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MARXISM, FUNCTIONALISM, AND GAME THEORY

The Case for Methodological Individualism

JON ELSTER

How should Marxist social analysis relate to bourgeois social science? The obvious answer is: retain and develop what is valuable, criticize and reject what is worthless. Marxist social science has followed the opposite course, however. By assimilating the principles of functionalist sociology, reinforced by the Hegelian tradition, Marxist social analysis has acquired an apparently powerful theory that in fact encourages lazy and frictionless thinking. By contrast, virtually all Marxists have rejected rational-choice theory in general and game theory in particular. Yet game theory is invaluable to any analysis of the historical process that centers on exploitation, struggle, alliances, and revolution.

This issue is related to the conflict over methodological individualism, rejected by many Marxists who wrongly link it with individualism in the ethical or political sense. By methodological individualism I mean the doctrine that all social phenomena (their structure and their change) are in principle explicable only in terms of individuals – their properties, goals, and beliefs. This doctrine is not incompatible with any of the following true statements. (a) Individuals often have goals that involve the welfare of other individuals. (b) They often have beliefs about supra-individual entities that are not reducible to beliefs about individuals. "The capitalists fear the working class" cannot be reduced to the feelings of capitalists concerning individual workers. By contrast, "The capitalists' profit is threatened by the working class" can be reduced to a complex statement about the consequences of the actions taken by individual workers.[1] (c) Many properties of individuals, such as "powerful," are irreducibly relational, so that accurate description of one individual may require reference to other individuals.[2]

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The insistence on methodological individualism leads to a search for micro-foundations of Marxist social theory. The need for such foundations is by now widely, but far from universally, appreciated by writers on Marxist economic theory.[3] The Marxist theory of the state or of ideologies is, by contrast, in a lamentable state. In particular, Marxists have not taken up the challenge of showing how ideological hegemony is created and entrenched at the level of the individual. What microeconomics is for Marxist economic theory, social psychology should be for the Marxist theory of ideology.[4] Without a firm knowledge about the mechanisms that operate at the individual level, the grand Marxist claims about macrostructures and long-term change are condemned to remain at the level of speculation.

The Poverty of Functionalist Marxism

Functional analysis[5] in sociology has a long history. The origin of functionalist explanation is probably the Christian theodicies, which reach their summit in Leibniz: all is for the best in the best of all possible worlds; each apparent evil has good consequences in the larger view, and is to be explained by these consequences. The first secular proponent perhaps was Mandeville, whose slogan "Private Vices, Public Benefits" foreshadows Merton's concept of latent function. To Mandeville we owe the Weak Functional Paradigm: an institution or behavioral pattern often has consequences that are (a) beneficial for some dominant economic or political structure; (b) unintended by the actors; and (c) not recognized by the beneficiaries as owing to that behavior. This paradigm, which we may also call the invisible-hand paradigm, is ubiquitous in the social sciences. Observe that it provides no explanation of the institution or behavior that has these consequences. If we use "function" for consequences that satisfy condition (a) and "latent function" for consequences that satisfy all three conditions, we can go on to state the Main Functional Paradigm: the latent functions (if any) of an institution or behavior explain the presence of that institution or behavior. Finally, there is the Strong Functional Paradigm: all institutions or behavioral patterns have a function that explains their presence.

Leibniz invoked the Strong Paradigm on a cosmic scale; Hegel applied it to society and history, but without the theological underpinning that alone could justify it. Althusser sees merit in Hegel's recognition that history is a "process without a subject," though for Hegel the process still has a goal. Indeed, this is a characteristic feature of both the main and strong paradigms: *to postulate a purpose without a purposive actor* or, in grammatical terms, a predicate without a subject. (Functionalist thinkers characteristically use the passive voice.) I shall refer to such processes guided by a purpose without

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an intentional subject *objective teleology*. They should be distinguished from both *subjective teleology* (intentional acts with an intentional subject) and *teleonomy* (adaptive behavior fashioned by natural selection). The main difference between subjective teleology and teleonomy is that the former, but not the latter, is capable of waiting and of using indirect strategies, of the form "one step backward, two steps forwards."[6] To the extent that the Main Functional Paradigm invokes teleonomy, as in the explanation of market behavior through a natural-selection model of competition between firms, there can be no objection to it. In the many more numerous cases where no analogy with natural selection obtains, latent functions cannot explain their causes.[7] In particular, long-term positive, unintended, and unrecognized consequences of a phenomenon cannot explain it when its short-term consequences are negative.[8]

Turning to examples of functional analysis in non-Marxist social science, consider this statement by Lewis Coser: "Conflict within and between bureaucratic structures provides the means for avoiding the ossification and ritualism which threatens their form of organization."[9] If instead of "provides the means for avoiding," Coser had written "has the consequence of reducing," there could be no methodological quarrel with him. But his phrasing implies objective teleology, a simulation of human intentional adaptation without specification of a simulating mechanism. Alexander J. Field has observed that a similar functional explanation lies behind the Chicago school of "economic interpretation of the law."[10] For a somewhat grotesque example, consider a statement by Richard Posner:

> The economic case for forbidding marital dissolution out of concern for the children of the marriage is weakened if the parents love the child, for then the costs to the child of dissolution will be weighed by the parents in deciding whether to divorce, and they will divorce only if the gains to them from the divorce exceed the costs to the child, in which event the divorce will be welfare maximizing. If, as suggested earlier, love is a factor of growing importance in the production of children, this might help to *explain* why the law is moving toward easier standards for divorce.[11]

Posner and his school actually tend toward the Strong Functional Paradigm, which most sociologists have abandoned for the more subtle Main Paradigm. Merton, the leading exponent of the Main Paradigm, is also an acute critic of the Strong Paradigm.[12] In Radical and Marxist social science, however, both the crude Strong Paradigm and the less crude (but equally fallacious) Main Paradigm are flourishing. Although my main concern is with Marxism, a few comments on the closely related Radical approach may be in order. As exemplified in the work of Michel Foucault and Pierre Bourdieu, this tends to see every minute detail of social action as part of a vast design for oppression.

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For an example, we may take Bourdieu's assertion that when intellectuals play around with language and even deliberately violate the rules of grammar, this is a strategy designed to exclude the petty-bourgeois would-be intellectuals, who believe that culture can be assimilated by learning rules and who loose their footing when they see that it is rather a matter of knowing when to break them.[13] This sounds like a conspiratorial view, but actually is closer to functionalism, as can be seen from Bourdieu's incessant use of the phrase "*tout se passe comme si.*"[14] If everything happens as if intellectuals thought of nothing but retaining their monopoly, then objectively this must be what explains their behavior. This argument is a theoretical analogue of envy – arising when "our factual inability to acquire a good is wrongly interpreted as a positive action against our desire."[15]

Marx recognized the Weak Functional Paradigm, but argued that what Sartre calls "counterfinality" – the systematic production of consequences that are harmful, unintended, and unrecognized – was equally important. In addition one can certainly trace to him the Main Functional Paradigm, and in at least one passage the Strong Paradigm as well. In the *Theories of Surplus-Value,* Marx reconstructs the rational core of an adversary's argument:

> 1 . . . the various functions in bourgeois society mutually presuppose each other;
>
> 2 . . . the contradictions in material production make necessary a superstructure of ideological strata, whose activity – whether good or bad – is good, because it is necessary;
>
> 3 . . . all functions are in the service of the capitalist, and work out to his "benefit";
>
> 4 . . . even the most sublime spiritual productions should merely be granted recognition, and *apologies* for them made to the bourgeoisie, that they are presented as, and falsely proved to be, direct producers of material wealth.[16]

Although the context is ambiguous and the text far from clear, a plausible reading suggests the Strong Paradigm. All activities benefit the capitalist class, and these benefits explain their presence. This conspiratorial world view, in which all apparently innocent activities, from Sunday picnics to health care for the elderly, are explained through their function for capitalism, is not, however, pervasive in Marx's work. Much more deeply entrenched, from the level of the philosophy of history to the details of the class struggle, is the Main Paradigm.

Marx had a theory of history, embedded in a philosophy of history: an empirical theory of the four modes of production based on class division, and a speculative notion that before and after the division there was, and will be, unity. In the latter idea, clearly, there is also present the Hegelian or

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Leibnizian[17] notion that the division is necessary to bring about the unity, and can be explained through this latent function. Marx's objective teleology is especially prominent in the 1862–63 notebooks, of which the middle third was published as the *Theories of Surplus-Value,* while the remaining parts are only now becoming available.[18] Consider in particular the argument that

> The original unity between the worker and the conditions of production . . . has two main forms. . . . Both are embryonic forms and both are equally unfitted to develop labour as *social* labour and the productive power of social labour. Hence the necessity for the separation, for the rupture, for the antithesis of labour and property . . . The most extreme form of this rupture, and the one in which the productive forces of social labour are also most fully developed, is capital. The original unity can be reestablished only on the material foundations which capital creates and by means of the revolutions which, in the process of this creation, the working class and the whole society undergoes.[19]

Elsewhere Marx states that "insofar as it is the coercion of capital which forces the great mass of society to this [surplus labour] beyond its immediate needs, capital creates culture and exercises an historical and social function."[20] He also quotes one of his favorite verses from Goethe:

> Sollte diese Qual uns quälen,
> Da sie unsre Lust vermehrt,
> Hat nicht Myriaden Seelen
> Timur's Herrschaft aufgezehrt?[21]

It is difficult, although perhaps not impossible, to read these passages otherwise than as statements of an objective teleology. Marx, as all Hegelians, was obsessed with *meaning.* If class society and exploitation are necessary for the creation of communism, this lends them a significance that also has explanatory power. In direct continuation, Marx can also argue that various institutions of the capitalist era can be explained by their functions for capitalism, as in this analysis of social mobility:

> The circumstance that a man without fortune but possessing energy, solidity, ability and business acumen may become a capitalist in this manner [i.e., by receiving credit] – and the commercial value of each individual is pretty accurately estimated under the capitalist mode of production – is greatly admired by the apologists of the capitalist system. Although this circumstance continually brings an unwelcome number of new soldiers of fortune into the field and into competition with the already existing individual capitalists, it also reinforces the supremacy of capital itself, expands its base and enables it to recruit ever new forces for itself out of the substratum of society. In a similar way, the circumstance that the Catholic Church in the Middle Ages formed its hierarchy out of the best brains in the land, regardless of their estate, birth or fortune, was one of the principal means of consolidating ecclesiastical rule and suppressing the laity. The more a ruling class is able to assimilate the foremost minds of a ruled class, the more stable and dangerous becomes its rule.[22]

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By using the word "means" in the penultimate sentence, Marx suggests that the beneficial effects of mobility also explain it. In this case the explanatory assertion, although unsubstantiated, might be true, because the Catholic Church was in fact a corporate body, able to promote its interests by deliberate action. This cannot be true of social mobility under capitalism, however, because the capitalist class is not in this sense a corporate body, shaping and channeling everything for its own benefit. That mobility may have favorable consequences for "capital" is neither here nor there, as capital has no eyes that see or hands that move. Indeed, the German "capital logic" school represents a flagrant violation of the principle of methodological individualism, when it asserts or suggests that the needs of capital somehow bring about their own fulfillment.[23]

There is, however, one way in which the capitalist class may promote its collective interests: through the state. Here we confront the difficulty of specifying the capitalist character of the state in a capitalist society. Marx did not believe that the concrete states of the nineteenth century were a direct outgrowth and instrument of capitalist class rule. On the contrary, he argued that it was in the interest of the capitalist class to have a noncapitalist government – rule by the aristocracy in England, by the Emperor and his bureaucracy in France. It was useful for the English capitalists to let the aristocracy remain in power, so that the political struggle between rulers and ruled would blur the lines of economic struggle between exploiters and exploited.[24] Similarly, capitalism on the European continent could only survive with a state that apparently stood above the classes. In these analyses Marx asserts that the noncapitalist state was beneficial for capitalism. He never states or implies that this benefit was deliberately brought about by the capitalist class, and yet he strongly suggests that it explains the presence of the noncapitalist state:

> The bourgeoisie confesses that its own interests dictate that it should be delivered from the danger of its *own rule;* that in order to restore the tranquillity in the country its bourgeois Parliament must, first of all, be given its quietus; that in order to preserve its social power intact its political power must be broken; that the individual bourgeois can continue to exploit the other classes and enjoy undisturbed property, family, religion and order only on condition that his class be condemned along with the other classes to like political nullity; that in order to save its purse it must forfeit the crown, and the sword that is to safeguard it must at the same time be hung over its own head as the sword of Damocles.[25]

I defy anyone to read this text without understanding it as an *explanation* of the Bonapartist régime. What else is it but a functional explanation? The anticapitalist state is the indirect strategy whereby the capitalists retain their economic dominance: one step backward, two steps forward. But an explanation in terms of latent functions can never invoke strategic considerations of this

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kind. "Long-term functionalism" suffers from all the defects of ordinary functional explanations, notably the problem of a purpose in search of a purposive actor. Moreover, it is *arbitrary,* because the manipulation of the time dimension nearly always lets us find a way in which a given pattern is good for capitalism; *ambiguous,* because the distinction between the short and the long term may be read either as a distinction between transitional effects and steady-state effects, or as a distinction between two kinds of steady-state effects;[26] and *inconsistent,* because positive long-term effects could never dominate negative short-term effects in the absence of an intentional actor. It is not possible, then, to identify the state in a capitalist society as a capitalist state simply by virtue of its favorable consequences for bourgeois economic dominance.

From Marx I now turn to some recent Marxist writings. Consider first some writings by Marxist historians. In an otherwise important study, John Foster makes the following argument:

> The basic function of feudal social organization was, therefore, to maintain just that balance between population and land which (given technological conditions) would produce the biggest possible feudal surplus.... It was enough to ensure that [peasant] marriage and childrearing were strictly tied (by customary practice and religion) to the inheritance of land, and rely on peasant self-interest to do the rest.[27]

By what is the subject of the verbs "ensure" and "rely" in the last sentence? This is clearly a case of objective teleology, of an action in search of an actor.

E. P. Thompson writes that in pre-industrial England there were recurring revolts which, although usually unsuccessful in achieving their immediate objectives, had long-term success in making the propertied classes behave more moderately than they would have otherwise. He also seems to conclude that long-term success provides an (intentional or functional) explanation of the revolts. This, at any rate, is how I interpret his rhetorical question of whether the revolts "would have continued over so many scores, indeed hundreds of years, if they had consistently failed to achieve their objective."[28] If functional, the explanation fails for reasons by now familiar. If intentional, it fails for reasons related to a crucial difference between individual and collective action. If an individual acts in a way that he knows to be in his interest, we may conclude that he acted for the sake of that interest. But when a group of individuals act in a way that is to their collective benefit, we cannot conclude that they did so to bring about that benefit.[29]

The attempt to read meaning into behavior that benefits the actors can take one of three distinct forms. First, the functionalist, discussed above. Second,

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the consequences can be transformed into motives, as in the example from Thompson. This inference, although not always incorrect, is unwarranted in the cases where the benefits emerge only if the actions are performed by *all* the actors concerned, yet the *individual* has no incentive to perform them. For instance, it is beneficial for the capitalist class as a whole if all capitalists search for labor-saving inventions, for then the aggregate demand for labor and hence the wage rate will fall. And it may well be true that historically there has been a trend to labor-saving inventions. Yet the collective benefits cannot explain the trend, for they could never motivate the individual capitalist who, under conditions of perfect competition, is unable to influence the overall wage level. The trend, if there is one, must be explained by some other mechanism, of which the collective benefits are accidental byproducts. Third, one may invoke a conspiratorial design and seek one unifying but hidden intention behind the structure to be explained. Thus, if a pattern such as social mobility benefits the capitalist class as a whole, but not the "already existing individual capitalists," the conspiratorial explanation postulates a secret executive committee of the bourgeoisie. I do not deny that conspiracies occur, or that their existence may be asserted on indirect evidence. I simply argue the need for evidence – preferably direct or, if this is not available, as in the nature of the case it may not be, indirect – pointing to some hidden coordinating hand. Simply to invoke beneficial consequences supplies no such evidence.

Turning now from Marxist history to Marxist social science proper, we find that functionalism is rampant. Functional explanations pervade the theory of crime and punishment,[30] the analysis of education,[31] the study of racial discrimination,[32] and (most important) the analysis of the capitalist state, a Marxist growth industry during the last decade. Not all Marxist studies fall victim to the functionalist fallacies identified above, but most Marxist authors seem to believe that "everything that happens in a capitalist society necessarily corresponds to the needs of capital accumulation,"[33] so that the "correspondence between the actions (and structure) of the state and the requirements of capital accumulation [is] taken for granted."[34] Alternately, the "assumption is made that the capitalist state is universally functional for reproducing the dominance of the capitalist class."[35] These neo-Marxist works appear to be guided by the following principles. (i) All actions of the state serve the collective interest of the capitalist class. (ii) Any action that would serve the collective interest of the capitalist class is in fact undertaken by the state. (iii) Exceptions to the first principle are explained by "the relative autonomy of the state." (iv) Exceptions to the second principle are explained along the lines of Marx in the *Eighteenth Brumaire:* it is in the political interest of the bourgeoisie that the state should not always act in the

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economic interest of the bourgeoisie. Needless to say, the effect of the last two clauses is to render the first two virtually vacuous. In a seminal article Michal Kalecki[36] raised some of the issues that came to the forefront in recent debates, particularly concerning the limits of state intervention to save capitalism from itself. To the question of why industrial leaders should oppose government spending to achieve full employment, he offers three answers, the two most important of which are these. First,

> under a *laisser-faire* system the level of employment depends to a great extent on the so-called state of confidence. . . . This gives to the capitalists a powerful indirect control over Government policy: everything which may shake the state of confidence must be carefully avoided because it would cause an economic crisis. But once the Government learns the trick of increasing employment by its own purchases, this powerful controlling device loses its effectiveness. Hence budget deficits necessary to carry out the Government intervention must be regarded as perilous. The social function of the doctrine of "sound finance" is to make the level of employment dependent on the "state of confidence."

Second, Kalecki argues that capitalists not only oppose this way of overcoming the crisis, but actually need the crisis itself:

> [under] a regime of permanent full employment, "the sack" would cease to play its role as a disciplinary measure. The social position of the boss would be undermined and the self-assurance and class consciousness of the working class would grow. Strikes for wage increases and improvements in conditions of work would create political tension. It is true that profits would be higher under a regime of full employment than they are on the average under *laisser-faire;* and even the rise in wage rates resulting from the stronger bargaining power of the workers is less likely to reduce profits than to increase prices, and thus affects adversely only the rentier interests. But "discipline in the factories" and "political stability" are more appreciated by business leaders than profits. Their class instinct tells them that lasting full employment is unsound from their point of view and that unemployment is an integral part of the normal capitalist system.

In conclusion Kalecki states that "one of the important functions of fascism, as typified by the Nazi system, was to remove the capitalist objection to full employment." To the extent that this thesis is only a variation on the inherent dilemma of the capitalist class – *Et propter vitam vivendi perdere causas*[37] – there can be no objection to it. As admirably explained in the work of Amid Bhaduri,[38] the ruling class often faces a change that gives short-term economic profit but has adverse long-term political (and hence economic) effects. But Kalecki never says whether his analysis is intentional or functional, in addition to being causal. He does make the case for a causal relation between unemployment and the interests of capital, but how does the latter explain the former? As any serious historian can imagine, a mass of detailed evidence is required to make an intentional explanation credible – hence the strong temptation to take the functionalist short cut.

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Many contemporary Marxists think the state has three main functions: repression, legitimation, and creating the conditions for accumulation. Whereas traditional Marxists stress the first function, their modern counterparts assert the importance of the second. Indeed, legitimation is viewed as "symbolic violence" that in modern societies is the functional equivalent of repression. The state exerts its legitimating function through "ideological apparatuses" (e.g., education) and the provision of social welfare. The state's function for capital accumulation is mainly to help the capitalist class overcome the particular interests of individual capitalists. In fact, the state is sometimes said to represent "capital in general," which is (logically) prior to the many individual capitals.[39] This of course is a drastic violation of the tenet of methodological individualism defended here. True, there is often a need for concerted capitalist action, but the need does not create its own fulfillment. The necessary collective action may fail to materialize even if seen as possible and desirable, because of the free-rider problem, and *a fortiori* if the need and possibility go unperceived. Failures of cartelization, of standardization, of wage coordination take place all the time in capitalist societies. Moreover, even when the actions of the state serve the interests of capital against those of individual capitalists, evidence must be given to show that this consequence has explanatory power – i.e., that there exists a mechanism by which state policy is shaped by the collective interest of the capitalist class. The mechanism need not be intentional design[40] – but *some* mechanism must be provided if the explanation is to be taken seriously.

Examples of the Marxist-functionalist analysis of the state abound in the German tradition of Altvater or the French manner of Poulantzas. In the United States Marxist functionalism is best represented by James O'Connor's influential *The Fiscal Crisis of the State,* from which the following passage is taken:

> The need to develop and maintain a "responsible" social order also has led to the creation of agencies and programs designed to control the surplus population politically and to fend off the tendency toward a legitimization crisis. The government attempts to administer and bureaucratize (encapsulate) not only monopoly sector labor-management conflict, but also social-political conflict emerging from competitive sector workers and the surplus population. The specific agencies for regulating the relations between capital and organized labor and unorganized workers are many and varied. . . . Some of these agencies were established primarily to maintain social control of the surplus population (e.g. HEW's Bureau of Family Services); others serve mainly to attempt to maintain harmony between labor and capital within the monopoly sector (e.g., the Bureau of Old Age and Survivors Insurance). In both cases the state must remain independent or "distant" from the particular interests of capital (which are very different from the politically organized interests of capital as the ruling class). The basic problem is to win mass loyalty to insure legitimacy; too intimate a relation between capital and state normally is unacceptable or inadmissible to the ordinary person.[41]

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Note the implicit three-tier structure of capital interests: (1) the interest of the individual capitalist out to maximize profits come what may; (2) the interest of the capitalist class, which may have to curb the individual's greed; and (3) the interest of Capital, which may have to dissociate itself from class interests to ensure legitimacy. It is not surprising that *any* given state action can be viewed from one of these perspectives. O'Connor's scheme suggests the following methodological principle: if crude class interests will not do the explanatory job, then – but only then – invoke subtle class interests. This makes Marxism invulnerable to empirical disconfirmation, and nullifies its scientific interest.

Obviously, an alternative approach is required. Having given my views elsewhere,[42] let me summarize them briefly. (1) There are three main types of scientific explanation: the *causal,* the *functional,* and the *intentional.* (2) All sciences use causal analysis. The physical sciences use causal analysis exclusively. (3) The biological sciences also use functional analysis, when explaining the structure or behavior of organisms through the benefits for reproduction. This procedure is justified by the theory of natural selection, according to which such beneficial effects tend to maintain their own causes. Intentional analysis, on the other hand, is not justified in biology – because natural selection is basically myopic, opportunistic, and impatient, as opposed to the capacity for strategic and patient action inherent in intentional actors. (4) The social sciences make extensive use of intentional analysis, at the level of individual actions. Functional analysis, however, has no place in the social sciences, because there is no sociological analogy to the theory of natural selection. (5) The proper paradigm for the social sciences is a mixed causal-intentional explanation – *intentional understanding* of the individual *actions,* and *causal explanation* of their *interaction.* (6) Individuals also interact intentionally. And here – in the study of the intentional interaction between intentional individuals – is where game theory comes in. The need for game theory arises as soon as individual actors cease to regard each other as given constraints on their actions, and instead regard each other as intentional beings. In parametric rationality each person looks at himself as a variable and at all others as constants, whereas in strategic rationality all look upon each other as variables. The essence of strategic thought is that no one can regard himself as privileged compared to the others: each has to decide on the assumption that the others are rational to the same extent as himself.

The Uses of Game Theory in Marxist Analysis

The basic premises of rational choice theory[43] are (1) that structural constraints do not completely determine the actions taken by individuals in a

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society, and (2) that within the feasible set of actions compatible with all the constraints, individuals choose those they believe will bring the best results. If the first premise is denied, we are left with some variety of structuralism – an element of which reasoning is present in Marx, and is most fully developed in French Structuralism. Although it may occasionally be true that the feasible set shrinks to a single point, a general theory to this effect cannot be defended – unless by the ptolemaic twist of counting preferences or ideologies among the constraints. True, the ruling class often manipulates the constraints facing the ruled class so as to leave it no choice, but this very manipulation itself presupposes some scope of choice for the rulers. If the second premise is denied, we are left with some variety of role theory, according to which individuals behave as they do because they have been socialized to, rather than because they try to realize some goal: causality vs. intentionality. Against this I would argue that what people acquire by socialization is not quasicompulsive tendencies to act in specific ways, but preference structures that – jointly with the feasible set – bring it about that some specific action is chosen. If the role theory was correct, it would be impossible to induce behavior modification by changing the feasible set (e.g., the reward structure), but clearly such manipulation is an omnipresent fact of social life.[44]

Game theory is a recent and increasingly important branch of rational choice theory, stressing the *interdependence of decisions.* If all violence were structural, class interests purely objective, and class conflict nothing but incompatible class interests, then game theory would have nothing to offer to Marxism. But because classes crystallize into collective actors that confront each other over the distribution of income and power, as well as over the nature of property relations, and as there are also strategic relations between members of a given class, game theory is needed to explain these complex interdependencies. In a "game" there are several players or actors. Each actor must adopt an action or a strategy. When all actors have chosen strategies, each obtains a reward that depends on the strategies chosen by him *and* by the others. *The reward of each depends on the choice of all.* The notion of a reward can be understood narrowly or broadly. In the narrow interpretation it signifies the material benefit received by each actor. In the broad interpretation, it covers everything in the situation of value to the actor, including (possibly) the rewards to other actors. *The reward of each depends on the reward of all.*[45] It is assumed that the actors strive to maximize their reward – to bring about a situation they prefer to other situations. When an actor chooses a strategy, he must take account of what the others will do. A strategy that is optimal against one set of strategies on the part of the others is not necessarily optimal against another set. To arrive at his decision, therefore, he has to *foresee their decisions,* knowing that they are trying to foresee his. *The*

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choice of each depends on the choice of all. The triumph of game theory is its ability to embrace simultaneously the three sets of interdependencies stated in the italicized sentences.[46] Nothing could be further from the truth, then, than the allegation that game theory portrays the individual as an isolated and egoistic atom.

An essential element of the situation is the *information* that the actors possess about each other. In games with perfect information, each individual has complete information about all relevant aspects of the situation. These include the capabilities of the other actors, their preferences, their information, and the payoff structure that maps sets of individual strategies into outcomes. The condition of perfect information is likely to be realized only in small and stable groups, or in groups with a coordinating instance. Also crucial is the notion of an *equilibrium point* – a set of strategies in which the strategy of each actor is optimal vis-à-vis those of the others. It is thanks to this notion that game theory can avoid the infinite regress of "I think that he thinks that I think . . ." which plagued early attempts to understand the logic of interdependency. The notion of a *solution* can be defined through that of an equilibrium point. Informally, the solution to a game is the set of strategies toward which rational actors with perfect information will tacitly converge. If there is only one equilibrium point, it will automatically emerge as the solution – it is the only stable outcome, in the sense that no one gains from defection. If there are several such equilibria, the solution will be the one that is collectively optimal – the equilibrium point preferred by all to all the others. Not all games have solutions in this sense.

A brief typology of games may be useful. One basic distinction is between two-person and n-person games, both of which are important for Marxism. The struggle between capital and labor is a two-person game, the struggle between members of the capitalist class an n-person game. Often, however, complicated n-person games can be reduced without too much loss of generality to simpler two-person games – as games played between "me" and "everybody else."[47] The simplest two-person games are zero-sum games, in which the loss of one player exactly equals the gain of the other. This is the only category of games that always have a solution. The conceptual breakthrough that made proof of this proposition possible was the introduction of *mixed strategies,* i.e., the choice of a strategy according to some (optimal) probability distribution. In poker, for instance, a player may decide to bluff in one half of the cases, a policy implemented by tossing a coin in each case. Here the opponent may calculate how often the player will bluff, but not whether he will do so in any particular case. In variable-sum games not only the distribution of the rewards, but also the size of the total to be distributed,

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depends on the strategies chosen. These games can be further divided into games of pure cooperation and games of mixed conflict and cooperation (whereas zero-sum games are games of pure conflict). Not all variable-sum games have a solution in the sense indicated above. They can, however, have a solution once we take the step from noncooperative to cooperative games. In cooperative games – which should not be confused with the (noncooperative) games of pure cooperation – there is joint rather than individual choice of strategies. The actors can coordinate their choices so as to avoid certain disastrous combinations of individual strategies. If there is a choice between left-hand and right-hand driving, the actors may agree to toss a coin between both driving on the right and both driving on the left – a *jointly-mixed strategy*. If they toss a coin individually, the chances are 50% thay they will end up on a collision course.

The value of the cooperative approach to game theory is contested because it appears to beg the question by assuming that agreements to cooperate will be enforced. On general grounds of methodological individualism, noncooperative games are prior to cooperative games. Assuming that the actors will arrive at a cooperative solution is much like assuming that a functional need will create its own fulfillment. For this reason, and also because there are so many solution concepts for cooperative games, one will have to tread carefully when explaining the emergence of cooperative behavior in terms of cooperative games. Properly used, however, the method can yield important results, and in any case is fruitful for the purpose of normative analysis. For n-person games, the cooperative approach does not involve universal cooperation, but rather the cooperation of some actors against the others. The theory of coalitions in n-person game theory is an increasingly important branch of game theory for economic, political, and normative analysis.[48] The simplest solution concept for such games is that of the "core" – the set of all reward distributions in which no coalition of individuals can improve their lot by breaking out and acting on their own. Once again, the cooperative approach begs the question by assuming that coalitions can be formed and maintained whenever needed. And, once again, this is more an objection to the analytical-explanatory than to the normative use of the theory.

Turning now from exposition to applications, I discuss in turn the logic of solidarity and cooperation within classes, the problem of worker-capitalist coalitions, and some static and dynamic aspects of the class struggle. These applications all presuppose that we have left behind us – if it ever existed – the capitalism of perfect competition, unorganized capital and unorganized labor. The income distribution that would emerge under perfect competition can serve as a baseline for comparison with the distributions that result when

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one or both of the main classes behave in an organized and strategic manner. Whether the classes will so behave is itself a question to be decided by game-theoretic analysis. I define class consciousness as the capacity of a class to behave as a collective actor. Operationally, this means the capacity to overcome the free-rider problem. This problem arises within both the capitalist and the working classes. As well explained by Mancur Olson,[49] each worker is tempted by the prospect of a free ride, of benefitting from the strikes fought by the other workers without taking part in the action himself. Similarly, capitalists face the same difficulty with regard to cartelization, wage policy, etc. If, however, we want to penetrate past these generalities to the fine grain of the problem, some distinctions must be made. I assume that each actor within the class has a choice between a *solidary strategy* (S) and an *egoist strategy* (E). In the artificial two-person game between "me" and "everybody else," four possibilities can be distinguished:

A. Universal cooperation: everybody uses S

B. Universal egoism: everybody uses E

C. The free rider: "I" use E, "everybody else" uses S

D. The sucker: "I" use S, "everybody else" uses E.

Every individual in the society will rank these outcomes in a particular order, according to what he – in the role of "I" – would prefer. Excluding ties, there are twenty-four possible rankings of these four alternatives.[50] If we disregard all that rank B before A, as we are permitted to do by the very nature of the problem under discussion, we are left with twelve cases. If we then exclude the "masochistic" cases that have D ranked above A, we are left with eight alternatives. I shall limit myself to four cases that have a central place in the literature on collective action. I shall also limit myself to the hypothesis that each "I" views the situation in the same way. Although mixed cases will be the rule in actual situations, the assumption of homogeneity makes for a more tractable analysis.[51]

The first case is the well-known Prisoners' Dilemma, defined by the ranking CABD and characterized by the following features. (1) Strategy E is dominant, i.e., for each actor it is the best choice regardless of what the others will do. Here, then, we need not impose any stringent information requirement for the solution to be realized. Also, it is not true here that "the choice of each depends on the choice of all." In a sense, therefore, it is a rather trivial game. (2) The solution to the game is universal egoism, which everybody ranks below universal cooperation. Individual rationality leads to collective disaster. (3) Universal cooperation is neither individually stable nor individually accessible: everybody will take the first step away from it, and no one

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the first step toward it. We can apply this to the workers' predicament. For the individual there is no point in going on strike if his fellow workers do so, for by remaining at work he can derive the benefit from their action *and* be (highly) paid during the strike – and if they do not strike he has nothing to gain and much to lose by unilateral action.

Is there a "way out" of the Prisoners' Dilemma? Can individuals caught in this situation overcome the dilemma and behave cooperatively? No consensus has emerged from the extensive literature, but I believe that in the present context two approaches stand out as the most promising. In the case of working-class cooperation the most plausible explanation is by change of the preference structure. Through continued interaction the workers become both concerned and informed about each other. Concern for others changes the ranking of the alternatives, and information about others enables the actors to realize the solution of the ensuing game. This is the "Assurance Game," defined by the ranking ACBD and possessing the following features. (1) There is no dominant strategy in this game. Egoism is "my" best reply to egoism, solidarity the best reply to solidarity. (2) The optimum of universal cooperation is individually stable, but not individually accessible. (3) Universal egoism and universal solidarity are both, therefore, equilibrium points in the game. Because universal cooperation is preferred by all to universal egoism, the former emerges as the solution to the game. (4) Because there is no dominant strategy, the solution will be realized only if there is perfect information. Imperfect information – about preferences or information – easily leads to uncertainty, suspicion, and play-safe behavior. Amartya Sen has argued that Marx's *Critique of the Gotha Programme* can be interpreted in terms of the Assurance Game.[52] Solidarity can substitute for material incentives. I would tend to believe that quite generally working-class solidarity and collective action can be understood in these terms, although I shall later point to an alternative explanation.

Although the Prisoners' Dilemma and the Assurance Game differ profoundly in their structure, behavior – in cases of incomplete information – may occur *as if* the preferences were a Prisoner's Dilemma when in fact they form an Assurance Game. In tax evasion or suboptimal use of public transportation, for instance, the observed outcome may be the result of lack of information rather than of free-rider egoism. Likewise, the Assurance Game preferences should be distinguished from those of the Categorical Imperative, although behaviorally they may be indistinguishable. The Categorical Imperative is defined by the ranking ADBC, with solidarity as a dominant strategy. The history of the working class shows, in my opinion, that cooperative behavior typically is conditional rather than unconditional – motivated by the concern

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for doing one's share of a common task rather than by the spirit of sacrifice or disregard for actual consequences characteristic of the Categorical Imperative. Indeed, more harm than good sometimes ensues from heroic individual acts of revolt or disobedience, if the others are not willing to follow suit, because such acts may provide the authorities or the employers the excuse they need to crack down further on the workers. This, I believe, shows that Kant's individualistic ethic is not appropriate for collective action.[53]

The Assurance Game also provides an interpretation of Charles Taylor's notion of *common meaning,* designed to elucidate the meaning of consensus. In his polemic against methodological individualism Taylor asserts there are two forms of meaning that are irreducibly nonsubjective: the intersubjective meanings and the common meanings. Intersubjective meanings are, roughly, rules for social behavior whose negation cannot be generalized without contradiction. Thus promises should be kept because the notion of a society in which promises were never kept is logically contradictory. Common meanings illustrate the Assurance Game. Taylor distinguishes common meanings from shared subjective meanings by saying that "what is required for common meanings is that this shared value be part of the common world, that *this sharing itself be shared.*"[54] The phrase I have italicized amounts to a condition of perfect information. For a consensus to be a living force, it must be known to exist. Everybody acts in a solidary manner because of knowing that the others are going to do so as well. This way of looking at consensus enables us to refute the following claim made by Taylor:

> Common meanings, as well as intersubjective meanings, fall through the net of mainstream social science. They can find no place in its categories. For they are not simply a converging set of subjective reactions, but part of the common world. What the ontology of mainstream social science lacks, is the notion of meaning as not simply for an individual subject; of a subject who can be a "we" as well as an "I".[55]

Game theory provides what Taylor claims is lacking – the notion of a subject that can be a "we" as well as an "I". Through the triple interdependence that game theory analyzes – between rewards, between choices, and between rewards and choices – the individual emerges as a microcosm epitomizing the whole network of social relations. A similar demystification makes good sense of Sartre's notion of the "group," even though he claims it cannot be rendered in the "neo-positivist" language of "analytical reason."[56]

Arthur Stinchcombe analyzes Trotsky's account of the October Revolution in terms that fit this analysis of solidarity. The key idea in Stinchcombe's explanation is the breakdown of authority in the prerevolutionary situation. The old authority breaks down when new social orders become thinkable, i.e., real

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possibilities. The "Revolution grows by the exploration of these possibilities, and by the communication of there being possibilities to those who would support them, 'if only they knew they were really Bolsheviks'."[57] When the workers and the soldiers, especially, come to believe that change is possible, change becomes possible:

> The fickleness of the masses during a revolution thus takes on a completely different interpretation. Trotsky's sarcasm about spontaneity as an explanation of the movements is essentially an assertion that the explanations of the masses about why they are doing what they are doing are going to be reasonable, but that reasonableness is going to be based on their estimates of the probabilities that (a) this institution or authority will pursue my goals; or (b) this institution or authority is the best I am likely to find, because no alternatives are possible or because the alternatives are in the hand of the enemy. And it is these probabilities that fluctuate wildly during a revolution but are reasonably stable during times of governmental quiescence.[58]

Revolutions succeed when these probabilities cease to fluctuate wildly and settle into some new and stable pattern because uncertainty, suspicion, and play-safe thinking no longer are predominant. Tacit coordination that becomes possible when people come to trust each other is the essential condition for successful collective action. The role of the revolutionary leader is to provide the information that makes this tacit coordination possible, rather than to be a center of command and authority. This view constitutes an alternative to the Leninist theory of revolutionary leadership. Mancur Olson,[59] following Lenin, assumes that the only possible motivational structures are the free-rider egoism of the Prisoners' Dilemma and the unconditional altruism of the Categorical Imperative. Rightly rejecting the latter as wishful thinking, and observing that the former can never bring about collective action, he concludes that strikes or revolutions can only be brought about from above, through discipline verging on coercion. But the conditional altruism of the Assurance Game is also a possible motivational structure, which may lead to collective action by tacit coordination, given information provided by the leaders.

The problem of capitalist class solidarity requires different tools. We can hardly assume that interaction between capitalists will make them care about each other and change their motivations. Nor can we assume that the structure of their coordination problems invariably is that of a Prisoners' Dilemma. As to the last question, we can return to the issue of labor-saving inventions, which illustrates the ranking CADB.[60] This game has the paradoxical feature that the optimum is individually accessible, but not individually stable. When everyone uses E, it is in the interest of each actor to use S, but when everyone uses S, it is in the interest of each to switch to E. The game, in fact, has no solution. If no other capitalists seek labor-saving inventions, wages can be

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expected to rise, which makes it rational for the individual capitalist to preempt the wage rise by saving on labor – but if all capitalists do this, the individual capitalist has no incentive to do so. Clearly, this inherent contradiction sets up a pressure for concerted action,[61] which may or may not be realized.

I have assumed that for the individual capitalists there are costs associated with the search for labor-saving inventions, as distinct from the search for inventions in general. If we drop this assumption, the resulting interaction structure takes the following form. Each capitalist is indifferent between A and C, but prefers both to B and D, between which he is also indifferent. This, again, offers a crucial scope for the exercise of leadership. The task of the business leaders will be to persuade the individual entrepreneurs to act in a way that is neither harmful nor beneficial from their private viewpoint, but which brings about collective benefits when adopted by all. Leadership, then, is to make use of the "zone of indifference" of the individuals.[62]

These problems are hardly discussed in the literature. By contrast, there are many discussions of capitalist Prisoners' Dilemmas, mainly in the context of cartelization. For each firm the best option is to have a high output at the high prices made possible by the cartel restrictions on the output, but such free-rider behavior will of course make the cartel break up, or its anticipation prevent the cartel from forming. Yet cartels sometimes do form without immediately breaking up. This often happens because of asymmetries among the firms. A large firm will be strongly motivated to adopt the cartel policy even if the others do not follow suit, because it can internalize more of the benefits.[63] Moreover, it will typically possess the economic power to retaliate against firms that do not follow suit. But even in competitive markets with many identical firms, cartelization may occur by voluntary and selfish action. This may be explained by the theory of "supergames," or repeated Prisoners' Dilemmas.[64] When the same actors play a Prisoners' Dilemma over and over again, the possibility of retaliation against free riders may make it rational to cooperate. It is easy to see that this will occur only if the number of iterations is indefinite. If the actors know when the games come to an end, there will be no reason for cooperation in the very last game, because no retaliation can take place afterwards if they defect. But this means that for the purposes of decision the penultimate game can be treated as the last, to which the same reasoning applies, and so on in argument that inexorably zips back to the first game. According to John Bowman, this explains the failure of Roosevelt's National Recovery Act: "Voluntary cooperation in the Prisoners' Dilemma is possible only when the supergame is of indefinite length. The N.R.A. had a terminal date. Thus it was in the best interests of every conditional cooperator to break the code provisions before his competitors did."[65]

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Explanations in terms of supergames may also apply to working-class cooperation, though less plausibly. I believe anyone familiar with the history of the working class will agree that solidarity is not merely enlightened long-term selfishness. Operationally, the issue could be decided by looking at cases in which the working-class interaction was known to have a terminal date, as in the National Recovery Act, and see whether this had any stifling effects on cooperation and solidarity. For solidarity among the workers to emerge, it is crucial that they interact for some time, because otherwise the mutual concern and knowledge will not have time to be shaped. But there should be no reason to believe that solidarity requires a cooperation of indefinite length, if my account is correct. In perfectly competitive capitalism, as I have argued elsewhere, workers are doubly alienated – from the means of production and from the products of their labor.[66] Alienation from the means of production stems from the alienation of the workers from their own history, i.e., from past generations of workers who produced the means of production currently used. The alienation from the products stems from their alienation from the class to which they belong, and permits the capitalist to treat each worker as if he were "the marginal worker," in the economic sense of that term, and to pay him according to marginal productivity. Only by overcoming this double alienation, by taking possession of their past history and by acting jointly as a class, can the workers achieve class consciousness that goes beyond wage claims to make a radical rupture with capitalist relations.

What happens if the workers overcome the alienation from their class, but not that from their history – if they see through the "marginalist illusion," but not the "presentist illusion"? This partial liberation distinguishes the modern capitalist societies of the social democratic variety, in which working-class organizations negotiate with employer associations over the division of the net product. Because the basic assumption behind this bargaining is that capital, as a "factor of production" on a par with labor, has a right to some part of the product, the only issue of the class struggle becomes the *size* of that part, not its existence. Take first the simplest case, in which we disregard the question of reinvestment out of profits. In this purely static setting, workers do not ask what use is made of the surplus value extracted from them. If they could get the whole net product and spend it immediately, they would. But they cannot. The problem, then, is one of dividing a jointly-made product between the producers. It is, clearly, a mixed conflict-cooperation game, in which the strategies determine both the total product and how it is to be divided. Both parties have threats – strikes and lockouts – that are characteristically double-edged: they enhance the probability of getting a large share of the total, but reduce the total to be shared. In such bargaining each side has a lower limit beneath which it cannot go, e.g., subsistence for the workers

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and a minimal profit for the capitalists. And the sum of these limits is smaller than the total to be shared. In other words, there is a set of possible divisions that are compatible with the last-ditch demands of both classes, and over which the bargaining takes place.

There is no way the two groups can converge tacitly in a pair of demands that exactly exhaust the total product. The game has no noncooperative solution. Considerations other than purely rational calculation must, therefore, decide the outcome. Bargaining theory addresses this problem. Its general assumption is that the actors must form some psychological hypotheses about each other, even if these cannot be rationally justified. Indeed, according to some bargaining models, each actor at each step of the process believes himself to be one step ahead of the other.[67] The mutual inconsistency of these beliefs do not, however, necessarily prevent the sequence of demands and counter-demands from converging toward some division of the product, which is then the outcome of the bargaining process.

Of the many varieties of bargaining theory,[68] one has received general attention and is uniquely interesting from the methodological point of view. This is the Zeuthen-Nash theory, named after the authors who proposed two radically different versions, which John Harsanyi later proved to be mathematically equivalent.[69] The Nash version offers an axiomatic method of finding the normatively justified outcome for two-person cooperative games, whereas the Zeuthen method offers a step-by-step method, taking us through claims and counterclaims to a uniquely determined outcome. Because both versions lead to the same result, we can use cooperative game theory without coming into conflict with methodological individualism. We do not, that is, simply *assume* that the cooperative outcome will be realized simply because there is a *need* for it; rather we exhibit *a causal mechanism whereby it will be achieved.* The Nash solution is determined by assuming that a certain number of conditions are fulfilled. First, it should not make any difference to the outcome whether the rewards are measured on one particular utility scale among the many scales that are positive linear transformations of each other. To explain the last expression, it should suffice to point out that the Celsius and Fahrenheit temperature scales are positive linear transformations of each other, differing only in the choice of zero and in the unit of measurement. Secondly, the outcome should be Pareto-optimal, so that it is impossible to improve the situation of one actor without harming that of another. Thirdly, it should be symmetrical, in the sense that equally powerful actors should get equal rewards. Lastly, it should satisfy the "condition of the independence of irrelevant alternatives," stipulating that adding new alternatives to the bargaining situation can only change the outcome if the new outcome is

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one of the new options. The addition of a new alternative, that is, can never make a different old alternative emerge as the outcome.

Nash's theorem states there is only one division of the product that satisfies these conditions – viz, the division that maximizes the mathematical product of the rewards. From the way these rewards are measured,[70] a further feature of the solution follows: it typically accords the largest portion of the jointly made product to the most powerful actor. This is the "Matthew effect" in bargaining theory: to him that hath, shall be given. For a poor actor, even a small gain is so important that he can be made to be content with it, whereas the more affluent can say with equanimity, "Take it or leave it." The Matthew effect may itself be seen as a form of exploitation,[71] or at least as contrary to distributive justice, which rather demands that the least advantaged person should be given more.[72] This inequity, however, is secondary, because there is no normative basis for the capitalist class to get anything at all. In any case, the model may be behaviorally attractive even if its normative appeal is weak. Zeuthen's argument showed that it is plausible to believe that this outcome will in fact be the result of bargaining, if at each step the player whose relative loss is smaller makes a concession to the opponent.[73] This approach is important in bargaining cases that involve a once-and-for-all confrontation that does not have consequences beyond the present. If, however, the bargaining parties know they will have to bargain again later, and that the outcome of present bargaining will affect future welfare, it will not do. Wage bargaining, in fact, tends to be regular, institutionalized, sometimes even continuous. Also, the current division of the net product between wages and profit makes a big difference to the future welfare of both classes, because part of the profit is reinvested. The less the capitalist class has left in profits, the smaller the prospects for economic growth and future increase in consumption.

Kelvin Lancaster proposes a model that captures this double time-dependence of bargaining.[74] He views the wage struggle between capital and labor as a "differential game," i.e., as a continuous strategic interaction. The model, and even more the general theory behind it, constitutes an important conceptual breakthrough, with many consequences for the way in which we think about exploitation, power, and capitalism. The theory does for social democracy what Marx did for classical capitalism: it explains how class struggle evolves when the workers overcome the synchronic alienation, but not the diachronic one. Lancaster assumes that workers and capitalists confront each other as organized groups, and that there are no other social classes. He assumes, moreover, that each of the two classes controls an essential economic variable. The workers can, within certain limits,[75] determine the rate of working-

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class consumption out of the current net product, whereas the capitalists can control the rate of investment out of profits. The assumption regarding the capitalists' control variable is simply part of the definition of capitalism, whereas the assumption regarding the workers' control over the current consumption reflects the development of capitalism since Marx. In modern capitalist economies, especially the social democratic variety prominent in northwestern Europe, the workers have the power – either directly through unions or indirectly through profit taxation – to retain for themselves virtually all of the net product, should they so desire. This statement is not easily substantiated, being counterfactual, yet it is defensible. Under early capitalism, working-class consumption was kept down to subsistence for many reasons, including low productivity, weak working-class organizations, a high degree of capitalist cohesion, rapid population growth, and a state that championed the capitalist class. In modern capitalist economies of the social democratic variety, none of these conditions obtains. True, the capitalist class remains strong, in that it is able to discipline its own members. But its capacity for subjugating the workers has been drastically reduced, for if the workers are denied in direct wage bargaining, they can retaliate with state intervention and heavy taxation on profits.

Yet the workers do not use their power. Lancaster suggests, correctly, that this hesitancy owes to certain strategic facts of the situation and to the interest of both classes in present and future consumption. Hence the workers must leave some profit to the capitalists for reinvestment and increased future consumption. Finn Kydland and Edward Prescott suggest that the workers, therefore, should bind themselves – that the "workers, who control the policy, might rationally choose to have a constitution which limits their power, say, to expropriate the wealth of the capitalist class."[76] This is a new twist on the theme of abdication, performed here by the workers instead of the capitalists, as in Marx's *Eighteenth Brumaire*. Their analysis is incomplete, however, as it does not take the strategic nature of the situation into account, as Lancaster does when he observes that both the workers and the capitalists are in a dilemma. To be precise, we have:

> *The Workers' Dilemma:* If they consume everything now, nothing will be left for investment and future increases in consumption, but if they leave something for profits, they have no guarantee that the capitalists will use this for investment rather than for their own consumption.
>
> *The Capitalists' Dilemma:* If they consume the entire profits now, nothing will be left for investment and future increases in consumption, but if they invest out of profits, they have no guarantee that the workers will not retain for themselves the increase in consumption thereby generated.

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Observe the assumption that capitalists desire consumption rather than profits. The rate of profit is fixed by the working class, hence it cannot also be maximized by the capitalists. This argument does not deny the importance of profit maximization, for if capitalists can do even better than the rate fixed for them, they will also benefit in consumption terms. Observe, too, that the model has potential applications in many settings. Consider, for instance, the relation between a multinational firm that controls the rate of local reinvestment out of locally created profits, and the local government that controls the tax rate on profits.

A strategy, in the game set up by these dilemmas, is a time profile of values of the control variable, i.e., a continuous sequence of rates of consumption out of the net product for the workers, and a sequence of rates of investment out of profits for the capitalists. A solution, here as in general, consists of two strategies that are optimal against each other. Lancaster shows that if the two classes are assumed to maximize their consumption over some finite time period, the game has a solution. He also shows that the solution is suboptimal, in the sense of implying a smaller total consumption for each class than would be possible with different time profiles. It is also discontinuous: at one point in time both classes switch from minimal to maximal consumption. In my view these results depend too heavily on the specific assumptions of the model to be of great interest. The importance of the model is above all conceptual. It shows how the workers can hold political power, yet be powerless if the capitalists retain economic power; how the workers may control consumption, yet be powerless if the capitalists control investment; how the workers can determine the present, yet be powerless if the capitalists determine the future. The exploitation of the working class, then, does not consist only in the capitalists' appropriation of surplus-value, but also in the workers' exclusion from decisive investment choices that shape the future. Or, alternatively, the workers suffer not only exploitation, but also lack of self-determination.[77] In the capitalist countries where social democracy is most advanced, one may argue with Ralf Dahrendorf that power rather than wealth is the crux of the class struggle.[78]

Cooperative n-person game theory has been usefully applied to the study of exploitation. In John Roemer's *General Theory of Exploitation and Class* it is shown that the feudal, capitalist, and socialist modes of exploitation can be characterized by means of notions from this theory.[79] A group of individuals are said to be exploited if, were they to withdraw from society according to certain withdrawal rules, they could improve their situation. Different forms of exploitation correspond to different withdrawal rules. Thus the serfs were exploited in the feudal sense, because they could have done better for them-

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selves had they withdrawn from society with their own land. Workers are capitalistically exploited because they could have done better were they to withdraw with their per capita share of society's tangible assets, i.e., capital goods. And under socialism a group is exploited if it could do better were it to withdraw with its per capita share of the intangible assets, i.e., skills and talents. Whereas the last notion is somewhat hazy, the characterizations of feudal and capitalist exploitation are very valuable, as is also the observation that the neoclassical view, that workers are not exploited under capitalism, really amounts to a denial of feudal exploitation in capitalist societies. It is also possible to arrive at specific statements about the intensity of exploitation, by using the framework of cooperative game theory. Consider a case discussed by Lloyd Shapley and Martin Shubik,[80] agricultural production where one capitalist owns the land and the workers own only their labor power. How will the product be divided between landowner and workers if coalitions can be formed between the owner and some of the peasants? Shapley and Shubik show that the outcome is worse for the workers than it is under perfect competition where no coalitions of any kind are allowed. Worker–landowner coalitions conform to a "divide and rule" principle: the workers are weakened by landowner inducements that lead them to betray their class. Even if the workers are too weak to agree on concerted action, they may be strong enough to prevent such partial accomodations with the capitalist. Compared to collective bargaining, individual wage negotiations betray weakness; but opposed to coalition bargaining, they betoken incipient class consciousness. Coalition theory thus embraces simultaneously the problems of class solidarity and of class struggle.

The weakness of game theory, in its present state, is the lack of testable hypotheses. There are many experimental studies of gaming, within the noncooperative and the cooperative framework, but few applications to nonexperimental settings. The value of the theory, therefore, is mainly in illuminating the nature of social interaction and in creating more discriminating categories of sociological analysis. Yet I am confident that this is a transitory situation only, and that game theory will increasingly help us understand social and historical problems. My reasons for this belief are somewhat *a priori*. If one accepts that interaction is of the essence of social life, then I submit that the three, interlocking, sets of interdependencies set out above capture interaction better than does any alternative. Game theory provides solid microfoundations for any study of social structure and social change. Yet the problems of aggregation and statistical analysis still confound us when it comes to complex real life cases. This is not an argument for abandoning the search for microfoundations, but a compelling reason for forging better links between aggregate analysis and the study of individual behavior.

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For Marxism, game theory is useful as a tool for understanding cases of mixed conflict and cooperation: cooperation in producing as much as possible, conflict over dividing up the product. Game theory can help understand the mechanics of solidarity and class struggle, without assuming that workers and capitalists have a common interest and need for cooperation. They do not. The interest of the working class is to suppress the capitalist class – and itself qua wage-earners – not to cooperate with it. Within the alienated framework of capitalism, however, this interest is easily misperceived. For there is the appearance of a common interest, such that working class action will follow lines like those sketched here. Only through proper analysis of the mechanism of this reformist class struggle can one understand how to transform it into one that aims at abolishing the capitalist system.

NOTES

1. The philosophical point invoked here is that in contexts of belief, desire, etc. it is not in general possible to substitute for each other expressions with the same reference, without change of truth value. We fear an object as described in a certain way, and we may not fear it under a different description.
2. For an analysis of this idea, see my *Logic and Society* (Chichester: Wiley, 1978), 20 ff.
3. A forceful statement of the need for microfoundations is in John Roemer, *Analytical Foundations of Marxian Economic Theory* (Cambridge University Press, 1981), Ch. 1 and *passim*.
4. I argue in more detail for this claim in Ch. V of my *Sour Grapes*, forthcoming from Cambridge University Press.
5. For a fuller statement of my views on functional explanation, see Ch. 2 of my *Explaining Technical Change*, forthcoming from Cambridge University Press; see also my exchange with G.A. Cohen in *Political Studies* XXVIII (1980), my exchange with Arthur Stinchcombe in *Inquiry* 23 (1980), and my review of P. van Parijs, *Evolutionary Explanation in the Social Sciences* (Totowa, NJ: Rowman and Littlefield 1981), forthcoming in *Inquiry*.
6. For a fuller statement, see Ch. I of my *Ulysses and the Sirens* (Cambridge University Press, 1979).
7. Natural selection invokes competition between coexisting individuals. Arthur Stinchcombe (in his contribution to *The Idea of Social Structure: Papers in Honor of Robert K. Merton*, ed. Lewis A. Coser (Harcourt, Brace, Jovanovich, 1975)) points to an analogous model involving selection among successive social states. The model pictures social change as an absorbing Markov process – which for the present purposes may be summarized by saying that institutions undergo continuous change until they arrive in a state in which there is no pressure for further change (the "absorbing state"). This view could be used as a basis for functional explanation, with the modification that it would explain social states in terms of the absence of destabilizing consequences rather than through the presence of stabilizing ones. I would argue, however, that – unlike the biological case – there are no reasons for thinking that this adaptive process would ever catch up with the changing social environment.
8. A radically different account of functional explanation is offered by G.A. Cohen, *Karl Marx's Theory of History* (Oxford University Press, 1978). He argues that functional explanations can be sustained by *consequence laws*, of the form "Whenever x would have favourable consequences for y, then x appears." If a law of this form is established, we may affirm that x is explained by its favorable consequences for y, even if no mechanism is indicated (although Cohen asserts that some mechanism must indeed exist). To the (partially misguided) objections to this idea stated in my review of his book in *Political Studies* (note 5 above), I now would like to add the following. First, x and the y-enhancing effect of x might both be effects of some third factor z, and thus related by spurious correlation. Second, the definition of a consequence law is vitiated by the imprecise way in which the time dimension is brought in. The law could in fact be vacuously confirmed by suitably ignoring short-term in favor of long-term consequences.

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9. "Social Conflict and the Theory of Social Change," in *Conflict Resolution: Contributions of the Behavioral Sciences*, ed. C.G. Smith (University of Notre Dame Press, 1971), 60.
10. "What's Wrong with the New Institutional Economics" (Mimeograph, Department of Economics, Stanford University, 1979).
11. *Economic Analysis of the Law* (Little, Brown, 1977), 106. Italics added, parentheses deleted.
12. R.K. Merton, *Social Theory and Social Structure*, rev. ed. (Free Press, 1957), 30 ff.
13. P. Bourdieu, *La Distinction* (Paris: Editions de Minuit, 1979), 285. For a critical discussion of this inverted sociodicy, which proceeds from the assumption that all is for the worst in the worst of all possible worlds, see my review in *London Review of Books*, 5–18 November 1981.
14. I counted 15 occurrences of this phrase in *La Distinction*.
15. M. Scheler, *Ressentiment* (Schocken, 1972), 52.
16. *Theories of Surplus-Value*, 3 vols. (Moscow: Progress, 1963–71), 1, 287.
17. "You know my admiration for Leibniz" (Marx to Engels, 10 May 1870). For the structure of Leibniz's philosophy of history, see Ch. VI of my *Leibniz et la Formation de l'Esprit Capitaliste* (Paris: Aubier-Montaigne, 1975).
18. The manuscript consists of 23 notebooks, of which books 6 to 15 were published by Kautsky as *Theories of Surplus-Value*. Books 1 to 5 and 16 to 18 have recently been published in the new *Marx-Engels Gesamt-Ausgabe*, and the remaining will soon be available in the same edition. Just as Marx's *Grundrisse* testify to the influence of Hegel's *Logic*, these manuscripts bear witness to the influence of Hegel's philosophy of history.
19. *Theories of Surplus-Value*, 3, 422–23.
20. *Marx-Engels Gesamt-Ausgabe*, Zweite Abteilung, Band 3, Teil 1 (Berlin: Dietz, 1976), 173.
21. *Ibid.*, 327. The verse is also quoted in Marx's article on "The British Rule in India" (*New York Daily Tribune*, 25 June 1853) and, in a more ironic vein, in *Neue Oder Zeitung*, 20 January 1855.
22. *Capital*, 3 vols. (International Publishers, 1967), 3, 600–1. For the distinction between short-term and long-term functionalism in Marxism, see also Roemer, *Analytical Foundations*, 9.
23. For surveys, see B. Jessop, "Recent Theories of the Capitalist State," *Cambridge Journal of Economics* 1 (1977), 353–74 and the Introduction to J. Holloway and S. Picciotta, eds., *State and Capital* (London: Edward Arnold, 1978). I should mention here that by "corporate body" I mean something different from what is later referred to as a "collective actor". The former refers to a juristic person, or more broadly to any kind of formal organization with a single decision-making center. The latter is defined below as any group of individuals who are able, by solidarity or enlightened self-interest, to overcome the free-rider problem. Another way of overcoming it is to create a corporate body with legal or effective power to keep individual members in line, but in the discussion below I mostly limit myself to cooperation emerging by tacit coordination.
24. *New York Daily Tribune*, 25 August 1852.
25. "The Eighteenth Brumaire of Louis Bonaparte," in Marx and Engels, *Collected Works* (Lawrence and Wishart, 1979), 143.
26. De Tocqueville, in *Democracy in America*, distinguishes both between the transitional effects of democratization and the steady-state effects of democracy; and between the inefficient use of resources and the efficient creation of resources that are both inherent in democracy as a going concern. For details, see Ch. 1 of my *Explaining Technical Change*.
27. *Class Struggle and the Industrial Revolution* (Methuen, 1974), 15. Thus Marxist functionalism explains the institutional arrangements of feudalism in terms of their favorable consequences for the surplus product, whereas non-Marxist functionalists such as D. North and R.P. Thomas (*The Rise of the Western World* (Cambridge University Press, 1973)) explain the same arrangements in terms of their favorable consequences for total product.
28. "The Moral Economy of the English Crowd in the Eighteenth Century," *Past and Present* 50 (1971), 120.
29. For an analysis of this fallacy, see my *Logic and Society*, 118 ff.
30. Stark examples include W.J. Chambliss, "The Political Economy of Crime: A Comparative Study of Nigeria and the USA," in *Critical Criminology*, ed. I. Taylor, et al. (Routledge and Kegan Paul, 1975), and W.J. Chambliss and T.E. Ryther, *Sociology: The Discipline and Its Direction* (McGraw-Hill, 1975), 348. The closely related Radical approach is exemplified by M. Foucault, *Surveiller et Punir* (Paris: Gallimard, 1975), 277 and *passim*.

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31. S. Bowles and H. Gintis, *Schooling in Capitalist America* (Routledge and Kegan Paul, 1976), e.g., 103, 114, and 130 features many such examples. In the same vein is also M. Levitas, *Marxist Perspectives in the Sociology of Education* (Routledge and Kegan Paul, 1974). A Radical version is that of P. Bourdieu and J.-C. Passeron, *La Reproduction* (Paris: Editions de Minuit, 1970), e.g., 159.
32. H. Bowles and S. Gintis, "The Marxian Theory of Value and Heterogeneous Labour: a Critique and Reformulation," *Cambridge Journal of Economics* 1 (1977), 173–92; J. Roemer, "Divide and Conquer: Microfoundations of a Marxian Theory of Wage Discrimination," *Bell Journal of Economics* 10 (1979), 695–705. The fallacy involved in both these articles is the belief that because internal cleavages in the working class benefit capitalist class domination, they are to be explained in terms of this benefit. This, however, is to confuse what Simmel (*Soziologie* (Berlin: Dunker und Humblot, 1908), 76 ff.) referred to as, respectively, *tertius gaudens* and *divide et impera*. Third parties may benefit from a struggle even when they have not been instrumental in setting it up.
33. As Jessop, "Recent Theories," 364, characterizes the "capital logic" school.
34. Introduction to Holloway and Picciotta, 12, characterizing Yaffe's work.
35. E.O. Wright, *Class, Crisis and the State* (New Left Books, 1978), 231.
36. M. Kalecki, "Political Aspects of Full Employment," in *Selected Essays on the Dynamics of the Capitalist Economy* (Cambridge University Press, 1971), 139–41.
37. "And for the sake of life to sacrifice life's only end" (Juvenal), quoted by Marx in *Neue Oder Zeitung*, 12 June 1855.
38. A. Bhaduri, "A Study in Agricultural Backwardness under Semi-Feudalism," *Economic Journal* 83 (1973), 120–37 and "On the Formation of Usurious Interest Rates in Backward Agriculture," *Cambridge Journal of Economics* 1 (1977), 341–52.
39. R. Rosdolsky, *Zur Entstehungsgeschichte des Marxschen "Kapital"* (Frankfurt: Europäische Verlagsanstalt, 1968, 61–71), refers to the passages (mainly in the *Grundrisse*) where Marx develops the concept of "capital in general."
40. For a survey of alternatives to intentional design, see P. Van Parijs.
41. *The Fiscal Crisis of the State* (St. Martin's, 1973), 69–70. Closely related explanations of the welfare state are given in J. Hirsch, *Staatsapparat und Reproduktion des Kapitals* (Frankfurt: Suhrkamp, 1974), 54 and N. Poulantzas, *Pouvoir Politique et Classes Sociales* (Paris: Maspero, 1968), 310.
42. Van Parijs, passim; also *Ulysses and the Sirens*, Ch. I.
43. A standard treatment is R.D. Luce and H. Raiffa, *Games and Decisions* (Wiley, 1957). Some nonstandard problems are raised in *Ulysses and the Sirens*, especially Ch. 3.
44. For an elaboration of my critique of structuralism and role theory, see *Ulysses and the Sirens*, Ch. III.1 and III.6.
45. This could be part of what Marx meant by his statement in the *Communist Manifesto*: "In place of the old bourgeois society, with its classes and class antagonism, we shall have an association in which the free development for each is the condition for the free development of all." (Another possible reading is indicated in the next note.) If "each" and "all" are transposed in this passage, a more adequate expression occurs. Proper understanding of the philosophical anthropology behind this statement presupposes the idea that even for the single individual, the free development of all faculties is the condition for the free development of each faculty (*The German Ideology*, in Marx and Engels, *Collected Works* (Lawrence and Wishart, 1976), 5, 262). The freely-developed person is both a totality of freely-developed faculties and part of a totality of freely-developed persons. Hypertrophy is atrophy, in the individual and in society.
46. A fourth kind of independence falls outside game theory, however. It can be summed up by saying that the *preferences of each depend on the actions of all*, by socialization and more invidious mechanisms such as conformism, "sour grapes," etc. Game theory takes preferences as given, and has nothing to offer concerning preference formation. The transformation of a Prisoners' Dilemma into an Assurance Game (see below) must be explained by social psychology, not by game theory. We can explain behavior intentionally in terms of preferences, but the latter themselves are to be explained causally.
47. For n-person versions of some of the games discussed here, see A. Sen, "Isolation, Assurance and the Social Rate of Discount," *Quarterly Journal of Economics* 80 (1967) 112–24. For a treatment of heterogeneous preferences in n-person games, see the brilliant framework developed by T.S. Schelling, *Micromotives and Macrobehavior* (Norton, 1978).
48. The most general analysis, permitting overlapping coalitions, is J. Harsanyi, *Rational Behavior and Bargaining Equilibrium in Games and Social Situations* (Cambridge University Press, 1977). The economic theory of the core is made easily accessible by

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W. Hildebrand and A.P. Kirman, *Introduction to Equilibrium Theory* (Amsterdam: North-Holland, 1976). Applications to ethics include John Roemer, *A General Theory of Exploitation and Class*, forthcoming from Harvard University Press, and Roger Howe and John Roemer, "Rawlsian Justice as the Core of a Game," forthcoming in the *American Economic Review*.

49. *The Logic of Collective Action* (Harvard University Press, 1965), Ch. 4.
50. For a more fine-grained typology, see A. Rapoport, M.J. Guyer, and D.G. Gordon, *The 2x2 Game* (University of Michican Press, 1976). For other discussions of the relation among the preference structures analyzed here, see S.-C. Kolm, "Altruismes et Efficacités," *Social Science Information* 20 (1981), 293–344; and R. van der Veen, "Meta-Rankings and Collective Optimality," *Social Science Information* 20 (1981), 345–74.
51. For a brief discussion of some mixed cases, see my "Introduction" to the articles by Kolm and van der Veen cited in the preceding note. See also Schelling.
52. A. Sen, *On Economic Inequality* (Oxford University Press, 1973), Ch. 4.
53. The point is that acting unilaterally on the Categorical Imperative may be downright unethical. A striking example could be unilateral disarmament, if the situation is such that other countries will rush in to fill the power vacuum. Instead of acting in a way that would lead to good results *if* everyone else did the same, one should act to promote the good on realistic assumptions about what others are likely to do. A little morality, like a little rationality, may be a dangerous thing. There is room and need for a "moral theory of the second best," corresponding to the economic theory of the second best which shows that if out of n conditions for an economic optimum, one is not fulfilled, the optimum may be more closely approached if additional conditions are violated. (R.G. Lipset and K. Lancaster, "The Economic Theory of Second Best," *Review of Economic Studies*, XXIV (1957–8), 133–62.)
54. C. Taylor, "Interpretation and the Sciences of Man," *Review of Metaphysics* 25 (1971), 31.
55. *Ibid.*, 31–32.
56. J.-P. Sartre, *Critique de la Raison Dialectique* (Paris: Gallimard, 1960), 417, 404 ff.
57. A. Stinchcombe, *Theoretical Methods in Social History* (Academic Press, 1978), 54.
58. *Ibid.*, 41.
59. Olson, 106.
60. For details about this game (often called "Chicken" after a well-known ritual of American juvenile culture), see A. Rapoport, *Two-Person Game Theory* (University of Michigan Press, 1966), 140 ff.
61. Luce and Raiffa, 107.
62. I am indebted to Ulf Torgersen for this observation. See also A. Stinchcombe, *Constructing Social Theories* (Harcourt, Brace and World, 1968), 157 for a discussion and some further references.
63. Olson, 29–30.
64. For the general theory of supergames, see M. Taylor, *Anarchy and Cooperation* (Wiley, 1976). For applications to competition and cooperation among firms, see M. Friedman, *Oligopoly and the Theory of Games* (Amsterdam: North-Holland, 1977).
65. "New Deal, Old Game: Competition and Collective Action among American Capitalists, 1925–1934" (unpublished manuscript, University of Chicago, Department of Political Science, 1979).
66. "The Labor Theory of Value," *Marxist Perspectives* 3 (1978), 70–101.
67. A. Coddington, *Theories of the Bargaining Process* (Allen and Unwin, 1968), 58 ff.
68. For surveys, see Coddington, and the articles collected in *Bargaining*, ed. O. Young (University of Illinois Press, 1975).
69. For a full explanation, see Harsanyi.
70. The rewards are measured in cardinal utilities, which are constructed from the individual's preferences over alternatives some of which may be lotteries (Luce and Raiffa, Ch. 2). This lends great importance to the attitude toward risk-taking; and typically the rich will be less risk-averse than the poor.
71. Perhaps Marx had something like this in mind when he wrote that in some forms of international trade, the "richer country exploits the poorer one, even where the latter gains by the exchange" (*Theories of Surplus-Value*, 3, 106).
72. This requirement could be defended either on utilitarian grounds, because the poor generally will get more utility out of a given increase in income, or on the grounds of the "difference principle" (J. Rawls, *A Theory of Justice* (Harvard University Press, 1971)), stating that one should maximize the welfare of the least-advantaged.
73. "Relative loss" means the difference between demand and offer, divided by the demand. "Concession" means making a new demand that gives one's opponent the smallest relative loss.

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74. K. Lancaster, "The Dynamic Inefficiency of Capitalism," *Journal of Political Economy* 81 (1973), 1092–1109. Further developments of the model include M. Hoel, "Distribution and Growth as a Differential Game Between Workers and Capitalists," *International Economic Review* 19 (1978), 335–50; and, importantly, A. Przeworski and M. Wallerstein, "The Structure of Class Conflict in Advanced Capitalist Societies," Paper Presented at the Annual Meeting of the American Political Science Association, August 1980.
75. These limits are required for the game to have a solution, but they may be arbitrarily close to = and 100% respectively, and hence do not restrict the model in any substantial manner.
76. "Rules Rather than Discretion: The Inconsistency of Optimal Plans," *Journal of Political Economy* 85 (1977), 473–92.
77. L. Kolakowski (*Main Currents of Marxism* (Oxford University Press, 1978), 3 vols., 1, 333) defines exploitation in terms of the "exclusive powers of decision" held by the capitalist. Similarly, E.O. Wright in various works (e.g., *Class Structure and Income Determination* (Academic Press, 1979), 14 ff.) adds authority to surplus extraction as a component of exploitation and class. John Roemer (*A General Theory of Exploitation and Class*) takes the more orthodox line that the lack of power over economic decisions is distinct from exploitation.
78. It should be observed at this point that even the Marxists who accept that authority relations are a component of class restrict themselves to intra-firm relations of command and subordination, whereas Dahrendorf extends the notion to include authority relations in any organization.
79. Roemer also argues, more ambitiously, that exploitation can be *defined* in terms of hypothetical alternatives. In my contribution to a symposium on Roemer's work (forthcoming in *Politics and Society*) I argue that this proposal has counter-intuitive consequences. It remains true that important cases of exploitation can be (non-definitionally) characterized in the way he proposes.
80. "Ownership and the Production Function," *Quarterly Journal of Economics* 80 (1967), 88–111.

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