

2020

Exploitation of Labour or Exploitation of Commodities?

Deepankar Basu

Department of Economics, UMass Amherst

Follow this and additional works at: https://scholarworks.umass.edu/econ_workingpaper



Part of the [Political Economy Commons](#)

Recommended Citation

Basu, Deepankar, "Exploitation of Labour or Exploitation of Commodities?" (2020). *Economics Department Working Paper Series*. 297.

<https://doi.org/10.7275/20622939>

This Article is brought to you for free and open access by the Economics at ScholarWorks@UMass Amherst. It has been accepted for inclusion in Economics Department Working Paper Series by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.

Exploitation of Labour or Exploitation of Commodities?

Deepankar Basu*

December 13, 2020

Abstract

Attempts to use commodities to construct theories of value and use such value theory to claim that, in capitalism, commodities can be exploited, just like labour is, rest on two conceptual flaws: (a) failure to distinguish between labour and labour-power; and (b) failure to distinguish labour-power and other commodities. One way to avoid these conceptual mistakes is to use the labour theory of value.

Keywords: labour theory of value; generalized commodity exploitation theorem.

JEL Codes: B51.

1 Introduction

The Marxian labour theory of value rests on the argument that labour is the substance of value (Marx, 1992, chapter 1). In the first volume of *Capital*, Marx refined and extended the classical labour theory of value (LTV) and used it to demonstrate that capitalism rests on the exploitation of the working

*Department of Economics, University of Massachusetts Amherst. Email: dbasu@econs.umass.edu. This paper supersedes a similar paper of mine, “Can Commodities be Substances of Value?” (UMass Economics Working Papers, 290). I would like to thank Weikai Chen, Debarshi Das, Duncan Foley, Nicholas Vrousalis, Naoki Yoshihara and two anonymous referees of this journal for helpful comments on earlier versions of this paper. The usual disclaimers apply.

class, or the exploitation of labour by capital. Marx's demonstration relied crucially on distinguishing between labour-power, the human capacity to do useful work, and labour, the actual input in the production process that arises when labour-power is used. Marx argued that what the capitalist purchases, and the worker sells, on the labour market is labour-power and not labour. On average, the capitalist purchases labour-power at its value and yet ends up with surplus value because the *value added by* labour-power (what the capitalist gets) is greater than the *value of* labour-power (what the capitalist pays for). The difference is the surplus value that is realized through the sale of commodities and distributed across capitalist society in the form of profit of enterprise, interest and rent.

An influential strand of what I will call Analytical Marxist (AM) thinking, for lack of a better term, has challenged this understanding with an argument that consists of at least two key claims: first, that any basic commodity can be used to construct a consistent value theory, where a basic commodity is understood as one which is used directly or indirectly to produce all commodities - let us call this a commodity theory of value (CTV); and second, that the basic commodity that is used to construct a CTV is exploited in a capitalist economy - let us call this a commodity exploitation theorem (CET).

The implication of the first claim is that there is nothing special in labour so far as it can be considered the substance of value. Basic commodities can as well function as a substance of value. Hence, just like we have the labour theory of value, we can also have a peanut theory of value if only we agree that peanuts are basic commodities (Gintis and Bowles, 1981, Appendix I). The implication of the second claim is even more striking. Just as labour is understood to be exploited by capital when we use a Marxian LTV, it can be equally well demonstrated that when a basic commodity is chosen as the candidate substance of value, that basic commodity is also necessarily exploited in a capitalist economy if we use a CTV (Gintis and Bowles, 1981; Roemer, 1982). Hence, labour does not have a special function to play even in a theory of exploitation (Roemer, 1982, 1985).¹

In this paper, I will critically evaluate both of the above claims. The main finding of this critical scrutiny is that these claims rest on elementary

¹For an excellent survey of the debate on exploitation theory since the seminal contribution of Nobuo Okishio in the 1960s, see Yoshihara (2017). The second claim of the CTV is called the generalized commodity exploitation theorem by Yoshihara (2017) and the commodity exploitation theorem by Fujimoto and Fujita (2008).

conceptual flaws. The problem with the first claim is that it does not properly distinguish between labour and labour-power - a distinction that is key in Marxian political economy. The problem with the second claim is that it does not correctly distinguish between labour-power and other commodities - another key idea in Marxist economics. These flaws nullify the two claims and highlight the conceptual problems associated with attempts to construct commodity theories of value and/or to use them to advance claims about commodity exploitation. Hence, this critique, if it is valid, paves the way for reconsidering labour as the *only* substance of value.

The argument in this paper is related to, but also different from, earlier attempts to provide a critique of the CET. Two contributions are worth mentioning in this regard. Fujimoto and Fujita (2008) provide a refutation of the CET by arguing that the result is just a numerical representation of the productiveness of the ‘complete matrix’ captured by the Hawkins-Simon condition.² Such a technical condition does not have anything to do with exploitation, which is a social phenomenon, they rightly note. Yoshihara and Veneziani (2013) argue in a similar vein that exploitation should be understood in social and not in technological terms - which is what the CET does. Drawing on their previous work, they offer a new definition of exploitation that undermines the implication of the CET for exploitation theory.³

Both of these, and similar, contributions are important in that they offer critiques of the CET. In this paper, I offer a different and simpler critique of the CET. I argue that even if the notion of commodity value, as defined in Gintis and Bowles (1981) and Roemer (1982, appendix 6.1), is legitimate as a technical construct, it cannot be used to show that commodities are exploited. Trying to use the technical concept of commodity value to advance claims about the exploitation of commodities is conceptually flawed because such an attempt commits a *category error*. It attaches the surplus value generated by labour-power to a commodity like food or steel, when, in fact, such accounting cannot be justified on the basis of any logic.

I highlight the category error in AM thinking by juxtaposing two different intuitions about value. One intuition of value is what might be called an ‘embodied substance of value’ intuition. Using this intuition, we understand that the value of any commodity is equal to the amount of the substance of

²The so-called complete matrix is discussed below.

³For references to this literature see Yoshihara (2017).

value embodied in a unit of the commodity. A second intuition of value is what might be called the ‘value transferred and value added’ intuition. If we use this intuition, we can assert that the value of any commodity is equal to the value transferred by, and the value added by, the production inputs. In the case of the LTV, both intuitions line up; in the case of CTV, the intuitions diverge. We can only make them coincide, I argue in this paper, by committing a category error, as do scholars who try to establish that commodities can be exploited. Both Gintis and Bowles (1981) and Roemer (1982, Appendix 6.1) had worked with the first intuition of value. They had not checked whether their formulation was in line with the second intuition. That might be one reason why the category error was hidden from view in these contributions.

The rest of this paper is organized as follows: in section 2, I summarize some key propositions of the AM traditions so far as it relates to a commodity theory of value and commodity exploitation; in section 3, I argue that only labour is a basic in the AM sense; in section 4, I highlight the category error associated with propositions that claim to establish commodity exploitation; I conclude the discussion in the last section.

2 Summary of a Commodity Theory of Value

A key ingredient of a CTV is the notion of a ‘basic’.

We define an input into production to be a *basic* if it enters directly or indirectly (via its being an input into another production input) into the production of all commodities. (Gintis and Bowles, 1981, pp. 18).

With this definition in place, the CTV can be presented in terms of four propositions (Gintis and Bowles, 1981, Appenidix I).

- Proposition 1: If the wage rate is positive, then labor is not the only basic in the economy.
- Proposition 2: Any basic commodity is a consistent basis for value theory.
- Proposition 3: Any marketed input into the production of commodities whose valorization process lies outside the site of capitalist production may have the same form of price equation as that of labor-power.

- Proposition 4: Any basic resource can be considered an acceptable basis for value theory.

The first proposition attempts to show that once we abstract from the physical characteristics of commodities, labour is still not the only production input that is common to all commodities. Hence, this proposition, if correct, would nullify Marx's claim in Chapter 1, Volume I of *Capital* that labour should be considered a true basis of value because it is the only thing that is common to all commodities (considered from the perspective of production). The second proposition shows that any basic commodity can be a consistent basis for constructing a value theory. To be precise, this means that we can demonstrate the following proposition: the rate of profit is positive if and only if the basic commodity is exploited.⁴ Since the first proposition has established that there will always be some basic (because the wage rate is bound to be positive), the two propositions, taken together, show that we can always find an alternative basis for value theory, i.e. alternative to labour. Any basic commodity can be used to construct a value theory and to show that, in a capitalist economy, existence of positive profit is equivalent to the exploitation of the basic commodity.

Following Gintis and Bowles (1981, pp. 19), if we understand the second proposition as demonstrating, further, that “the distinction between the use-value of labour-power to the capitalist and its exchange value cannot serve to demonstrate that labour is the only proper basis for value theory”, then we should look for some other respect in which labour is different from commodities and then use that to construct a value theory. One key difference that we can identify relates to the pricing of commodities. For all commodities, the price of production is the sum of the cost-price and profit (calculated with the uniform rate of profit) on the cost-price.⁵ But the price of labour-power does not include the element of profit; its price is simply its cost-price. Proposition 3 demonstrates that any marketed input that lies outside the valorization process associated with capitalist commodity production will have the same form of price equation as labour-power. One example of such a marketed input would be land. Proposition 4 then demonstrates, in parallel to Proposition 2, that such a marketed input, e.g. land, can also form the basis of a value theory. Taken together, the third and fourth propositions

⁴Recall that this proposition in the case of labour is known as the Fundamental Marxian Theorem (Morishima, 1973).

⁵Cost-price is the sum of constant capital and variable capital (Marx, 1993).

show that even the “noncommodity attribute of wage labour ... is not sufficient to justify labour as the proper basis for value theory.” (Gintis and Bowles, 1981, pp. 19).

To summarize: Proposition 1 and 2 demonstrate, according to Gintis and Bowles (1981), that the unique feature of labour-power as a commodity cannot justify using labour as the only basis of value theory; Proposition 3 and 4 close off the option of turning to the noncommodity attribute of wage labour to justify the use of labour as the basis of value theory. Taken together, the four propositions demolish the claim of labour being the sole basis of a consistent theory of value and of showing that only labour is exploited in capitalism.

3 Elements of the Wage Bundle are not Basics

Proposition 1 is key in establishing the chain of claims captured by the four propositions given above. Hence, I will begin by carefully studying its rather simple and short proof.

We shall assume that labour is a basic input. If the wage rate is positive, then there is some commodity or resource in the wage bundle. This commodity or resource is thus indirectly embodied in any commodity produced by labour. Thus, any element of the wage bundle is also a basic. It follows that labour is not the only basic (Gintis and Bowles, 1981, pp. 19).

The key step in the proof is the following sentence: “This commodity or resource is thus indirectly embodied in any commodity produced by labour.” Is this statement true? To be concrete, let us suppose that the wage bundle has a commodity called ‘food’. This simply means that ‘food’ is consumed by the worker, i.e. ‘food’ is used to produce labour-power, the human capacity to do useful work. In the labour market, labour-power is sold to the capitalist for a wage. When labour-power is used, we get labour, the input into production. Thus, what is produced by ‘food’ and sold on the labour market is *different from* what is the input in production. This means that ‘food’ is not a ‘basic’ as defined above by Gintis and Bowles (1981). This is because ‘food’ is not used to produce labour. Hence, Proposition 1 is invalid.

The key error in the proof of Proposition 1 is the inability to distinguish between labour-power and labour. It is useful to recall that labour-power is the human capacity to do useful work; and labour is what we get when that capacity is actually used in a production process. In a capitalist society, labour-power is the commodity that is sold on the labour market, not labour. In the production process, labour-power is used and that adds labour to the objects of labour. The claim that any element of the wage bundle is a basic gives up this crucial conceptual difference between labour-power and labour.

Two further points about Proposition 1 are worth highlighting. First, the definition of a basic input in Gintis and Bowles (1981) is different from the one used by Sraffa (1960). For Sraffa,

[t]he criterion is whether a commodity enters (no matter whether directly or indirectly) into the production of *all* commodities. Those that do we shall call *basic*, and those that do not, *non-basic* products. (Sraffa, 1960, pp. 6, emphasis in original).

By this definition, a basic is always a commodity; Sraffa's definition of a basic product does not include non-commodities. Hence, Sraffa's definition of a basic product is a technical property of the input-output coefficient matrix, i.e. whether the input-output coefficient matrix is irreducible (Pasinetti, 1977, pp. 104–105). Gintis and Bowles (1981) move away from Sraffa's definition and include a non-commodity, labour, in the category of a basic. The motivation for this expanded definition seems to be to subsequently argue, in Proposition 1, that any element of the wage bundle is also a basic. But as we have seen above, such an argument is invalid.⁶

Second, it is important to recall that classical political economists before Marx had not been able to conceptually distinguish between labour-power and labour. The inability to distinguish between labour-power and labour led to the failure of political economists before Marx to clearly understand the source of surplus value. This point was highlighted by F. Engels in his introduction to Marx's 1849 pamphlet, *Wage Labour and Capital*, when it was published in 1891.

Before we proceed, it is important to note the implication of the argument I have presented in this section. I have shown that the claim made by Gintis

⁶It is interesting to note that L. Pasinetti makes the same error: "Notice that, as a consequence of the hypothesis that all commodities require labour, directly or indirectly, to be produced, wage goods are necessarily basic commodities." (Pasinetti, 1977, footnote 4, pp. 124).

and Bowles (1981) that any element of the wage bundle is a basic is false. This means that, following their definition, there is only one basic: labour. This is because labour is a direct production input into the production of all commodities.

If my critique of Proposition 1 is accepted, then it also means that Proposition 2 loses its force - because Proposition 2 requires the theoretical support of Proposition 1: if one cannot demonstrate that there exists some basic other than labour, then the claim that a basic (other than labour) can be a consistent basis of value theory is vacuous. Hence, the fact that Proposition 1 is false nullifies the whole chain of claims that comprise the CTV. While I note this to draw attention of the reader, I will nonetheless proceed to develop a critique of a key component of Proposition 2 in this paper, viz. the claim that commodities can be exploited. I do so for two reasons. First, the claim about commodity exploitation has been presented in the literature as a stand-alone result and is often referred to as the commodity exploitation theorem.

Marx believed that labour power was the commodity which produced a surplus under capitalism. In this appendix I show that one can define embodied value in terms of any commodity numeraire, with the result that the technology is productive if and only if each commodity is exploited when it is taken as numeraire. Steel is exploited if the steel value embodied in a unit of steel is less than one. Labour power is not special in having this property. (Roemer, 1982, Appendix 6.1, pp. 186)

Hence, a critical engagement with this part of the second proposition is called for irrespective of the status of Proposition 1. Second, Proposition 2 highlights another conceptual flaw that animates attempts to construct any CTV: the inability to distinguish between labour-power and all other commodities.

4 A Critique of Commodity Exploitation

In this section, I will first evaluate the validity of the claim that commodities can be exploited by working with a simple example discussed in Gintis and Bowles (1981, pp. 19) where the economy produces 2 commodities. In the following sub-section, I will discuss a more general version of the same

claim that is presented in Roemer (1982, Appendix 6.1). I will highlight the conceptual error in both versions of the argument.

4.1 Commodity Value: A 2-Commodity Economy

4.1.1 The Set-up

The economy in this example has two goods, food (F) and jewelry (J), where F is a *basic* and J is not. The technology for producing the two goods are specified as follows:

Food is used to produce all goods, and is in the wage bundle, while jewelry is consumed only by nonworkers and is not used in production (i.e. it is not a basic). Specifically, suppose 1/2 bushel of F and 1/2 hour of labour are used to produce one bushel of F, and 1/2 bushel of food is in the wage bundle. Also suppose 1/4 bushel of food and one hour of labour is used to produce one unit of J. (Gintis and Bowles, 1981, pp. 19).

4.1.2 Labour Values: Definition and Two Intuitions

Let Λ_F , Λ_J and Λ_{LP} represent the labour values of food, jewelry and labour-power. From the specification of the technology for producing F and J, and the fact that the real wage bundle contains 1/2 units of food, we see that their labour values must be determined by the following equations,

$$\frac{\Lambda_F}{2} + \frac{1}{2} = \Lambda_F, \quad (1)$$

and

$$\frac{\Lambda_F}{4} + 1 = \Lambda_J, \quad (2)$$

and

$$\Lambda_{LP} = \frac{\Lambda_F}{2}. \quad (3)$$

On solving the three equations, (1), (2), and (3), we get: $\Lambda_F = 1, \Lambda_J = 5/4, \Lambda_{LP} = 1/2$. Thus, the labour value of food is 1, the labour value of jewelry is 5/4, and the labour value of labour-power is 1/2.

These equations capture two different intuitions about the concept of labour value. The first intuition is what I will call the ‘embodied substance

of value’ intuition. It comes from the idea that the labour value of one unit of any commodity is the total magnitude of labour embodied in one unit of the commodity, and that the latter is the sum of the direct and indirect amounts of labour needed to produce it (Steedman, 1977, pp. 40). For instance, in (1), the labour value of one unit of F , Λ_F , is the sum of the amount of direct labour, $1/2$, and the amount of indirect labour, $\Lambda_F/2$, used in the production of 1 unit of F . The same logic holds for the equation determining the value of jewelry, Λ_J , in (2). Finally, the value of labour-power, $\Lambda_{LP}/2$, is equal to $\Lambda_F/2$ because the wage bundle has $1/2$ units of F . The implicit understanding is that in the production of labour-power, value accounting will only include the indirect input, food (F), because the labour that is used in the production of labour-power falls outside the domain of capitalist commodity production.

A different intuition is also embedded in the above equations (1), (2) and (3) that I would like to call a ‘value transferred and value added intuition’. According to this intuition, the value of one unit of the output is equal to the sum of the value transferred by the non-labour inputs used up and the value added by labour in producing one unit of the commodity (Marx, 1992, Chapter 8). For instance, in the production of F , the non-labour input transfers $\Lambda_F/2$ units of value and the labour input (i.e. use of labour-power) adds $1/2$ units of value. This second intuition is important because it allows us to clearly see the source of surplus value. The value *added by* labour-power is larger than the value *of* labour-power, and this difference is the source of surplus value. For instance, in the production of food, the value added by labour-power is $1/2$, but the value of labour-power is $\Lambda_{LP}/2$. Hence, the surplus value generated in the production of food is given by $(1/2 - \Lambda_{LP}/2) = 1/4$. The same intuition applies to the equation determining the value of jewelry, i.e. (2).

4.1.3 Food Values: First Intuition

Let us now follow Gintis and Bowles (1981) and use food as the substance of value. We can do so, according to Gintis and Bowles (1981), because food is a basic, i.e. it is used directly or indirectly in producing all commodities. This means that we can meaningfully define the value of all commodities in terms of food. Let μ_F, μ_J, μ_{LP} denote the F-value (food value) of food, jewelry and labour-power, respectively.

According to the first intuition discussed above, the F-value of any commodity is the sum of the direct and indirect amounts of food used in pro-

ducing 1 unit of the commodity. Using the technology for food production given above, we can implement this definition through the following value determination equation for food as,

$$\frac{1}{2} + \frac{\mu_{LP}}{2} = \mu_F. \quad (4)$$

Here the direct input of food is $1/2$ and the indirect input of food is $\mu_{LP}/2$. In a similar way, we can implement the definition of the food value of jewelry, using information about the technology of jewelry production, as,

$$\frac{1}{4} + \mu_{LP} = \mu_J. \quad (5)$$

Since the wage bundle has $1/2$ bushel of food, we finally get the value equation for labour-power as,

$$\mu_{LP} = \frac{1}{2}. \quad (6)$$

Solving the three equations in (4), (5) and (6), we get $\mu_F = 3/4$, $\mu_J = 3/4$, and $\mu_{LP} = 1/2$. Thus, we see that the F-value of every commodity is a positive number. Moreover, these calculations show that the F-value of food is less than 1 (because $\mu_F = 3/4$). This is interpreted by Gintis and Bowles (1981, pp. 19) as demonstrating that food (the basic input, in this case) is exploited. To complete their argument, Gintis and Bowles (1981) show that a positive profit rate is implied by and implies positive exploitation of the basic commodity. But that demonstration is not relevant for my argument. I want to look critically *only* at the argument that has apparently demonstrated that ‘food’ is exploited. To do so, I will return to the calculation of F-values and look at the equations determining F-values of commodities using the second intuition.

4.1.4 Food Values: Second Intuition

Let us start with the equation for the determination of the F-value of food given in (4): $1/2 + \mu_{LP}/2 = \mu_F$. Let us look at the left hand side (LHS) of this equation from the perspective of value transferred and value added. Since $1/2$ units of food is used as an input, and since each unit of food has F-value of μ_F , the F-value transferred by food is $\mu_F/2$. Similarly, $1/2$ units of labour-power is used in production. We know that each unit of labour-power

has F-value of μ_{LP} . Hence the F-value transferred by labour-power is $\mu_{LP}/2$. Thus, total F-value transferred by the two inputs is given by $\mu_F/2 + \mu_{LP}/2$.

Comparing with (4), we see the following: if we add $1/2 - \mu_F/2$ and $\mu_F/2 + \mu_{LP}/2$ (total F-value transferred by the two inputs), we get the expression on the LHS of (4). This means that, in the production of food, *surplus* F-value of $1/2 - \mu_F/2$ units has been generated - because this amount of F-value is in excess of the F-value transferred by both inputs. Note immediately that surplus F-value is positive if and only if $\mu_F < 1$. Hence, if we can show that $\mu_F < 1$, as was shown by Gintis and Bowles (1981) and as we have confirmed in the example above, then we are justified in claiming that surplus F-value has been generated. But the fact that $\mu_F < 1$ does not allow us to answer the question as to which commodity is exploited. To answer that question, we need to figure out the answer to another question: does food add this surplus F-value or does labour-power add this surplus F-value? If it is the former then we would be justified in claiming that food is exploited; if it is the latter, we will not be so justified.

The first option is to argue that labour-power adds the surplus F-value. In this case, we could rearrange (4) and write it as,

$$\frac{\mu_F}{2} + \left[\frac{\mu_{LP}}{2} + \frac{1}{2}(1 - \mu_F) \right] = \mu_F, \quad (7)$$

which clearly shows that the F-value added by labour-power, the term in the square bracket, is larger than the F-value of labour-power, $\mu_{LP}/2$. In this case, the fact that $\mu_F < 1$ does not imply that food is exploited. In fact, in this case, since labour-power adds the surplus F-value, we are justified in asserting that labour is exploited (even though we compute values in units of food). Hence, the claim of Gintis and Bowles (1981) that $\mu_F < 1$ implies that food is exploited is false.

The second option is to argue that food adds the surplus F-value. In this case, we could rearrange (4) and write it as,

$$\left[\frac{\mu_F}{2} + \frac{1}{2}(1 - \mu_F) \right] + \frac{\mu_{LP}}{2} = \mu_F, \quad (8)$$

which shows that the F-value added by food, the term in the square bracket, is larger than the F-value of food, $\mu_F/2$. If this is the case, then we are certainly justified in claiming that food is exploited. But it is not legitimate to claim that food adds the surplus F-value. To claim that food adds the

surplus F-value would imply that food adds more F-value than it has. But this is absurd: food cannot add more F-value than food has. I look at this argument in greater detail in section 4.3 below. Here let us understand the nature of the error that underlies the claim that food is exploited.

In using equation (4) to claim that food is exploited, one is implicitly confounding terms, i.e. one is making a *category error*. Instead of attaching the surplus F-value that is generated by the use of labour-power to the commodity labour-power, we are instead attaching that surplus F-value to the commodity food. It is this confounding of terms, this category error, that generates the surprising result: food is exploited.

The same reasoning applies to the equation for determining the F-value of jewelry. To begin, note that in the production of jewelry, the F-value transferred by food is $\mu_F/4$ and the F-value of labour-power is μ_{LP} . With these magnitudes in mind, we can see that equation (5) can be equally written as

$$\frac{\mu_F}{4} + \left[\mu_{LP} + \frac{1}{4}(1 - \mu_F) \right] = \mu_J$$

and also as

$$\left[\frac{\mu_F}{4} + \frac{1}{4}(1 - \mu_F) \right] + \mu_{LP} = \mu_J.$$

In the first version, we are correctly attaching the surplus F-value, $1/4 - \mu_{LP}/4$, to the commodity labour-power; in the second, we are incorrectly attaching the surplus F-value to the commodity food. The second version is what takes us to (5) and the claim that food is being exploited, and it is now clear why that is conceptually problematic.

4.2 Commodity Value: An n-Commodity Economy

4.2.1 Basic Set-up

The above argument about the conceptual problems of using commodities as the substance of value and then claiming that that commodity is exploited can be demonstrated in a more formal setting. Consider a capitalist economy with n sectors, each producing a single commodity using labour and all commodities. There are no joint products and there is no fixed capital. The technical conditions of production in each sector is taken as given and

is captured by the $n \times n$ matrix of input-output coefficients,

$$\mathbf{A} = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ & & \vdots & \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix}$$

and the corresponding $1 \times n$ vector of direct labour inputs

$$\mathbf{L} = [L_1 \quad L_2 \quad \cdots \quad L_n]$$

where a_{ij} is the physical magnitude of the i -th commodity used to produce 1 unit of the j -th commodity, and L_j is the quantity of direct labour used to produce 1 unit of commodity j . Let \mathbf{b} denote the $n \times 1$ vector of the real wage bundle per hour of labour-power sold, and let the augmented input matrix be defined as,

$$\mathbf{M} = \mathbf{A} + \mathbf{bL},$$

and assume that \mathbf{M} is nonnegative and productive, as is standard in the literature (Roemer, 1981).⁷

I will follow Roemer (1982) and define values in terms of commodity 1 (the commodity is called ‘steel’). Let the $1 \times (n + 1)$ vector,

$$\boldsymbol{\mu} = [\mu_1 \quad \mu_2 \quad \cdots \quad \mu_n \quad \mu_{n+1}],$$

denote the S-values (steel values) of all commodities, and where, in particular, μ_{n+1} is the S-value of labour-power. Following Roemer (1982), we display the technology as follows,

$$\mathcal{A} = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} & b_1 \\ a_{21} & a_{22} & \cdots & a_{2n} & b_2 \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} & b_n \\ L_1 & L_2 & \cdots & L_n & 0 \end{bmatrix},$$

where the first row and first column refer to steel, the chosen substance of value.⁸ In this representation of technology, Roemer (1982) notes that

⁷The non-negative matrix \mathbf{M} is said to be productive if there exists a nonnegative column vector, $\mathbf{x} \geq \mathbf{0}$, such that $\mathbf{x} > \mathbf{M}\mathbf{x}$. If \mathbf{M} is productive, then $(\mathbf{I} - \mathbf{M})^{-1} > \mathbf{0}$, where \mathbf{I} is the identity matrix of the correct dimensions (Pasinetti, 1977, appendix).

⁸This matrix is called the ‘complete matrix’ in Bródy (1970), as noted by Fujimoto and Fujita (2008).

[the] j^{th} column of this array lists the inputs of all $(n + 1)$ commodities used as inputs into production of the j^{th} good - and this statement is true also for $j = n + 1$, namely, the commodity labour power. The i^{th} row lists the inputs of the i^{th} good into the various processes - and this statement is true also for $i = n + 1$, namely the input of labour. (Roemer, 1982, pp. 187).

In the above array, the $(n + 1) \times (n + 1)$ entry is 0 because labour is not an input into the production of labour-power, i.e. labour-power is produced outside the framework of capitalist commodity production.

4.2.2 Steel Value: First Intuition

Let us calculate S-values according to the first intuition: value of one unit of any commodity is the sum of the direct and indirect amount of steel needed to (re)produce it. For the first n commodities, we have

$$\mu_j = a_{1j} + (\mu_2 a_{2j} + \cdots + \mu_n a_{nj} + \mu_{n+1} L_j), \quad j = 1, 2, \dots, n, \quad (9)$$

where a_{1j} is the direct amount of steel and $\mu_2 a_{2j} + \cdots + \mu_n a_{nj} + \mu_{n+1} L_j$ is the indirect amount of steel needed to produce 1 unit of the j -th commodity. For the $n + 1$ -st commodity, i.e. labour-power, we have,

$$\mu_{n+1} = b_1 + (\mu_2 b_2 + \cdots + \mu_n b_n), \quad (10)$$

because the real wage bundle has b_1, \dots, b_n amounts of the first n commodities. Bringing the $n + 1$ equations together and writing in matrix form, we get

$$[\mu_1 \quad \mu_2 \quad \cdots \quad \mu_n \quad \mu_{n+1}] \begin{bmatrix} 1 & 0 & \cdots & 0 & 0 \\ -a_{21} & 1 - a_{22} & \cdots & -a_{2n} & -b_2 \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ -a_{n1} & -a_{n2} & \cdots & 1 - a_{nn} & -b_n \\ -L_1 & -L_2 & \cdots & -L_n & 1 \end{bmatrix} = \begin{bmatrix} a_{11} \\ a_{12} \\ \vdots \\ a_{1n} \\ b_1 \end{bmatrix} \quad (11)$$

which can be used to solve for nontrivial solutions of $\boldsymbol{\mu}$ because, in general, the matrix multiplying $\boldsymbol{\mu}$ on the left hand side is invertible and the coefficient vector on the right hand side is not the zero vector.

One can be more specific. As long as the augmented input matrix, $\mathbf{M} = \mathbf{A} + \mathbf{bL}$, is productive, (11) has a well-defined solution given by,

$$\tilde{\boldsymbol{\mu}}_1 = (1 - \mu_1) \mathbf{M}_1. (\mathbf{I} - \mathbf{M})^{-1}, \quad (12)$$

where $\tilde{\boldsymbol{\mu}}_1$ is the $1 \times n$ vector formed from the first n elements of $\boldsymbol{\mu}$, the subscript $\mathbf{1}$ in $\tilde{\boldsymbol{\mu}}_1$ is meant to indicate that this vector of S-values come from implementing the first intuition about value, and $\mathbf{M}_1.$ is the first row of \mathbf{M} . Moreover, one can show that $\mu_1 < 1$, which then leads to the claim that steel is exploited (Roemer, 1982, Appendix 6.1).

4.2.3 Steel Value: Second Intuition

Let us now revisit the equations that determine S-value of commodities and look at them using the second intuition: value of one unit of the output is equal to the sum of the value transferred from the non-labour inputs used up, and value added by the use of labour-power, in producing 1 unit of the commodity. For $j = 1, 2, \dots, n$, a_{1j} units of the first commodity, a_{2j} amount of the second commodity, \dots , a_{nj} amount of the n -th commodity, and L_j units of labour-power are needed to produce 1 unit of the j -th commodity. Since each unit of commodity 1 has a S-value of μ_1 , a_{1j} units of the first commodity transfers $\mu_1 a_{1j}$ units of S-value to the output; similarly, each unit of the second commodity has a steel value of μ_2 , so that a_{2j} amount of the second commodity transfers $\mu_2 a_{2j}$ amount of S-value to the output, and so on. Hence, for the first n commodities, we have

$$\mu_j = (\mu_1 a_{1j} + \mu_2 a_{2j} + \dots + \mu_n a_{nj}) + \mu_{n+1} L_j + s_j, \quad j = 1, 2, \dots, n. \quad (13)$$

where, it is crucial to note, that $s_j > 0$ is the surplus S-value generated in the production process, so that the S-value added by labour-power, $\mu_{n+1} L_j + s_j$, is greater than the S-value of labour-power, $\mu_{n+1} L_j$. To determine the exact magnitude of surplus S-value generated, we can compare with the LHS (9) and rearrange it as

$$\mu_j = (\mu_1 a_{1j} + \mu_2 a_{2j} + \dots + \mu_n a_{nj}) + \mu_{n+1} L_j + a_{1j} (1 - \mu_1), \quad (14)$$

which, in comparison with (13), shows that the magnitude of surplus S-value is given by $s_j = a_{1j} (1 - \mu_1)$. We see immediately that surplus S-value is positive if and only if $\mu_1 < 1$. Let us ask, once again, the question as to

which commodity adds this surplus S-value? Is it added by labour-power or is it added by steel?

If we argue that the surplus S-value is added by labour-power then we could implement the second intuition by writing (13) as,

$$\mu_j = [\mu_1 a_{1j} + \mu_2 a_{2j} + \cdots + \mu_n a_{nj}] + [\mu_{n+1} L_j + a_{1j} (1 - \mu_1)],$$

which shows that the S-value of 1 unit of the j -th commodity is equal to the sum of S-value transferred by the non-labour inputs,

$$\mu_1 a_{1j} + \mu_2 a_{2j} + \cdots + \mu_n a_{nj}$$

and the S-value added by labour-power,

$$\mu_{n+1} L_j + a_{1j} (1 - \mu_1).$$

In this case we see that $\mu_1 < 1$ does not imply that steel is exploited. Since labour-power adds the surplus S-value, we are justified in claiming, instead, that labour is exploited (even though we express value in units of steel).

If, instead, we argue that the surplus S-value is added by steel, then we could reconstruct (9) by rearranging (14) as follows: instead of attaching the surplus S-value with the commodity labour-power, as we have done in (14), if we instead add it to the commodity steel, i.e.

$$\mu_j = [\mu_1 a_{1j} + a_{1j} (1 - \mu_1)] + \mu_2 a_{2j} + \cdots + \mu_n a_{nj} + \mu_{n+1} L_j, \quad (15)$$

we get (9), because the term in the square brackets in (15) is a_{1j} . In this case we see that $\mu_1 < 1$ implies that steel is exploited. But this rests on the same category error that we have identified in the case of F-value: the claim that steel is exploited rests on moving the surplus S-value generated by labour-power and adding it up with the S-value transferred by steel. The same category error that I identified in Gintis and Bowles (1981) is in play in Roemer (1982, Appendix 6.1).

4.3 Commodity Exploitation: Conceptual Problem

What *is* the conceptual problem with trying to establish commodity exploitation? As a technical matter, there is no problem with defining something called ‘food value’ or ‘steel value’ - as done by Gintis and Bowles (1981) or by Roemer (1982, Appendix 6.1). Following these scholars, one can certainly

define something called food value or steel value, if one so wishes. One can write equations to determine these values and show that the equation system can be solved to get a positive number for such values. One can then also demonstrate that the food (steel) value of food (steel) is less than 1. So far there is no problem - it is just a technical matter of defining an odd quantity called food (steel) value and then solving a system of equations.

When the finding that the food (steel) value of food (steel) is less than 1 is used to conclude that food (steel) is exploited, it is then that a conceptual error creeps into the argument. This is because the food (steel) value of food (steel) being *less than* 1 rests on positive exploitation of labour, i.e. on the fact that the food (steel) value added by labour-power is greater than the food (steel) value of labour-power. Only by an accounting trick is the surplus value generated by the use of labour-power added to the food (steel) value transferred by food (steel). Thus, even when the food (steel) value of food (steel) is less than 1, it is still labour that is exploited. Food (steel) is not exploited.

The source of this conceptual problem, as I see it, is associated with the attempt to treat labour-power symmetrically with all other commodities, i.e. to fail to distinguish between labour-power and all other commodities. Labour-power is the capacity to do useful work; labour is the outcome when that capacity is used. As a qualitative matter, no such distinction can exist for any other commodity, including food (steel). It is meaningless to try to define 'food-power' ('steel-power') as distinct from food (steel). This is because the capacity of food (steel) to be used is not distinct from the commodity food (steel) itself. Food, or any other commodity, does not have the will, consciousness or incentive to resist its use in whatsoever way its possessor wants. In the case of labour-power that is not the case. The possessor of labour-power, the worker, can and does, resist the way her employer, the capitalist, uses her labouring capacity. Hence, while it is meaningful to distinguish labour-power (the labouring capacity) from labour, it is meaningless to do so for *any* other commodity. And only because it is meaningful to distinguish between labour-power and labour, does it make sense to claim that there can be a difference between the value of labour-power and the value added by the use of labour-power. In the case of any commodity other than labour-power, such a claim cannot be sustained.

Gintis and Bowles (1981, pp. 7) would not agree with this argument because for them it is meaningful to define something called 'lathe-power' of the commodity lathe.

But clearly every commodity has an abstract form as a commodity and a concrete form as a physical entity engaged in production. A lathe can be considered a union of lathe-power, its abstract potential to perform useful functions, and as lathing, the concrete activity of the lathe engaged in production. (Gintis and Bowles, 1981, pp. 7).

As a logical and philosophical statement, the above assertion *might be* correct. But in terms of political economy and social analysis, the difference between lathe-power and lathe only makes sense if by purchasing the former, i.e. lathe-power, the capitalist does *not* automatically get the latter, lathing. But that is clearly impossible unless we are ready to impute consciousness and will to the lathe.

The point to note is that there is a fundamental difference between lathe-power and labour-power. The difference relates to the latter being a capacity of a human being and the former being the abstract capacity of an inanimate object. The difference between a human being and an inanimate object comes from the will and consciousness possessed by the former, which is absent in the latter. Hence the attempt to use lathe-power in a parallel way to the concept of labour-power does not stand scrutiny.

From a quantitative angle, when we worked with the LTV we had used the fact that labour, the input in production, has no value, but labour-power, the commodity purchased by the capitalist, does have value, and moreover that, the value added by labour was greater than the value of labour-power. To repeat this logic in the case of food (steel), we would have to say that food (steel), as an input in production, has no food (steel) value, but food (steel), as the commodity purchased by the capitalist, does have food (steel) value. Furthermore, we would have to assert that each unit of food (steel), used as an input in production, adds more food (steel) value than the food (steel) value of each unit of food (steel) that was purchased by the capitalist. Clearly, these are absurd propositions - because we are talking about the same entity, food (steel), in both cases. No wonder then that the whole attempt to claim that commodities can be exploited leads to conceptual conundrums.

5 Conclusion

The Marxian labour theory of value is built on the premise that labour is the *only* substance of value. This understanding comes from a deeper

understanding of the role of labour in the history of humankind, and of the role of the process of exchange in enforcing a social division of labour in a society of independent, private producers. After developing it, the labour theory of value is used by Marx to demonstrate the exploitative nature of capitalism.

A strand of Marxist thinking, which I will call Analytical Marxist for lack of a better term, developed a whole set of arguments in the 1970s and 1980s that was interpreted as raising serious doubts on the labour theory of value. One argument in this broader class of Analytical Marxist thinking advanced two claims, first, that any basic commodity can be used to construct a consistent theory of value, and second, that such a value theory will show that, in a capitalist economy, the basic commodity (which is the substance of value) is exploited (Gintis and Bowles, 1981; Roemer, 1982).

In this paper, I have argued that both claims are based on elementary conceptual flaws, and once those flaws are dealt with, the theory collapses. The conceptual flaws are: (a) the failure to distinguish labour and labour-power (which underpins the first claim); and (b) the inability to distinguish between the commodity labour-power and all other commodities (which underpins the second claim).

My argument is two fold. First, once we distinguish between labour-power and labour, it is no longer possible to demonstrate that there are basics other than labour in the sense defined by Gintis and Bowles (1981). Hence, the claim that we can construct a theory of value on the basis of some basic other than labour is no longer valid. Second, once we distinguish between labour-power (the human capacity to do useful work) and all other commodities, it is no longer possible to claim that surplus value can be generated by commodities other than labour-power. Hence, the claim that commodities are exploited becomes invalid. One way to avoid these conceptual errors is to use the Marxian labour theory of value.

References

- Bródy, A. (1970). *Proportions, Prices and Planning: A Mathematical Restatement of the Labor Theory of Value.* , Akadémiai Kiadó, Budapest.
- Fujimoto, T. and Fujita, Y. (2008). A refutation of the commodity exploitation theorem. *Metroeconomica*, 59(3):530–540.

- Georgescu-Roegen, N. (1966). Analytical economics. In Georgescu-Roegen, N., editor, *Some Properties of a Generalized Leontief Model*, pages 316–337. Harvard University Press.
- Gintis, H. and Bowles, S. (1981). Structure and practice in the labor theory of value. *Review of Radical Political Economics*, 12:1–26.
- Hawkins, H. D. and Simon, H. A. (1949). Note: Some conditions of macroeconomic stability. *Econometrica*, 17(3/4):245–248.
- Marx, K. (1992). *Capital: A Critique of Political Economy, Volume I*. Penguin. (First published in 1867).
- Marx, K. (1993). *Capital: A Critique of Political Economy, Volume III*. Penguin. (First published in 1894).
- Morishima, M. (1973). *Marx's Economics: A Dual Theory of Value and Growth*. Cambridge University Press.
- Nikaido, H. (1968). *Convex Structures and Economic Theory*. Academic Press, New York, NY.
- Pasinetti, L. L. (1977). *Lectures on the Theory of Production*. Columbia University Press, New York, NY.
- Roemer, J. E. (1981). *Analytical Foundations of Marxian Economic Theory*. Cambridge University Press.
- Roemer, J. E. (1982). *A General Theory of Exploitation and Class*. Harvard University Press, Cambridge, MA.
- Roemer, J. E. (1985). Should marxists be interested in exploitation? *Philosophy and Public Affairs*, 14(1):30–65.
- Sraffa, P. (1960). *Production of Commodities By Means of Commodities: Prelude to A Critique of Economic Theory*. Cambridge University Press.
- Steedman, I. (1977). *Marx after Sraffa*. New Left Books.
- Yoshihara, N. (2017). A progress report on marxian economic theory: On the controversies in exploitation theory since okishio (1963). *Journal of Economic Surveys*, 31(2):632–659.

Yoshihara, N. and Veneziani, R. (2013). Exploitation of labour and exploitation of commodities: A “new interpretation”. *Review of Radical Political Economics*, 45(4):517–524.