B_r$. But $\mathbf{y}' = (L\mathbf{x})' = (0, 0, 1, \ldots, 0)$ is obviously not actual employ-
ment. The derivation of this special $\mathbf{y}$ implies that some evaluation has been imposed
on the actual employment vector—an evaluation that leads to neglecting all types of
labour except one. This, however, is inconsistent with maintaining $\Theta = \mathbf{u} = (1, 1, \ldots, 1)$
because Θ implies that all types of labour are given the same weight. This assumption
about Θ has to be maintained throughout all changes of $\mathbf{y}$ required for generating
e_1, e_2, e_3 and so on. Therefore $\mathbf{y}$ requires changing the relative valuation of the various
labour groups while Θ requires keeping them constant, in the same formula and the
same term of that formula.

Similar remarks can be made about the σ_r-definition. In formula (5) above, $\mathbf{y}$ can
be taken as the actual employment vector, while in order to generate the sequence
σ_1, σ_2, σ_3 ... etc. we must assume that the weights vector Θ changes like $\Theta_1 = (1, 0,
0, \ldots, 0)$, $\Theta_2 = (0, 1, 0, \ldots, 0)$ and so on. But in the actual employment vector $\mathbf{y}$ certain,
unchanging, valuations of the relative importance of the various labour groups have
been incorporated. These unchanging valuations inevitably clash with changing
valuations implicit in the various Θ, which leads to an inconsistency of valuations
similar to that observed with respect to the e_r-definition.

Such similarities between the apparently unconnected definitions e_r and σ_r, as well
as the dependence of their magnitude and sign on systems of weights of aggregation,
can easily be explained by noticing that e_r and σ_r are duals, derived from (4) by sym-
metrical pre- and post-multiplications of $\mathbf{g}$ by the vectors Θ and $\mathbf{y}$, respectively.

Turning now to the question of the possible negativity of the rates of exploitation,
inspection of (2) and (3) shows that their sign does not depend solely on the matrix B,
the wage-goods bundles typically consumed by workers in each working-class segment,
but also on the conversion coefficients implicit in e_r and σ_r. Thus, in the case of e_r, B,
determines its sign only because all types of labour ($\Theta = \mathbf{u} = 1, 1, \ldots, 1$) are treated

[1] I am grateful to an unnamed referee for pointing this out to me.

as equivalent, which abolishes heterogeneity. As for σ_r, the sign obviously depends on **y** which has been shown to operate as a vector of weights for the definition. Since **y** itself depends on the structure of output (**y**=L**x**) we end up with the rate of exploitation of a particular segment of labour being determined not by extra-economic criteria (race, sex) as the authors would have it, but by the structure of output.

Finally, it is very doubtful whether either definition (2) or (3) is capable of formalising the concept of a negatively exploited labour aristocracy, considered so important by Bowles and Gintis. In the theorems of their original paper Bowles and Gintis claim to have shown that the rate of profit is positive if and only if all σ_r are positive. This implies that, as far as these authors are concerned, normal capitalism, i.e., capitalism in which profits are made, is incompatible with negative exploitation. Negative exploitation is admittedly compatible with positive profits under the e_r-definition, but then labour heterogeneity is suspended through the use of the vector **u**, which assigns equal importance to all kinds of labour. It seems that the uncorrected argument by Bowles and Gintis leads to what, in the context of their analysis, must sound paradoxical: labour heterogeneity is incompatible with negative exploitation. (By contrast, this incompatibility vanishes if we take account of Morishima's corrections.)

IV. Conclusion

By making wage-discrimination their main point, Bowles and Gintis have, probably without fully realising it, substituted for the age-old problem of labour heterogeneity the rather different problem of labour segmentation. The latter was well-known by Marx and, in itself, does not necessarily create for the labour theory of value the difficulties associated with non-homogeneous labour, as it may be due to extra-economic criteria (e.g. racial criteria) imposed upon groups of workers supplying labour technically identical.

Replying to Morishima, the authors claimed (Bowles and Gintis, 1978, p. 313) that the bulk of their article and the first three of their four theorems were independent of any ratios of conversion of different types of labour to common labour. But their fourth theorem depends on the e_r-definition which, as we saw, suspends labour heterogeneity, while of the three others, the crucial theorem 2 was refuted by Morishima and in addition all three depend on the σ_r-definition which was itself shown to depend on both explicit and implicit (and very extreme) conversion coefficients (weights) for the various labour groups.

Despite our authors' serious and valiant effort the problem, pointed out by Morishima and originally by Böhm-Bawerk (and indeed by Marx himself), which heterogeneous labour creates to the labour theory of value and surplus value remains to be solved.

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