



Class and exploitation in general convex cone economies[☆]

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ABSTRACT

In this paper, we examine what appropriate formulations for labor exploitation are, in order to explain the emergence of class and exploitation status in capitalist economies. Given the well-known controversy pertaining to plausible formulations for labor exploitation in joint production economies, we propose an axiom, *Axiom for Labor Exploitation (LE)*, which every 'appropriate' formulation of labor exploitation should satisfy. Using this axiom, the necessary and sufficient condition for plausible formulations of labor exploitation is characterized to verify Class-Exploitation Correspondence Principle (CECP) (Roemer, 1982). According to this, CECP no longer holds in general convex cone economies if the well-known formulations of labor exploitation such as Morishima (1974) and Roemer (1982; Chapter 5) are applied. Therefore, we propose two new definitions of labor exploitation, each of which verifies CECP.

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1. Introduction

Exploitation of labor is the difference between labor hours an individual provides and the labor hours necessary to produce commodities the individual can purchase via his income. This notion has been one of the prominent key-concepts relevant to capitalist economic systems, particularly in a number of debates, ranging from analyses of labor relations, especially focusing on the weakest segments of the labor force, such as women, children, and migrants (see, e.g., ILO, 2005a,b, 2006). This has been seen as the cornerstone of Marxist social theory, but it is also extensively discussed in normative theory and political philosophy (see, e.g., Wertheimer, 1996; Wolff, 1999; Bigwood, 2003; Sample, 2003). In addition, this notion deserves recognition in contemporary economics for understanding one of the *essential* characteristics of market economies with private ownership of wealth, given the recent and common trends of growing disparity in income and wealth and the increase in poverty among advanced countries. In fact, though, traditionally, the Marxian social theory has described capitalist society as that the capitalist class *exploits* the working class, it is Roemer (1982) who discusses, by applying the standard general equilibrium analysis, that this phenomenon is shown as a formal *theorem* called *Class-Exploitation Correspondence Principle* (CECP),¹ as opposed to a mere descriptive theory.

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¹ Before this argument, during the 1970s and 1980s, there were remarkable developments in the debate about this concept in mathematical Marxian

Given this CECP, an appropriate formulation of exploitation can be seen as relevant to the inequality of opportunities which are generic in capitalist society. This is because CECP shows that the wealthier agents are *exploiters*, and they can rationally choose from all classes of society to belong to the *capitalist class*, whereas the least wealthy agents are *exploited* and relegated to the *working class* being that there is no other available option. Thus, the exploiting agents of the capitalist class tend to have a myriad of options, whereas the exploited agents of the working class have far fewer options: the existence of labor–exploiters and labor–exploited agents reflects *unequal opportunity of life options*, due to unequal access to productive assets.²

Furthermore, interestingly, an appropriate formulation of exploitation can perhaps be seen as an index for capturing ‘unjust’ distribution of *well-being freedom* in the following sense: As discussed by Rawls (1971); Sen (1985a,b), etc., well-being freedom implies an individual’s ability to choose to pursue the life she values.³ There are two crucial factors which stipulate the degree of an individual’s well-being freedom: one is the amount of income she can spend to purchase the commodities necessary to achieve her goals, and the other is the amount of time she has to sacrifice as labor supply in order to purchase such commodities. Then, the rate of labor exploitation can represent her degree of well-being freedom, or indeed *un* freedom, since it measures the difference of these two factors by using labor hours as a *numéraire*: if this value is negative for the individual, she is *exploiting* the free hours that some other agents sacrificed as labor supply for the production of the commodities she can purchase. If the value is positive, she is *exploited* in the sense that some of the free hours she sacrificed as labor supply to purchase the commodities are appropriated by somebody else.

Granting the normative relevance of labor exploitation, the well-known formulation of this notion was proposed by Okishio (1963) in the simple Leontief-type model, and given this model, CECP holds true under this definition of exploitation, as Roemer (1982; Chapter 4) illustrated. However, once a more general convex cone model such as the von Neumann model is applied, the Okishio (1963) formulation is known to be ill-defined, as Morishima (1973) and Steedman (1977) argued. Given this difficulty, two alternative formulations were respectively proposed by Morishima (1974) and Roemer (1982; Chapter 5), which are indeed well-defined in more general models. However, as this paper will point out below, neither the Morishima (1974) nor the Roemer (1982; Chapter 5) definition could preserve CECP as a theorem in general convex cone models. This is indeed problematic for both the definitions, since, as Roemer (1982) forcefully argued, the central relevance of CECP in exploitation theory implies that it should be epistemologically considered as a *postulate*, by requiring that any satisfactory definition of exploitation preserves CECP.

Given this background, our main concern in this paper is to discuss what formulations of exploitation are appropriate. Regarding this issue, previous publications on exploitation theory, including Morishima (1974) and Roemer (1982), have repeated the process of criticizing the existing formulations while proposing an alternative one that to some, could be seen as more appealing. However, since there is potentially an infinite number of formulations for exploitation, we may find it difficult to come to a consensus on which formulations could be deemed appropriate if we were to continue this argument. In contrast, this paper introduces an *axiomatic method* which is a completely new approach to the exploitation theory. By taking an axiomatic approach, this paper suggests to start from the very basic principles which represent the normative intuitions behind exploitation theory, thus explicitly identifying the class of proper formulations for exploitation.

To be precise, in this paper we first propose a plausible axiom, *Axiom for Labor Exploitation (LE)*, which is a *minimal* necessary condition for any formulation to be considered as an appropriate one. By using this axiom, we characterize what kinds of formulations can verify CECP as a theorem in general convex cone economies. Based upon this characterization, we show that, in contrast to the above mentioned two traditional definitions, the two new definitions of exploitation satisfy **LE** and preserve CECP: one is a refinement of Roemer’s (1982; Chapter 5) formulation and the other is an extension of the so-called “New Interpretation” (Duménil, 1980; Foley, 1982) formulation of exploitation (originally defined in Leontief models) to general convex cone models. Both of these definitions formulate the exploitation index as the difference between one unit of labor supplied by an agent per day and the minimal amount of labor socially necessary to achieve the agent’s *income*

economics. Fundamental Marxian Theorem (FMT) was originally proved by Okishio (1963) and later named as such by Morishima (1973). FMT shows a correspondence between the existence of positive profit and the existence of labor exploitation. It gives us a useful characterization for *non-trivial* equilibria, where a trivial equilibrium is such that its social production point is zero.

Note that FMT was originally considered to prove the classical Marxian argument that the exploitation of labor is the sole source of positive profits in a capitalist economy. However, the exploitation of labor is not the unique source of positive profits. The reason being that any commodity can be shown to be exploited in a system with positive profits whenever the exploitation of labor exists. This observation was pointed out by Brody (1970); Bowles and Gintis (1981); Samuelson (1982), and was named “Generalized Commodity Exploitation Theorem (GCET)” by Roemer (1982).

After the seminal work by Morishima (1973), there were many generalizations and discussions of FMT. While the original FMT is discussed in simple Leontief economies with homogeneous labor, the generalization of FMT to Leontief economies with heterogeneous labor was made by Fujimori (1982); Krause (1982), etc. The problem of generalizing FMT to von Neumann economies was discussed by Steedman (1977) and one solution was proposed by Morishima (1974). Furthermore, Roemer (1980) generalized the theorem to convex cone economies. These arguments may reflect the robustness of FMT.

² This argument was criticized by Bowles and Gintis (1990) and Devine and Dymski (1991, 1992), since it assumed a standard neoclassical labor market, which was regarded as not a *real* model, but an *ideal* one of capitalist economies by these critics. However, as Yoshihara (1998) showed, CECP essentially holds true even if the neoclassical labor market is replaced by a non-neoclassical labor market with *efficiency wage* contracts, which was interpreted as a more realistic aspect of capitalist economies by those same critics.

³ In the Rawls–Sen theory, inequalities in the distribution of well-being freedom are formulated as *inequalities of capabilities*, whereas they are formulated as *inequalities of (comprehensive) resources* in Dworkin’s theory (Dworkin, 2000). The resource allocation problem, in terms of equality of capability, is explicitly analyzed in Gotoh and Yoshihara (2003), whereas this problem, in terms of equality of resources, is explicitly analyzed in Roemer (1986) and Yoshihara (2003).

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