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# Property rights, asset specificity, and the division of labour under alternative capitalist relations

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# PROPERTY RIGHTS, ASSET SPECIFICITY, AND THE DIVISION OF LABOUR UNDER ALTERNATIVE CAPITALIST RELATIONS[1].

## Introduction.

The relationship between property rights and the organization of work has been one of the fundamental issues examined in the "New Institutional Literature" ([2]) and in the "Labour Process Literature" ([3]). The variety and the complexity of the contributions present in both streams of the literature makes it difficult and imprecise any definition of the general characteristics which may distinguish one set of writers from the other. Nevertheless, in my opinion, it can be said that one important difference lies in a evaluation of the relative importance of the causal relationships existing between property rights and the organization of work. The New Institutional Literature has emphasized one direction of causality, that running from the needs of an efficient organization of work to the formation of an adequate structure of property rights and of governance. By contrast, the Labour Process Literature has emphasized the opposite direction of causality pointing out how the property rights and the other institutions which define an economic system shape the organization of work and the technology of that system.

Consider the following question: does the often very detailed and hierarchical division of labour, which characterizes many firms under capitalism, exist because of transaction cost and technological efficiency or because of capitalism?

The New Institutional Literature has provided arguments supporting the first possibility. Here, capitalist property rights and the hierarchical division of labour are considered as an

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[1]. This paper is a substantially revised and enlarged version of Pagano (1988) which was presented at the Workshop on Economics and Institutions of the International School of Economic Research held at the Certosa di Pontignano ( University of Siena) in July 1988. I wish to thank the other participants to the workshop for their comments and, in particular, Sam Bowles, Robert Clower, Marcello De Cecco, Axel Leijounfuld, Edmund Phelps, Robert Rowthorn and Herbert Simon. I have also received additional useful comments by Partha Dasgupta, Ernst Fehr, G. C. Harcourt, Geoffrey M. Hodgson, R. Ramana and Frank Wilkinson and two anonymous referees of the Cambridge Journal. The responsibility for any mistake is only mine.

[2]. The most complete exposition of the New Institutional Literature is Williamson (1985). Useful Readers are Putterman (1986), which also includes some contributions of the Labour Process Literature, and Langlois (1986). The New Institutional Literature is usually defined to include what are sometimes called the Transaction Costs and the Property Rights Literature. Important contributions are Coase (1952), Demsetz (1967), Alchian and Demsetz (1972), Posner (1973), North and Thomas (1973), North (1981) and Alchian (1987).

[3]. The recent Labour Process Literature stems from Marx analysis of the factory system and starts with Braverman (1974) and Marglin (1974). It includes Edwards (1982), Littler (1982), Wood (1982), and Bowles and Gintis (1983) and (1986). Useful introductions to this stream of the Literature are Thompson (1983) and the first two chapters of Sawyer (1989). Pagano (1990b) provides a short evaluation of Braverman' s contribution.

endogenous outcome of the necessities of transaction and technological efficiency. By contrast the Labour Process Literature has given reasons and considered numerous historical cases providing evidence for the second possibility: that exogenously given (capitalist) property rights dictate a technology and a division of labour which has very little to do with the dictates of efficiency.

The main object of this paper is to deal with this particular instance of the relationship among property rights, division of labour and technology. Still, an attempt will also be made to make more general observations about the relationship itself and it may be useful to emphasize immediately that the two different approaches outlined above arise in many other instances and cut across the traditional divisions between Marxian and Neo-Classical Economics ([4]).

The first section of this paper examines the principles of the division of labour which should be applied to obtain an optimum organization of work. These are the Gioia-Babbage, the Smithian and the Workers Preferences principles. Here it is shown that the Babbage principle provides a powerful explanation for the existence of hierarchies and a strong argument for their relative efficiency. By contrast the Smithian and the Workers Preferences principles imply that less hierarchical and possibly more democratic forms of organization could be advantageous. However, an "optimal" division of labour would require that the effects of all the principles considered should be taken into account.

The second section examines the effects of exogenously given capitalist property rights on the division of labour. This examination is close to the spirit of the Labour Process Literature. It tries to show how capitalist property rights do have an important influence in explaining the nature of the division of labour of the firm under capitalism and its possible departure from the optimal division of labour examined in the first section. However, the analysis utilizes one concept developed in the New Institutional Literature: the concept of asset-specificity or of assets which can be deployed in other organizations only at substantial costs. The concept of asset-specificity plays an important role in the claim that the organization of work may be inefficient under capitalism because of an underapplication of the Smithian and Workers' Preferences principles and of an overapplication of the Babbage principle. Another inefficiency of "classical" capitalism is shown to lie in the existence under that system of the Ure-Marx effect - that is the tendency to invest more in physical than in human capital and a bias to choose machines requiring little firm-specific human skill for their operation.

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[4]. Indeed Neo-Classical Economics has usually assumed exogenously given property rights. On the other hand the recent work by Coase, Alchian and Demsetz (see note 1) has attempted to use the powerful neo-classical theory of externalities to study the implications of technological changes on property rights. This approach, enriched by some elements of the Marxian tradition, has been developed and used by North (1981) to provide a framework for the interpretation of history. The co-existence (and the conflict) of these two approaches within the Marxian tradition is striking. For, Marx himself provides ( but does not integrate) the outlines of both theories. On one hand the development of technology is seen as the ultimate cause for the change of property relations. On the other hand property relations (influenced, in turn by class struggle) influence the development of technology. To my knowledge, the best case for the first theory is provided by Cohen (1978), whereas the best illustration for the second theory can be found in Brenner (1986) and his contributions in Aston and Philpin eds.(1988) The Brenner Debate. Roemer (1988,chap.8) provides a useful introductory survey.

We consider in the third section a New Institutional Literature argument: that inefficiencies such as those examined in the second section would generate endogenously new property rights and/or governance structures which would tend to eliminate these inefficiencies. This argument is criticized by showing that, in spite of their inefficiencies, the property rights of "classical" capitalism can be self-sustaining. Factors contributing to the institutional stability and factors contributing to the institutional instability of "classical capitalism" are also examined in this section.

Finally, in the last section we consider two alternative forms of capitalist property rights which may offer some solution to the problems which have such an unsatisfactory solution under "classical capitalism". Comparing them with "classical capitalism" allows a better evaluation of the factors determining the institutional stability of these systems. In particular a result of this analysis is that the market itself, far from being a neutral environment where efficient institutions necessarily evolve, is an institution the survival and stability of which is itself dependent on the existence of the institutions which it is supposed to select.

## 1. The principles of the "optimal" division of labour.

The existence of hierarchical firms characterized by an authoritarian organization of work and a detailed division of labour can be explained by the following principle formulated by Charles Babbage ([5]) in 1832:

"That the master manufacturer, by dividing the work to be executed into different processes, each requiring different degrees of skills or force, can purchase exactly that precise quantity of both which is necessary for each process; whereas, if the whole work were executed by one workman, that person must possess sufficient skill to perform the most difficult, and sufficient strength to execute the most laborious, of the operations in which that art is divided."(Babbage, 1832 pp.137-8).

After discovering independently this principle, Babbage generously acknowledged that he had been anticipated by Melchiorre Gioia (1815). However, there is a difference between the two formulations: whereas Babbage refers to the advantages of the division of labour for a cost-minimising "master manufacturer", Gioia considers the same advantages for a rational society taken as a whole. Indeed one could speak of a joint Gioia-Babbage principle which illustrates the very same advantages of the division of labour occuring for society and for a cost-minimising employer: thus, following its own self interest, the latter happens to do what is in the interest of the former. In both cases these advantages are due to the principles of comparative advantage and of the minimization of learning time.

The division of labour entails the exploitation of the principle of comparative advantage because it allows each individual to perform only that activity in which she is comparatively more

[5]. The Babbage principle was extensively used by Marx ( vol 1, 1967) and has had a central role in Braverman (1974) analysis of labour process. Leijonhufuld (1986) contains also a clear exposition of what is described in the present paper as the Gioia-Babbage principle which Leijonhufvud calls (in my opinion, misleadingly) the "efficient, Smithian technology" (p. 221).

gifted. More important, the division of labour also implies a dramatic saving of training time. If each worker is performing all the tasks necessary for a certain productive process , it also becomes necessary that each worker learn all these tasks. By contrast if a very detailed division of labour happens to be introduced, and each worker is assigned only one task, then she obviously has to learn only that task. In other words, the Babbage principle indicates that a very detailed division of labour minimises training time; productivity is increased by the simple fact that, since less time is required for learning, more time is spent on producing useful goods. Productivity can be increased up to the point where all jobs imply performing only one task, require the minimum amount of learning and entail the full exploitation of the principle of comparative advantage . (See point (i) of the Appendix)

The Gioia-Babbage principle therefore indicates the efficiency of a fairly rigid hierarchy. It suggests that only a few people should be assigned to the more skilled jobs and the other workers to the less skilled, or completely unskilled jobs.

It also suggests that the planning, co-ordination, monitoring and, in general, the management tasks should be separated from the other activities. The separation of the management of tasks from their execution would allow a remarkable saving of training time. Only a few people would then have to learn these management activities, and the large majority of people simply learn how to execute what they are being told to do.

Braverman (1974) pointed out how the three main principles of Taylor's "scientific management" implied respectively the dissociation of the labour process from the skills of the workers, the separation of conception from execution, and the use of management's knowledge of the productive process to plan and control each step of the productive process. In this respect "Taylorism" can be considered as a detailed set of corollaries of the Gioia-Babbage principle.

In other words, the Gioia-Babbage principle gives powerful reasons for the relative efficiency of an authoritarian and detailed division of labour. It offers a normative justification for the hierarchical structure of the firm: hierarchies increase productivity, and therefore human welfare, because they save on the learning necessary to acquire new skills and use more efficiently given skills because of the principle of comparative advantage. In the opinion of the present writer the recently popular question - why do firms' hierarchies exist? - has already found in the Gioia-Babbage principle one of its most convincing answers ([6]). Entrepreneurs had an incentive to

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[6]. The literature inspired by Coase's (1952) famous article on the nature of the firm explains its existence by referring to the market transaction costs that would otherwise arise if the firm did not exist. The Gioia-Babbage principle seems to imply that firms may well exist even if market transaction costs were equal to zero. For, even in this case, somebody managing other people, who execute his commands, can be cheaper than each person managing himself and executing the commands conceived by himself. In other words, the Gioia-Babbage principle seems to imply that specialization in command giving and taking is advantageous independently of any positive market transaction costs argument. This would seem to support Demsetz' s (1988) idea that increasing returns to management are a sufficient explanation for the existence of firms and they can also arise in an ideal situation of zero market transaction costs. However, a possible objection to this argument is that, in a world of zero transaction costs, commands could themselves be traded and managers could even be hired by workers as consultants. Still, in order for the workers to buy commands, they should engage in some form of costly evaluation of the commands themselves which would violate the Gioia-Babbage principle. If the resources expended in the evaluation of commands are defined as market transaction costs, then it can

organize hierarchical firms characterized by a very detailed division of labour because it minimized their costs. And this also happened to maximize the welfare of society.

I wish now to consider an alternative mechanism by which the division of labour can influence productivity and welfare. This mechanism was spelt out by Adam Smith and happens to be so well known that it may seem inappropriate to spend time on it. Nevertheless, I feel that this is necessary because it is often confused with the Gioia-Babbage principle whereas there is a substantial difference between the two.

The first difference between the Smithian and the Gioia-Babbage principles is that Smith considers the difference in skills more a consequence than a cause of the division of labour. From the Smithian point of view there is little comparative advantage to be exploited before the introduction of the division of labour. For the differences in skills arise as a consequence of the introduction of the division of labour.

The second and more important difference can only be understood after re-examining the famous Smithian principles of the division of labour. According to Smith, improved dexterity, saving of time otherwise spent on changing occupation, and invention of machines by workmen are the main reasons why the division of labour improves productivity and welfare. These principles can be summarized by stating that each worker, by specializing in particular activities, acquires better job specific skills than would be the case if he were performing a more numerous set of tasks. The more a worker performs a particular activity the more he learns that activity and therefore his productivity also increases. The division of labour increases productivity because it aids a process of learning by doing.

We can now try to compare the Smithian and the Gioia-Babbage principles.

Smith emphasizes the advantages of the division of labour due to a better acquisition of new skills, whereas Gioia and Babbage concentrate on its advantages due to an optimal utilization of given skills. Babbage and Gioia say that the division of labour increases productivity because it minimises the amount of learning which is required for doing. Smith says that the division of labour increases productivity because it maximizes the amount of learning acquired by doing. Or, to put it in another way, for Babbage and Gioia the learning necessary for the doing is minimized whereas for Smith the learning due to the doing is maximized.

The distribution, over time, of the benefits of the Gioia-Babbage and Smith principles is different. The first occur immediately by reducing the training time spent on the workers. The second take more time. They occur after that the workers have acquired additional skills because of the learning by doing process.

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still be maintained that firms exist because of market transaction costs. A discussion of the ambiguities contained in the definition of market transaction costs can be found in Dow (1987) and chapter 9 of Hodgson (1988).

A limit to the traditional transaction costs explanation of the existence of the firm is that it has concentrated its attention on the information and enforcement costs which can be observed in a situation of market equilibrium. Pagano (1990a) tries to show that "disequilibrium transaction costs" are very important to explain the relative advantages and the existence of firms.

We cannot rule out a priori the fact that the same particular division of labour may optimise the use of both principles. Or that the division of labour which minimizes the learning required before doing, also happens to be the one which maximizes learning by doing. But there are good reasons to believe that this is not the case and that the overall optimization problem of productivity over time often involves some compromise between the degrees of specialization suggested by the Gioia-Babbage and the Smithian principles.

Indeed, there are good reasons to believe that the Smithian principles involve a less detailed division of labour than that which the Gioia-Babbage principle does. A very detailed division of labour may minimise the learning required for doing certain activities, but it may also inhibit the future advantages to be gained from the learning by doing process. In this case enlarging the job may be a way of exploiting the Smithian advantages. This may be convenient even if there is some loss of the Gioia-Babbage benefits. Enlarging a job, which is specialized on the basis of the Gioia-Babbage principle, may imply that the worker can acquire a greater understanding of how some tasks are linked together and, therefore, can learn by doing to reorganise these tasks more efficiently. (See point (ii) of the Appendix). This enlargement of the job may require much more preliminary knowledge of the productive process than that which is implied in the Gioia-Babbage principle. Still, the Smithian dynamic benefits of having a less detailed division of labour can be greater than the additional training costs.

Moreover, the Smithian principles do not seem to imply that a rigid separation of planning and co-ordination from execution activities is necessarily beneficial. Executing a job without understanding the reasons and the purposes for which it is performed is likely to be more an obstacle than an advantage for the learning by doing process.

To conclude, choosing a very detailed division of labour on lines of Gioia and Babbage may imply foregoing some of the future learning by doing advantages for the immediate minimum learning benefits.

Smith and Gioia-Babbage principles suggest two ways by which the division of labour can increase human welfare. In both cases the intermediate step is given by the effects of the division of labour on (the present or future) productivity of work. But the division of labour and, in general, the organisation of work does also directly influence human welfare. Workers are usually not indifferent to the different types of jobs which they perform nor to the type of organization for which they work . This simple fact is obviously very important. However, it has been usually ignored by orthodox economists, who have assumed that the only arguments of the utility functions are consumption goods and leisure and that work affects utility only indirectly either because of the products of work or as forgone leisure ([7]). When the preferences of the workers for their own work are taken into account, increases in the productivity of work do not necessarily imply higher welfare. The increase in welfare obtained by increases in the productivity of work may be offset by

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[7]. There are, however, remarkable exceptions in the history of the classical and neo-classical schools. Marx had an original position on this point because he believed that workers' preferences were important for the construction of the future society but irrelevant for understanding the economic institutions of Capitalism. On this see Pagano (1985).

the decrease in welfare due to an increase in the disutility of work. Narrow jobs, organized on the basis of the Gioia-Babbage principles, may well imply an increase of the disutility of work greater than the increase of utility due to the increase of the product of work obtained by an application of these principles (Pagano, 1985).

Two consequences of taking workers' preferences into account (or the "workers' preferences principle") are here important. First, the workers may rather enjoy the process of learning by doing and the necessary preliminary learning so that the workers' preferences principle may imply that the division of labour should be less detailed than even a joint application of the Gioia-Babbage and Smithian principles suggests. Secondly, the workers may prefer a greater variety of activities and participation to management decisions than it is implied by these principles.(See point (iii) of the Appendix). These consequences of the workers preferences may hold even when they come together with a lower productivity and a lower level of consumption.

In general, an optimal division of labour should take into account the effects of the Gioia-Babbage principles on present productivity and of the Smithian principles on future productivity as well as the effects that the division of labour has on the disutility of work because of the Workers Preferences principle. Giving different weights to these principles implies a different division of labour and organization of work. A greater weight given to the Gioia-Babbage principle implies a more authoritarian and detailed division of labour and the existence of rigid hierarchies. By contrast, a greater weight given to the Smithian and workers' preferences principles imply a less detailed division of labour and less hierarchical and more democratic organization of work. (See point (IV) of the Appendix). The purpose of the next section is to examine the influence of the property rights, defining a "classical" capitalist system, on the weight given to the application of each one of these principles.

## 2. Asset specificity and "classical" capitalism.

A claim advanced in some of the works of the labour process literature is that capitalism has degraded and deskilled work introducing an undesirable division of labour. In particular, in his book Labour and Monopoly Capital (1974), Braverman argued that there is empirical evidence to support this claim. The extent and the validity of the de-skilling tendency has, however, been questioned by other contributions, which have appeared in this stream of the literature ([8]).

The purpose of the present paper is not to deal with whether or not there is empirical evidence to support this thesis. Instead I will try to advance a different view point: one can give a

[8]. In particular Edwards (1979) has observed that skilling and de-skilling occur simultaneously for different groups of workers so that the overall tendency is not clear. This point emerges also from the contributions contained in Wood (1982). For an introduction to the debates concerning Braverman' s de-skilling thesis see Thompson (1982), Sawyer (1989) and Pagano (1990a).

definition of the property rights defining "classical capitalism" which, in my opinion catches rather well some aspects of the capitalist societies of the past and also, perhaps, some characteristics of some of the contemporary capitalist societies. Then, it is possible to show that this particular set of property rights defining "classical capitalism" is likely to bring about institutions characterized by some of the features described by Braverman, in particular, firms characterized by an undesirably hierarchical and detailed division of labour. This division of labour cannot be justified by technological or transaction efficiency alone but must be seen through the constraints posed by the property rights system of a "classical" capitalist society.

In order to maintain that the property rights system of "classical" capitalism produces an undesirably hierarchical and detailed division of labour, I will try to show that this system brings about an overapplication of the Gioia-Babbage principle and an underapplication of the Smithian and workers' preferences principle (see point IV of the Appendix) . This claim is not meant to imply that the Smithian and workers' preferences principles do not have any role under capitalism but instead to point out that they have less influence than they would if the system was not constrained by capitalist property rights.

The property rights of "classical" capitalism are here simply defined by the fact that, under this system, all the agents own their labour power and it is possible for some agents to hire and fire labour power of other agents. On the one hand, this differentiates capitalism from slavery or a feudal system, where the agents are allowed to have all or some property rights on the labour power of other individuals. On the other hand, the possibility of hiring and firing labour power differentiates capitalism from systems where people can only work for an organization if they are given some property rights in the organization itself. In fact the typical capitalist firm is characterized by the fact that the firm does not have any property rights on the worker and the worker, in turn does not have any property rights on the firm and/or her job.

I will now use one of the fundamental concepts developed by the New Institutional Literature: the concept of asset- specificity, or the concept of assets specific to certain organizations or firms, which cannot be redeployed somewhere else without substantial losses. In situations characterized by uncertainty, bounded rationality and goal incongruence or opportunism ([9]), market relations cannot cope with asset- specificity. For, in cases of unforeseen events, not well specified in market contracts because of bounded rationality, each agent cannot defend himself against the opportunism of other agents by changing trading partner at a low cost. This implies that transactions to be supported by asset-specific investment may not take place in the absence of a governance structure or of a redefiniton of property rights. Instead, there will be a tendency to use transactions which do not involve any asset-specificity and are supported by general purpose assets. In other

[9]. Some of these concepts have a particular meaning in New Institutional Economics and, in particular, in the often "book-specific" terminology used by Williamson (1985). Bounded rationality is mainly related by Williamson to the human incapacity of dealing with the future by writing complete contingent contracts and is not grounded in the more fundamental concept of limited computational capacity considered by Herbert Simon. On this point see Hodgson (1989). The fundamental meaning of opportunism in Williamson is the tendency of the agents to interpret and exploit necessarily incomplete market contracts to their own advantage. A discussion of the role of opportunism in transaction cost economics is contained in Hodgson (1988) and Langlois (1984).

words the asset- specificity problem arises because, under the existing property rights, some transactions generate externalities which make it difficult or impossible to carry out the transactions themselves. This is because they involve the development of assets over which property rights are ill defined ([10]).

It is easy to see that the application of the Gioia-Babbage principle does not involve the creation but rather the elimination of elements of asset-specificity. Consider, for example, that some of the learning which is necessary for production is likely to be specific to a particular organisation and, therefore, involves investment in human capital specific to that organization. Then, the application of the Gioia-Babbage principle, which implies the minimisation of all the learning necessary for the doing, also involves the minimisation of this organisational specific learning. In other words, the very detailed and hierarchical division of labour implied by the Gioia-Babbage principle is usually the means by which the asset-specificity problem can be suppressed.

Let us now consider the effects on the creation of asset specificity of the Smithian principles which, as already pointed out, rely on the maximisation of learning by doing. First, some of the additional preliminary learning which may be required for enjoying their advantages may happen to be firm-specific. Secondly, a great deal of the learning acquired by doing, is also likely to be specific to the organisation itself and not redemployable in other firms. Thus, contrary to the Gioia-Babbage principles the Smithian principles involve the creation of assets which are specific to the particular organization where they happen to be applied.

Finally, let us consider the "workers' preferences principle". Insofar as the workers would prefer a division of labour where they enjoy the process of learning by doing, this may simply accentuate the problem posed by the application of Smithian principles. This is because learning by doing which is partially firm-specific, will have to be more than that which is implied by the Smithian principles. Moreover, insofar as workers wish to acquire knowledge and to participate in the organisation's decisions, this involves an additional investment which is also clearly firm-specific. Finally, taking account of workers' preferences involves changes in the work environment which may imply expenditure on certain durable assets. These durable assets may have a strong element of firm-specificity. They may turn out to be valuable for the workers employed during the current period but prove less valuable for the workers joining the firm in the future. In other words they may not be redemployable for other workers at low cost.

Indeed, the "workers' preferences principle" may also find little application under capitalism. The workers may have very little incentive to make their working environment more pleasurable. This is because they know that the effort spent on, or the income forgone in, improving the organizational environment may be lost if they happen to be fired. The employers also may be little

[10]. The concept of asset-specificity is usually used in the New Institutional Literature to show how its existence involves the endogenous development of new forms of organizations and property rights. Here property rights are exogenously given and the focus of the analysis is on the implications of asset-specificity on the forms of organization suggested by the principles of the division of labour considered in the previous section.

inclined to spend on assets which may be expropriated if the workers leave the firm and which cannot be easily redemployable to new workers.

Thus, the application of the Smithian and the workers' preferences principles involves the creation of substantial elements of asset-specificity while the application of the Gioia-Babbage principle eliminates asset-specificity. For this reason it can be argued that the Gioia-Babbage principle is "overapplied" and the Smithian and workers preferences principles are "underapplied" under "classical" capitalism([11]).

For instance, consider what happens to the human firm- specific capital in a system where the firms can fire the workers and the workers, in turn, can quit the firm, that is to say, a system in which firms do not own the workers and workers do not own the firms. On the one hand, workers do not have well defined property rights in their human capital, because they can easily be expropriated of these assets by being fired. On the other hand, the owners of the firm also do not have well defined property rights in the human capital of the workers because the workers can just leave the firm.

Consider also the physical capital, which is complementary to this firm-specific human capital and workers' preferences. It is again not easily redemployable with other workers and the workers are also not easily redemployable with other machines. Both lose part of their value if they happen to be separated from each other. This also happens to be true for the part of physical capital which is invested to satisfy specific workers preferences.

Hence property rights are not well specified and a strong externality exists.

The same problem does not arise in the case of firm-specific physical capital which, however, is not specific to workers preferences or skills.

Unlike human capital, machines can be owned rather than being hired by the firm. By contrast owning rather than hiring labour is incompatible with capitalist property rights; for it would imply a reintroduction of slavery ([12]). This fundamental difference between human and non-human

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[11]. The exact meaning of "overapplied" and "underapplied" is clarified in the Appendix where we define the social welfare function which should be optimized in order to achieve maximum total utility. Of course, it is rather unsatisfactory to compare social systems with the "Nirvana" solutions maximizing the social welfare function. A proper criticism of a given system of property rights must be based on its comparison with alternative property rights systems which are likely to offer some solutions to its failures. This comparison is carried out in section 4 of this paper.

[12]. Indeed one might have the impression that an introduction of slavery or feudalism might quite paradoxically solve some of the externality problems which have been examined. For, under these systems property rights seem to be well defined because the master or the lord can enjoy all the fruits of the investment done on the human capital of the workers without fearing that the workers may quit. But the problem is that even under slavery the property rights that one individual can have on another individual are somewhat limited. Thus it is rather difficult to make slaves work hard and exploit their human capital if they do not have any incentive to do so. Feiner (1986) and Genovese (1961) illustrate how this was the cause of the low productivity of the slave mode of production. On the other hand, there is some evidence of the fact that the masters did invest in the human capital of their slaves. This may be somewhat overstated in Fogel and Engerman (1976) but it is not completely denied in the critical reviews contained in David (1976). The antiliteracy laws, existing in the majority of the American Southern states under slavery and their violation by single slave owners (Genovese, 1975 pp. 561-565) seem to imply that there was a contradiction between the general interest of the slave owners to keep the slaves illiterate (to prevent the possibility of reading the abolitionist publications and organizing mass revolts) and the individual interest of single slave owners to have some educated slaves (a "private" interest which was not dangerous to follow as long as the other slave owners did not do the same).

capital has two important consequences for the technology and the organization of work which is likely to be chosen under a system of classical capitalism.

First, under "classical capitalism" there a is tendency to invest more in machines than in workers ([13]). This is due to the fact that the asset specificity investment problem can be rather easily overcome for machines but not for workers. The user of firm-specific capital can buy the machines from their producer. This guarantees both the user and the producer against the expropriation hazards which would arise if the user was renting the organization specific machines from the producer. In the latter case in case of neither the user nor the producer could change its partner at low cost and machines would be undersupplied because of the fear of post-contractual opportunistic behaviour. This post-contractual opportunistic behaviour is remarkably limited if the user of firm-specific machines buys the machines instead of renting them from the producer and takes all the benefits and the risks which are due to their firm-specificity. Under capitalism this solution is, obviously, impossible for the case of human capital.

Secondly, under classical capitalism, there is a tendency to invest in a particular type of machines. In particular, there is a tendency to choose machines which are complementary to non-firm specific human capital.

These two consequences of the different status of human and non-human capital may be called "the Ure-Marx effect" because both authors observed how the development of Capitalism was based more on investment of machines skills than on human skills and, in particular on machines skills "independent" of human skills ([14]).

An important corollary of the fact that machines can be bought rather than rented from their owner is that, unlike labour, they can also be easily commonly owned .

Indeed, the joint stock company is a fairly common type of capitalist organization where machines are commonly owned and the capitalists own shares instead of machines. This has important consequences because it implies that asset specificity problems among machines can be overcome much more easily than asset specificity problems among workers, and among workers and machines. In the joint stock company each share holder can withdraw shares but cannot

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[13]. More precisely, the ratio of the capital-to-worker investment tends to be inefficiently high under "classical capitalism" with respect to alternative modes of production, such as the models of "company workers' capitalism" and "unionized capitalism" examined in section 4. There, we will show that in these systems the property rights problems of "classical capitalism" can find some solution.

[14]. Referring to the learning by doing advantages of the division of labour exposed by Adam Smith Ure (1835) claims that "what was in Dr. Smith's time a topic of useful illustration, cannot now be used without the risk of misleading the public's mind as to the right principle of the manufacturing industry". (p. 19). "On the contrary, whenever a process requires particular dexterity and steadiness of hand it is withdrawn as soon as possible from the "cunning" workman who is prone to many kinds of irregularities, and it is placed in charge of a particular mechanism, so self-regulating that a child could supervise it" (p. 19). Marx (1967) based his analysis of the Capitalist factory on Ure (and Babbage) and observed that the capitalist mode of production implied some form of skilling of machines and de-skilling of the workers.

expropriate or be expropriated by the withdrawal of asset specific machines. Thus, investment in mutually specific machines is not inhibited by the fear of expropriation problems ([15]).

The same solution is not easily available for the firm specific investment relations existing among workers and among workers and machines. This difference between relations among machines, on the one hand, and relations among workers and machines and among workers themselves, on the other hand, reinforces the "Ure-Marx effect". It contrasts sharply the almost unlimited potential of investment in machines, existing under "classical" capitalism, with the very limited potential for investment in people offered by this system of property rights.

In conclusion, "classical capitalism" is characterised by an unsatisfactory ([16]) definition of property rights.

A first consequence of this is the "Ure-Marx effect"; that is, a greater incentive to invest in machines rather than in workers and, in particular, in machines involving the complementary use of little human capital .

A second related consequence is that Gioia and Babbage rather than Smith are likely to be the source of inspiration for the organization of work under capitalism - this implying a too hierarchical and detailed division of labour within the firm.

Finally, the "workers preferences principle" may also find little application under capitalism.

Hierarchical firms, characterised by an inefficient quantity and quality of machines, a detailed and authoritarian organization of work and an unpleasant working environment, may well be generated by the property rights of "classical capitalism".

### 3. Self-sustaining and inefficient property rights.

In the introduction I considered the following question: is the often very detailed and hierarchical division of labour which characterizes many firms under capitalism because of transaction cost and technological efficiency or because of capitalism?

The overapplication of the Gioia-Babbage principle, and the Ure-Marx effect considered in the preceding section, give some support to the second possibility - a possibility which has been usually advanced in the labour process literature.

Still, a powerful objection inspired by the New Institutional Economics needs to be considered. Capitalism forbids only the owners of firms to own the workers but does not forbid the workers to own firms or to develop alternative contractual relationships by which, for example, the

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[15]. This point is nicely put forward in Leijonhufvud (1986) where he also considers a possible solution of the Dahlman paradox: that the industrial revolution implied the simultaneous institution of private property of land (enclosures) and common property of capital (joint-stock company).

[16]. This statement, as well as the following ones of this section, will become clearer in section 4 where "classical capitalism" is compared to alternative models of capitalism which are characterized by a more satisfactory definition of property rights. In fact, it is only by comparative analysis that the shortcomings of a particular system can be more precisely evaluated.

workers "own" their jobs. So, if the effects of the typical property rights arrangements are so unpleasant why do we not see the development of organizations and firms based on a different set of property rights? Or, in other words, why do rational agents not evolve a system of property rights and a governance system which adapts itself to the dictates of technological and transaction cost efficiency?

Posing these questions challenges what has been the underlying assumption of the preceding section: that property rights are exogenously given and determine the technological and transaction structure of the economy. Indeed it inverts the direction of causality and makes the "needs" of an efficient technological and transaction structure dictate the property rights system of the economy ([17]).

Consider the following theory of the property structure of the firm put forward by Professor Alchian (1987). In order to simplify the analysis Alchian assumes that there are owners of only firms-specific resources and owners of only "general" resources. Then, he writes:

"A firm, then, is a group of firm-specific and some general inputs bound by constraining contracts, producing a non-decomposable-end product value. As a result, the activities and operation of the firm will be most intensively controlled and monitored by the firm-specific input owners who gain or lose the most from the success or failure of the "firm". In fact, they are typically considered the "owners" or "employers" or "bosses" of the firm, though in reality the firm is a cooperating collection of resources owned by different people".([18])

This argument takes as given which assets are going to be general and which assets are going to be firm-specific. Given the general thrust of the argument (which is intended to show that the resulting configuration of property rights is efficient) we must assume that technological efficiency is given and determines the general or the firm-specific nature of the assets. Given this efficient configuration of the assets, it can be reasonably argued that rational agents will achieve an efficient set of property rights which minimize transaction costs. The owners of the firm- specific assets will be the ones which will be willing to pay the most for the ownership of the firm and, in particular, for the right of hiring and firing the other members, whereas the owners of general assets will value much less these property rights because they can leave the firm at low cost in case of

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[17]. This approach is taken by the property rights literature. See Demsetz (1967) where he claims that: "property rights develop to internalize externalites when the gains of internalization become larger than the cost of internalization. Increased internalization, in the main, results from changes in economic values, changes which stem from the development of new technology and the opening of new markets, changes to which old property rights are poorly attuned" (p. 350). This approach shares some aspects of Marx' theory of history, brilliantly examined and defended by Cohen (1978). In the Marxian theory, changes in property rights stem from their inability to cope efficiently with a certain level of the productive forces. The level of the productive forces expresses how much labour needs to be spent to make specified products if the productive forces were used in their optimal combination. It is, therefore, defined by the technology and the potential uses of resources which are available at a certain moment of time. Relations of production or property rights can "fetter" productive forces. Or, in other words they inhibit their development and their optimal use. Also here, when this "fettering" takes place, there is a tendency to displace the old system of property rights. According to Brenner, an alternative and more convincing theory of history can also be found in Marx (see note 3).

[18]. See Alchian (1984 ) and (1987) p. 1032 where he also maintains that "industrial democracy arrangements are rare, because the owners of more general resources have less interest in the firm than those of specific resources".

substantial disagreement with the other partners. In this approach capital hires and fires labour, or owns the firm only when capital is firm-specific, and labour the general input of production. When the opposite is true the theory predicts that labour will hire capital.

Under the market system the factor which needs to safeguard its firm-specific investment will acquire the property of the firm. This factor is also likely to be that which is willing to spend the greatest effort on its efficient management because it cannot exit ([19]) from the firm at low cost. Thus, the efficient property rights structure of the firm is endogenously generated by the market system. Co-operatives and capitalist forms of organizations will prevail because of their relative efficiency. Property rights arrangements which are not efficient are institutionally unstable in a market economy.

This endogenous generation of efficient organization structures is extended in the New Institutional literature to cover more complex cases where both machines and labour are firm-specific. Governance systems, exchange of hostages, formations of unions and the modern corporation are all institutions through which the agents can efficiently protect asset specific investments against the expropriation hazards due to the opportunism of other agents in unforeseen circumstances ([20]).

The aim of rational human agents to achieve technological and transaction cost efficiency is important for understanding the evolution of property rights. Still, the argument is incomplete because property rights do also have an important role in shaping the technological and transaction structure of the economy. In a world where transaction costs are not zero property rights cannot be easily transferred to the agents which can use more efficiently the resources over which they are defined; nor can property rights be easily be redefined according to the dictates of efficiency. Instead of being simply shaped by efficiency, the actual distribution of property rights is also likely to constraint efficiency and limit the choices which are feasible for the individuals by influencing the set of possible techniques and transactions. And, once these choices are implemented, even in an ideal word of zero transaction costs, a new set of property rights (different from the rights which were efficient before the implementation of these choices) becomes efficient.

Consider again Professor Alchian's statement. As we saw in the preceding section, the general and firm-specific characteristics of the inputs depend on the property rights existing at a certain moment of time. Thus, if it is true that technology influences property rights, the opposite

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[19]. In other words, these agents become the owners of the firm because they need a "voice" since asset-specificity prevents them from exercising the "exit" option to safeguard their interests. On "voice" and "exit" see Hirshman (1970).

[20]. The most complete exposition of the results, obtained by following this approach, is Williamson (1985). An important limit to the New Institutional economics is pointed out by Nutzinger (1982). He argues that the transaction costs which characterize each institutional arrangement are not independent of the co-existing institutions. Thus, it is only by making a strong "ceteris paribus" assumption that we can compare the relative efficiency of alternative institutions. "From this follows: Whenever the property right economists claim to have provided a generalization of the standard model of production and exchange, then this claim, strictly speaking, has to be confined to models of partial equilibrium in the tradition of Marshall, and cannot be easily extended to general equilibrium situations in the sense of Walras" (p. 181).

also is true: property rights influence technology. This implies that we have to face very complicated cumulative processes where property rights influence themselves via technology and technology influences itself via property rights.

In this context simple efficiency stories may well lose their meaning. Each outcome is likely to be path dependent and inefficient interactions between property rights and technology are likely to characterize the history of economic systems.

Suppose that the property rights of "classical" capitalism happen to be the dominant form of property rights and that the inefficiencies, considered in the preceding section can be overcome by the development of new organizations characterized by different property rights. Suppose, in particular, that workers' co-operatives, or other organizations where the workers have some property rights on their jobs, could overcome the asset-specificity problem by making the workers own their firm-specific human capital. Then, we can easily see how the need and the success of these organizations may require an alternative technology which, in turn, requires that the property rights defining these organizations already exist - an impossibility which may imply the institutional stability of inefficient organizations.

Recall that the existence of firms characterized by the property rights of "classical" capitalism gives raise to an organization of production where asset-specific investment is mainly concentrated on physical capital and comparatively little asset-specific investment is spent on human capital. Consider also that some learning by doing is acquired by managers and specialists in the use of this set of techniques. This has three consequences. In the first place, the need to redefine property rights in such a way as to solve the human capital specificity problem is overshadowed by the fact that little human asset-specificity is generated by the technology used by the system ([21]). In other words the property rights problem may not be visible to the agents because the asset over which the problem would arise is not generated under the property rights of "classical" capitalism. Secondly, even if the agents realize that an alternative arrangement of property rights which favours human asset specificity may yield higher benefits, redefining or transferring property rights is costly and requires time. As a consequence, for some time, investment continues to be concentrated on capital instead than labour. Thirdly, after a period of time in which these property rights constrained techniques have been used, the learning generated by their application may make them more efficient than the techniques unconstrained by inefficient property rights. Or, in other words, the

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[21]. In a world of perfect knowledge and zero transaction costs this would not happen. The problem would not be "overshadowed" by the fact that the asset to be generated under the new system of property rights does not yet exist. The agents would know the value of these future assets (or the value of the externality). Moreover in that world the identity of the owners would not matter for an efficient internalization of the externality. On this point see Coase (1960) and Demsetz (1988, chap. 2). However, in a world of imperfect knowledge and positive transaction costs it seems relevant to distinguish between existing and future assets over which property rights are ill-defined. The traditional examples of the property rights literature concern existing assets, such as air spaces and television channels, which were previously commonly owned and over which property rights were defined after the increase in the value of these assets. Here, the asset, its value and the competing property claims are clearly visible and an effort to redefine the property rights on the existing assets is likely to arise. By contrast the value of an asset which does not yet exist is likely to be relatively invisible to the agents and competing property claims on a non-existing asset are less likely to arise. As a consequence, the effort to redefine property rights is more unlikely to occur.

other techniques, unconstrained by an inferior property rights system, would have been more efficient if they had the possibility of being used and enjoyed a process of learning by doing. But, given that this has not happened, they are now less efficient given the current state of technological knowledge.

Thus, the existence of classical capitalist property rights generates technological conditions which make capital the asset characterized by a higher degree of asset-specificity relatively to labour. This, following Alchian, implies that capital should hire labour and that, in fact, the property rights of classical capitalism will be regenerated by the agents of a market economy. This regeneration of the capitalist property rights occurs even if we have assumed that co-operatives, or organizations characterized by some form of job ownership, were more efficient because they allowed investment in firm specific human capital. In order to generate the new superior property rights, which we have assumed to be provided by co-operatives, these organizations should already exist. This vicious circle which may prevent the formation of co-operatives is due to the fact that, only when human asset specificity already exists, does this form of property rights become clearly convenient. But this investment in human specific capital requires that co-operatives have had the time to generate the technology consistent with their property rights.

Thus, the system of property rights which characterizes "classical" capitalism can be self-sustaining even when it is less efficient than alternative property rights systems which do not discourage the investment in firm-specific human capital.

It is worth observing that under "classical" capitalism the existence of a competitive labour market is not inconsistent with the existence of rigid hierarchies based on an overapplication of the Gioia-Babbage principle. By contrast the existence of rigid hierarchies, where the workers at the bottom of the hierarchy are simply told to execute simple movements, creates the conditions for a flexible labour market for these workers. It minimizes the firm specific human capital which is lost when they change organizations and, therefore, implies low market transaction costs. Indeed it can be said that a flexible competitive labour market is made possible by the existence of rigid hierarchies which offer little learning by doing, no promotion possibilities and little realization of the workers' preferences for more interesting jobs and a better working environment. A competitive market for labour power, together with rigid hierarchies, here exists because of the failure of the property rights of classical capitalism to internalize the externality posed by workers' firm- specific assets and it is far from being associated with any Pareto optimality property.

In spite of this failure, the property rights of classical capitalism may exhibit some "institutional stability". This is because they may help to generate not only a technology but also a set of values which may make these property rights self-sustaining.

Indeed, under classical capitalism, another vicious circle may arise between values and property rights which prevents their change. Again, the need and the success of organizations where the workers have at least some property rights in their jobs may require a new set of values which in turn, partially, depends on the fact that these organizations already exist. The case of "positive" and "negative" freedom values illustrates this possibility and also some other relevant points.

Traditional liberal values put a lot of stress on negative freedom or "freedom from" instead of on positive freedom or "freedom to" ([22]). I feel that both concepts of freedom are appealing values and I find it somewhat discouraging to believe that there may be a trade-off between these two. Still, I am afraid that this problem exists. Negative freedom implies that we can easily break the constraints of pre-existing relations and move to relations which we prefer. Positive freedom implies the ability to do things within a certain set of relations and includes the possibility of investing in these relations without fearing the fact that they are going to be broken. The advantage of negative freedom is that we are not stuck in undesirable relations because we can always break them. Clearly, positive freedom is based on the opposite characteristics: it involves the ability to make specific investments in relations. But these specific investments in relations make their break-up very costly. In other words, positive and negative freedoms put severe limitations on each other.

Consider a set of traditional capitalist firms all using a technology characterized by a very pronounced application of the Gioia-Babbage principle. Consider also the position of the worker in that system. The worker enjoys a lot of negative freedom and very little positive freedom. In that system relations can be easily broken because no asset-specific investment is made by the worker in the organization nor by the organization in the worker. Changing organizations is cheap, but a necessary companion of market mobility is a hierarchical and detailed division of labour which gives very limited possibilities for the worker to enjoy positive freedom.

Consider, now, a system of firms where different property rights have produced an organization of work based on the learning by doing and "workers' preferences" principles. Here, the worker enjoys a lot of positive freedom but her negative freedom is somewhat limited. This new set of property rights and the consequent alternative organization of work imply that she has invested a lot in firm-specific assets which make it very costly for her and the organization if she happens to move to another organization.

Developing a strong taste for positive freedom, such that one is ready to give up some negative freedom, is partially dependent on the existence of organizations where positive freedom can show its advantages. Still the very existence and success of these organizations, as well as the need for them, is conditional upon the existence of people who have already developed a taste for positive freedom and a sense of commitment to the organization even when this limits their negative freedom. New organizations, based on an alternative structure of property rights, may require new values and the new values may require that those organizations already exist ([23]). A vicious circle between values and property rights similar to that existing between technology and property rights may prevent the formation of these organizations ([24]).

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[22]. On the concept of negative and positive freedom see Berlin (1969).

[23]. In other words the development of a compatible ideology is of fundamental importance for the success of a certain set of property rights. This point is correctly emphasized by North (1981).

Thus, the property rights of classical capitalism favour technology and values that may make them self-sustaining. Other factors contribute to their institutional stability.

The system can cope rather well with technological innovations insofar as they imply that the workers should be assigned to different tasks. For, neither the workers nor the employers have substantially invested in either job specific nor firm-specific skills which become redundant as a consequence of the innovation. Thus the resistance to technological change is likely to be low.

Moreover, monitoring jobs with little task and skill content is relatively cheap and simple. And, insofar as there is a relative abundance of unskilled labour and workers are not unionized, their bargaining power is low because they can be cheaply replaced by other workers. Indeed, any change in the property rights system which encourages workers' investment is going to alter these conditions and increase the bargaining power of the workers. The same change is going to have both efficiency and distributional consequences and may be opposed by the employers for these latter reasons.

At the same time many factors can threaten the institutional stability of the property rights of classical capitalism. Technological innovations may make particularly inefficient a system of property rights biased against firm-specific investment in human capital and make relatively visible the human capital externality which the property rights of classical capitalism are not able to internalize. The workers may increasingly dislike the values which sustain the property relations of that system. For instance, they may feel the relative emptiness of the concept of negative freedom which underlies the legitimacy of the system. The sense of non-belonging to the organization may make monitoring very expensive. Unions may be formed and, even simply for distributional purposes, may gain some forms of property rights for their members in the jobs which they perform and the organizations where they work. Finally, competitors who have succeeded in the internalization of the human capital externality and moved to a superior system of property rights may threaten to drive the firms of "classical" capitalism out of the market.

## 4. Institutional (in)stability of alternative capitalist relations.

A better assessment of the institutional stability of "classical capitalism" involves an evaluation of the comparative institutional stability of the alternative forms of property rights which may offer a partial solution to the inefficiencies due to its inability to favour firm-specific investment. Two alternative arrangements of property rights can and have sometimes offered a solution to the typical property rights problem of "classical capitalism".

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[24]. Another vicious self-sustaining circle between capitalist property rights, values and technology is illustrated by Marx (1967) in his illustration of commodity fetishism. I have examined this vicious circle in chap. 3 of Pagano (1985). Other interesting similar vicious circles are considered in Putterman (1982).

Under the first arrangement, which can be called "company-workers capitalism", the workers of a particular firm acquire some property rights in that firm. The owners of the physical capital of the firm loose the right of firing workers at their discretion and the workers acquire some form of job ownership in that particular firm. An internal labour market, or some bureaucratic rules, characterize the allocation of jobs to the workers after they have joined the firm: the understanding is that the insiders have a right to a job, even if not a right to a particular job in the firm, and they have priority over outsiders when some "better" jobs compatible with the skills they have acquired, are available in the firm. Under "company workers capitalism" rigid hierarchies have become flexible bureaucracies: some workers can climb the ladder and seniority is rewarded. Under "company-workers capitalism" investing in firm-specific skills is not subject to expropriation hazards and it is remunerated within the firm. Under this new arrangement of property rights the externality typical of "classical capitalism" is internalized in each particular firm .

The second alternative arrangement may be called horizontally "unionized capitalism" in that all workers involved in a particular occupation, or their union, acquire some property rights in a particular job performed in many different firms. In particular, they acquire the right of determining, together with the association of the employers, job specification and on the job training and they use this property right to make each firm develop human skills which can be transferred to other firms without substantial losses. Thus, the employers of each firm lose the property right of determining job specification and on the job training - a right that they keep under "company-workers capitalism". On the other hand, under this arrangement each firm keeps the right of firing workers - a right which is lost or seriously limited under "company-workers" capitalism. And this last right can be kept without diminishing the workers' incentive to invest in skills required by the organization. For, under this system of property rights, jobs have been standardized and any learning acquired in one firm can be used in another firm. Even if the workers change firm fairly often, they can climb the ladder of an occupational career. Their level of ability is certified by some authority outside the firm. This authority also supervises that the training and the jobs in each organization are not firm-specific and can be used in other organizations ([25]).

Either "company-workers capitalism" or "unionized capitalism" represent property rights arrangements which allow for a certain internalization of the externality typical of "classical capitalism" ([26]) - an externality which we have seen to imply that the property rights concerning

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[25]. However, only some forms of firm-specificity can be eliminated by this institutional arrangement. Still, it is important to emphasize that firm-specificity can be, often, due to absence of standardization. Consider the following example. Two firms are characterized by identical productive processes. In particular, in both firms four tasks (a,b,c,d) are performed. However, in the first firm there are two jobs respectively defined by tasks (a,b) and tasks (c,d). In the second firm there also two jobs but they are respectively defined by tasks (a,d) and tasks (b,c). Given this definition of the jobs in the two firms, jobs are firm- specific in spite of the fact that the tasks performed at the two firms are identical. In this important class of cases standardization can eliminate firm-specificity. Observe that, in absence of the co-ordination and the monitoring provided by the property rights of "unionized capitalism", the (over)application of the Gioia-Babbage system, typical of "classical capitalism" can standardize jobs but only at the lowest level. In this case the jobs in both firms will be identically defined by (a),(b),(c) and (d).

firm-specific human assets and assets complementary to them are ill-defined. In the case of "company-workers" capitalism the externality is internalized by giving the workers of each firm some property rights in that firm. In the case of "unionized" capitalism the externality is eliminated by making "general purpose" some previously firm-specific assets which become occupational specific assets owned by a union - an institutional solution which allows the formation of a market for the previous externality. In this respect, both systems are potentially Pareto-superior alternatives to "classical capitalism". In both systems we should expect that the overapplication of the Gioia-Babbage principle and the underapplication of the Smithian and worker principle are somewhat contained, and that the impact of the Ure-Marx effect is less pronounced than under "classical capitalism". Still, we have to consider the conditions of institutional stability of these alternative property relations.

In some ways, as with "classical capitalism", each one of these system can develop a technology and a set of values which makes each one of this set of property rights self-sustaining.

Consider "company-workers capitalism". Under this system of property rights, the workers have an incentive to invest in firm-specific assets. The resulting technology implies that the workers, owning firm-specific resources, will greatly value the property rights that they have in the firm. Moreover, under this property rights system, the workers, perceiving that their advancement is linked to success of the firm, are likely to develop a system of values that implies a certain loyalty to the organization. In turn this sustains the property rights system which requires that the workers have that sense of loyalty and are not going to "misuse" their rights against the general interests of the organization.

Examine now the case of "unionized capitalism". Under this system of property rights the workers have an interest to invest in occupational specific assets. The latter are valuable only insofar as each firm does not change job specification and training - a condition that is satisfied insofar as the union, together with the association of the employers, is able to enforce the property rights that it has in each firm. Again the property right system is technologically self-sustaining. The resulting technology implies that workers have invested in occupational- specific assets and have a vested interest in supporting the union which defends their property rights in those assets. Also the interaction between values and property rights follows a similar pattern. Under that system of property rights the workers realize the benefits of the union supporting those property rights and develop a sense of loyalty to the union - such a sense of loyalty making the union able to sustain and enforce these property rights.

Moreover, as with the case of "classical capitalism", the technology and the values of "company-workers capitalism" and "unionized capitalism" may enjoy learning by doing which

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[26]. In some ways the distinction outlined here between the workers of "unionized capitalism" and "company workers capitalism" resembles the distinction between the members of the scientific and technological community considered by Dasgupta and David (1988). Indeed, like the scientist, the "unionized worker", acquires rights, which are not specific to a particular firm and which are commensurate to her level of ability which is evaluated by the other members of the community of people employed in the same occupation. By contrast the "company worker", similarly to the technologist, acquires rights which are specific to a particular firm and are commensurate to her level of ability which is evaluated by the other members of the firm.

further contributes to the institutional stability of the corresponding property rights after they have prevailed for a sufficiently long time. Thus path dependence, in the form of lock-in effects, characterize each one of the three property right systems which we have examined.

In other respects, "company workers capitalism" and "unionized capitalism" differ as to the factors which contribute to their institutional stability or instability.

"Company workers capitalism" is characterized by firms' internal flexibility but by external labour market inflexibility. Within certain limits the firm has the possibility of redefining jobs within the organization and reallocating and retraining its workers. This contributes to its institutional stability by permitting adaptation to changes in demand and technological innovation. On the other hand, the firm cannot rely on an external occupational market to adapt to these changes. Trained workers for standardized jobs are not there and, in any case, insiders cannot be substituted for by outsiders without upsetting the property rights which lie at the institutional foundation of "company-workers capitalism".

This inflexibility contributes to the institutional instability of "company workers capitalism" in the face of changes in demand and technological innovation. For, when adaptation fails the workers realize that the property rights, acquired in firm- specific assets, lose their value. They may react by reducing firm-specific investment and feel less loyalty for the organization - a reaction which creates an inhospitable environment for the property rights of "company workers capitalism". This may degenerate into an institutional crisis of the firm founded on that system of rights. Each group of workers may be tempted to use their firm-specific assets to bargain for an increased share of the firms falling joint surplus and to resist changes in job specifications. In trying to do so they may discover the advantages of union action involving the participation of workers external to the firm. Unions may enforce standardized jobs and impose a uniform remuneration for all the workers doing the same job. In this case the system collapses into "unionized" capitalism. Or, they may simply support the struggle of workers defending their firm-specific investment and help arbitrating, together with employers associations, in disputes arising in specific firms ([27]). On the other hand, the latter may be tempted by the "classical" capitalism model which diminishes the bargaining power of the workers by eliminating their firm-specific assets. And this solution may be tempting not only when the firm cannot cope with a difficult external environment but also, simply, each time a group of workers uses their firm specific assets to "blackmail" the other members of the organization.

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[27]. A valuable example of the importance of the role of unions under "company workers capitalism" is suggested by Wilkinson (1977) and Elbaun and Wilkinson (1979) in their account of industrial relations in the British steel industry. "With the development of promotion by seniority, the institutionalised horizontal division created by skilled unionism was replaced by institutionalised vertical divisions between plants" . Still, the union had an important role in settling disputes and insuring peaceful agreements at industry level. Moreover the "the trade union card gave the worker the right to a place in the promotion line and hence the right to a series of jobs which made up the promotion line. Skills, or job opportunities were transferable neither to other industries, nor within the iron and steel industry, and therefore the iron and steel process workers had the status of unskilled worker outside the plant in which they were employed." ( Wilkinson, 1977 p. 129). According to Elbaun and Wilkinson (1979) this arrangement explains the successful resistance of British steel workers to Taylorism which differentiated the British and the American steel industries.

The situation of horizontally "unionized capitalism" lies at the opposite pole. Under this system the firm can rely on external labour market flexibility but not on the kind of internal flexibility which we have seen to characterize the firm defined by the property rights of "company-workers capitalism". Under "unionized capitalism" the firm can react to demand and technological shocks which involve changes in the composition of its work force by hiring and firing workers. In this way it can have a greater number of workers doing some standardized jobs and a lower number of workers performing some other standardized jobs. Thus, under "unionized capitalism" the firm enjoys the advantages of market flexibility for skilled labour. Contrary to the traditional view, which sees the unions only as an impediment to market flexibility and as source of monopolistic power, the union here is a precondition for having a market for skilled labour requiring substantial on the job training. Without a union determining with the collaboration of the employers' association the standardized nature of jobs and training, occupational markets for skilled labour collapse. A tendency to develop the property relations of either "company workers" or "classical capitalism" would replace occupational markets for skilled labour either with internal markets for firm-specific labour or with unskilled labour markets or with some combination of both.

Indeed, a great source of institutional instability for "unionized capitalism" does lie in the fact that under this arrangement each firm may have an incentive to free ride on job training and specification. Under this arrangement each firm may gain by providing cheaper training which is only firm-specific and having jobs which satisfy better the specific needs of that firm; for each firm it pays to deviate from the agreed standardized training and job specification, provided that other firms do not do the same. If many firms free ride, then the public good, the occupational market that they jointly "owned" with the union, is destroyed and each firm as well as each worker is worse off. Thus a public good problem is the source of institutional instability of the only true market solution for skills acquired in the organizations ([28]). It well illustrates how the market, far from being an exogenously given environment within which institutions evolve (possibly efficiently), is itself an institution supported and sustained by other institutions. If the union and the employers' associations fail to enforce their property rights in each firm ([29]), then the occupational markets for skills are

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[28]. Ryan (1984) observes that "there is usually the possibility of specializing trainees for particular job tasks in order to make them relatively productive at an early stage of their training - at the expense, of course, of their training. Cheap trainee labour presents an incentive to do just that; the control of management over production methods provides it with the opportunity to do so."(p. 199) He points out how, in the impossibility of writing and enforcing complete employment contracts, "the superior alternative is to remove the incentive to management to engage in the intensive use of trainee labour by limiting the trainee differential in pay". In his very stimulating book *The End of the Economic Man* Marsden (1986) examines the role of the union in limiting the tendency to free ride of each employer and creating the very conditions for the existence of occupational markets.

[29]. However, cooperation can evolve in more informal ways when the different units can easily monitor each other and they are likely to interact very often in the future creating the conditions for a repeated game of the sort considered by Axelrod (1984). These conditions seem likely to arise in the case of the "Marshallian industrial districts" considered in Brusco (1982), Sabel (1982), Priore and Sabel (1984) and Becattini (1987). Moreover, as it is pointed in this very interesting literature, the sense of trust and of belonging to a community can be an even more important factor for the development of skills, which may be specific to the industrial district but general within it. Informal exchanges of ideas and trust may favour the informal development of common standards. Specific working experiences may be more easily generalized in the "atmosphere" of the industrial district.

replaced by other market institutions supported by other institutions stemming from alternative systems of property rights: namely, markets for unskilled labour (supported by the rigid hierarchies of "classical capitalism") and internal labour markets (which is a disputable alternative name for the flexible bureaucracies of "company-workers capitalism").

Still, the public good problem examined above is not the only source of institutional instability for "unionized capitalism".

Technological and product innovations often put under stress the division of labour which has been agreed between unions and employers associations. Standardized jobs and training need to be continuously redefined and, together with them, the property rights of each single union need to be redefined. This redefiniton is not easy because the interests of different employers and unions are likely to be different. If a compromise is not achieved, the system is likely to move towards some mixture of the other two forms of capitalism examined above - a result which is very likely when the unions themselves cannot agree on the property rights to be attributed to each single union.

Another source of institutional instability is the monopoly power which each union can exercise in each firm using the occupational-specific assets owned by the members of the union. Each union can exploit the fact that its members own assets which are indispensable for the production process in many firms and bargain for higher wages, which squeeze the remuneration of the other owners of both specific and general resources employed in the firm. In particular, since the human capital owned by each union is only valuable if used together with the human capital owned by the other unions, each union may try to hold up its resources and squeeze the rewards obtained by the members of the other unions. Moreover, each union may restrict entry either by limiting, by some form of legal power, the number of the trainees who undergo organizational apprentiship or by increasing the wage to be paid to them while training ([30]). Again, a move to the property rights of "classical" or "company workers" capitalism may be the organizational answer favoured by the owners of the other assets cooperating in the firm ([31]).

Thus, technological change and unions' monopoly power, together with the public good problem examined above, pose a constant threat to the institutional stability of "unionized capitalism". Still, a movement towards "company workers" and/or "classical capitalism" is not the necessary result of an institutional crisis of "unionized capitalism". Indeed a centralization of the unions may be an alternative institutional solution to the problems of "unionized capitalism" as well as to the problems of "company workers capitalism". This arrangement, which is often referred to in the literature as "solidaristic corporatism" ([32]), is a system where centralized bargaining takes place

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[30]. For an alternative but not incompatible reason pushing up the wage of the trainees, see the preceding footnote 28.

[31]. The choice of one of these systems is therefore due to the social history of a particular industry and country rather than determined by technology. An empirical study supporting this thesis is offered by Maurice, Sellier and Silvestre (1984). In Pagano (1990) I try to argue that the different self-sustaining "property rights equilibria" which characterize the three major industrialized countries are due the strong shocks which these countries experienced after the end of second world war.

between two central organizations: the association of the employers and the association of the unions. "Solidaristic corporatism" can be defined as a system of property rights where each worker has a right to a job of quality close to the social norm but not to a job in a particular firm or occupation. "Solidaristic corporatism" is difficult to create and to sustain. Even if the other workers keep acting according to the general interest, for each group of workers it pays to pursue their particular interest. The solution of this problem requires that the unions, representing the interests of the workers engaged in particular firms or occupations, give up some of their rights to a single centralized union.

Indeed , under "centrally unionized" capitalism the workers do something similar to what is accomplished by the owners of physical capital when they give up the property of single machines and become shareholders: workers give up property rights in single specific jobs and become owners of a right to a job of quality close to the social norm. In this way, as for the case of share holders, they can diversify risk and eliminate some expropriation problems. However, the analogy is far from being complete. By its very nature work cannot be similarly standardized and separated from the individuals performing it. Thus not only the institution of this arrangement but also its institutional stability is much more problematic. A continuous tension between particular and general interest is bound to exist and may eventually bring about the collapse of "solidaristic corporatism" either into "unionized" capitalism or "company workers" capitalism or, even, into "classical capitalism". This collapse may, also, be favoured by employers if the unions use their centralized power to obtain conditions particularly unfavourable for the employers.

Still, the system has several advantages which may contribute to its institutional stability.

Under this system the workers, taken as whole, have greater bargaining power than under a system of decentralized unions. But, the possibility that one group of workers expropriates the employers and the other workers of their specific investment is greatly decreased under "solidaristic corporatism". The centralized union may realize that this behaviour does not only damage the owners of physical capital but also the other workers whose interest the union is supposed to defend. Thus, if there are reasons for which the employers may fear centralized bargaining, there are also reasons for which the employers as well the workers may prefer this system ([33]).

Under "solidaristic corporatism" each particular worker can invest in assets specific to certain occupation and/or firms and, at the same time, insure herself against circumstances such as technological and demand structure changes which may decrease the value of those assets. In these cases the worker has a right to be subsidised and/or retrained. This insurance may create "moral

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[32]. Rowthorn (1988) defines solidaristic corporatism as a variant of capitalism where there is centralized bargaining between strongly organized workers' and employers' organizations and where "the centralized trade union movement, and its associated political party (or parties), pursue the egalitarian objective of full employment. By full employment is meant not just a job of any kind at any price, but a satisfying job with a wage close to the average. Thus the objective is to equalise in so far as possible employment opportunities for all the workers." The following analysis of "solidaristic corporatism" owns a great deal to Rowthorn (1988) as well as to discussions with the author.

[33]. Calmfords and Driffill (1988) point out how the centralization of bargaining involves an internalization of the negative externality, induced by an increase of the wage of a group of workers, on inflation and unemployment. A similar point is argued in Freeman (1988).

hazard" problems. For, each worker, being aware of the fact that his occupational specific assets are insured if they become useless for society, may loose the incentive to look for occupations which are in short supply. Still, the problem can be solved by some degree of central allocation of work, carried out by the single centralized union; the worker, who has redundant skills, is subsidised only if he accepts to be retrained for some socially useful occupations.

Standardized jobs and the corresponding occupational markets as well as firms internal markets can be redefined without substantial resistance when this is required by technological innovations. The workers are insured against losses of occupational-specific and/or firm-specific assets. Thus, the system can enjoy the benefits of a frequent and flexible redefinition of occupational and "internal" markets which makes them consistent with the needs of technological change. Moreover, under "solidaristic corporatism" there is no occupational or company union which may limit entry to new trainees and exercise monopoly power. By contrast, the single centralized union can ensure a right to a job of approximately average quality for all its members by creating conditions where no skill is comparatively oversupplied or undersupplied. A limitation of entry to particular firms and/or occupations and an exercise of monopoly power would be inconsistent with these conditions. It would give an unfair advantage to some workers and damage other workers, contradicting the right to a job of average quality which is the institutional basis of "solidaristic corporatism".

Finally, as to the particular problems of occupational markets, centralized unions have a better chance of overcoming the typical public good problem of "unionized capitalism": that each employer has an incentive to deviate from the standardized training and job definition. On the one hand, enforcement is easier when a deviant employer is controlled and, eventually, punished by a union representing all the workers. On the other hand, the incentive to deviate is weaker if the unions are ready to adjust job definition, without major internal contrasts, when circumstances change. Thus, occupational markets for skilled labour are conditional on the existence of a union which, together with the association of the employers, establishes and enforces uniform standards in job training and definition. Or, in the terminology of the present paper, they are dependent on the existence of the property rights of horizontally "unionized capitalism". But an approximation to flexible markets, relatively free from the expropriation hazards of monopoly power and characterized by flexible job definitions, requires a centralization of the unions. Or, in the terminology of the present paper it requires the property rights defined by "solidaristic corporatism". It is ironic that the only fairly close approximation to the competitive markets ideal of general equilibrium analysis can only, perhaps, be achieved by a system of property rights which requires the most centralized organizations.

**Conclusion.**

In the introduction of this paper, we considered the following question: is the often very detailed division of labour and hierarchical division of labour which characterize many firms under capitalism because of transaction costs or because of capitalism?

The preceding sections suggest that this question itself need to be questioned. One should ask: "which type of capitalism is the question referring to?"

Indeed, in this paper, after considering the principles which define an optimal division of labour, three types of capitalism, characterized by different sets of property rights, have been defined and an attempt has been made to show that the answer changes according to the type of capitalism we are referring to. Whereas "classical capitalism" implies an excessively detailed and hierarchical division of labour, "company workers" and horizontally "unionized" capitalism offer some remedies for this situation.

Do these remedies necessarily come about? Do efficient property rights spontaneously arise? Do efficient institutions necessarily evolve in a market environment?

A positive answer to this question characterizes a great deal of the "New Institutional Economics". The conclusions of this paper do not share this positive answer and are in this respect closer to the spirit of the "labour process literature". Each one of these forms of capitalist property rights has been shown to be somewhat self-sustaining and each one of them has its own factors of institutional (in)stability. Thus, it seems that there is no well founded argument that justifies the necessary emergence of efficient property rights.

In particular, the argument that, in a market environment efficient institutions based on efficient property rights tend to emerge, has also been criticized by pointing out that the market itself, far from being the "neutral" environment where efficient institutions are selected, is also itself an institution, the survival and the existence of which depends on these institutions.

The possibly competitive and flexible but also suboptimal markets for unskilled labour of "classical capitalism" must live in symbiotic complementarity with the rigid hierarchies which also stem from this system of property rights. The internal markets or the flexible bureaucracies of "company workers capitalism" mean a substantial limitation of what is commonly meant by a market economy which becomes supported or substituted for by a cobweb of bureaucratic rules specifying the property rights of the workers in their companies. Finally, the markets for skilled labour of "unionized capitalism" must see the foundations of their life in the existence of unions and employers associations ([34]).

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[34]. Observe that some sort of completely self-regulating labour market is only consistent with "classical capitalism" and only for those workers who are outside its rigid hierarchies. Thus, a completely self-regulating labour market is likely to be a very unsatisfactory institution where workers do not acquire skills, attachment to trades and/or firms and do not experience any form of positive freedom and work satisfaction. Polanyi (1944) pointed out the devastating consequences of the institution of a completely self-regulating labour market. He argued that other institutions, which integrated or replaced the market institution with alternative regulation systems, had to be developed. Otherwise, society itself would have not survived the consequences of self-regulating markets. A modern presentation of Polanyi' s ideas is offered by Stanfield (1986). The possibility that some of Polanyi' s propositions can be re-considered by using the tools of New Institutional Economics is advanced by North (1977).

I hope that it is not over-ambitious to conclude this paper by briefly indicating one way in which the content of this paper may relate to the current issues concerning the transformations occurring in contemporary advanced capitalist economies and the economic policies intended to favour their development.

There is widespread consensus on four facts. The first is that we are living in period of fast structural change characterized by the application of new technologies and by different demand patterns. The second is that both new goods and new technologies require more human knowledge-intensive production processes. The third is that the need for a better quality of working life is becoming more powerful as people already own a fair amount of consumption goods. The forth is that only countries, developing the appropriate institutions, will be able to succeed in meeting this challenge.

A popular interpretation of these statements has been that more labour market flexibility ([35]) is required. There is some obvious truth in this statement insofar as in a changing word people need to do different things. But the statement has also acquired a different meaning: that all the rights of the workers, either at company level or at occupational level are simply an impediment to market flexibility: property rights in particular firms or occupations, industrial democracy or union activity prevent the efficient working of the market system. The institution, able to cope with the new problems, is the market system and the other institutions, which it is able to select efficiently when the collective action of organized groups of workers do not impose inefficient institutions.

Of course, collective action can often bring about inefficient institutions which may be an obstacle to the required changes. But limiting job property rights does not necessarily imply that the market selects the appropriate institutions. It may rather mean that by selecting this new set of property rights we are selecting a certain type of market: that for relatively unskilled labour, which is typical of "classical capitalism". And, if the change was intended to be towards the generation of more on the job learning and better quality of working life, we are certainly choosing the wrong set of property rights and the wrong markets. A positive change in this direction can only be obtained by accepting the importance for productivity and welfare of the workers' rights in their jobs and being aware of the new problems which they imply. It cannot be obtained by destroying them in name of market flexibility ([36]).

## APPENDIX

[35]. "Flexibility" is a very ambiguous word which has a surprising number of different meanings. This is pointed out in chap.10 of Boyer (1988), chap 12 of Morroni (1990) and Vercelli (1988).

[36]. While this paper was refereed and revised, an even more important economic policy issue has become the introduction of markets and of a new set of property rights in Eastern European economies - a transition which is popularly described as the introduction of "capitalism" in these economies. An implication of this paper is that in theory as well as in reality "capitalism" is far from being an unambiguous word. I believe it would be a great tragedy if the type of capitalism, which will be introduced, will turn out to be some sort of the "classical capitalism".

(i) Denote by T = 1.....t.....m the tasks to be performed to produce a product Y and by n the number of workers employed in the production process. Call $t_1$, $t_2$.....$t_n$ the number of tasks performed respectively by workers 1, 2.....n.

Then $J = (t_1 + t_2 + ..... + t_n)/n$ denotes the average number of tasks per worker or the average task content of a worker's job. Define L as the learning per worker necessary to start the production process and assume that it is a continuous function differentiable in J:

$L = L(J)$ and $L'(J) \geq 0$ (1)

(1) says that learning per worker increases with the number of tasks per worker.

Denote by h the total production time spent by a worker, then

$h - L(J)$ (2)

expresses the direct production time of a work net of training time performed by a worker.

Call productivity or product per worker by $y = Y/n$. The Gioia-Babbage principle assumes that productivity is a function:

$y = y[(J), L(J), h - L(J)]$ (4)

We will now try to understand the reasons for which, according to Gioia and Babbage y is a decreasing function of J for J greater than 1 and, therefore, it is maximized when J is equal to 1, or when the task content of each job is at a minimum. This can be done by showing that y is a decreasing (in one case constant) function of each one of the three arguments considered in (4).

An increase in J decreases y because a lower number of tasks per worker entails a greater exploitation of the principle of comparative advantage. Beside being directly a decreasing function of J, y is also indirectly affected by J because an increase in J requires an increase of the learning time. The increase in learning does not directly increase productivity. If the worker learns and performs more than one task, we could always obtain the same productivity by having each worker learning and performing only one task. Thus, productivity is a constant direct function of L(J). On the other hand this increase in learning time, due to an increase in J, decreases indirectly productivity because it reduces h - L(J) or the production time net of learning time. Thus, y is a decreasing function of h - L (J).

Therefore the maximization of y is achieved for J = 1. This maximization may be constrained by the fact that the scale of production does not allow the employment of such a number of workers that one worker performs one task only . In this respect the Gioia-Babbage benefits of the division of labour are limited by the extension of the market and imply increasing returns to scale until the quantity produced is such that each worker performs only one task.

(ii) Denote by $L_f$ the future learning by doing per worker and by $y_f$ the future productivity of labour. The Smithian principle implies that the future productivity is a function of the future learning due to the present division of labour or:

$y_f = y_f[L_f(J)]$ (5)

On the one hand, maximizing productivity by maximizing learning by doing involves that the task content of jobs is not too large, otherwise we do not acquire sufficiently "deep" knowledge to improve our activities . On the other hand, it requires that the task content of jobs is not too narrow, otherwise we do not acquire a sufficiently "wide" knowledge which enables us to improve them. Thus, (5) can be represented as strictly concave function in J having a maximum $J^*$ for $J > 1$. Also in this case the scale of production may not be sufficiently large to allow a sufficiently small number of tasks per workers compatible with the unconstrained maximization of (5). This was a major theme in Smithian economics embodied in the famous statement that the division of labour is limited by the extent of the market. Denote by J" the minimum number of tasks per worker which is possible for a certain extent of the market. The implications of the Gioia-Babbage and the Smithian principles coincide for:
$J'' > J^*$. But they diverge for: $J'' < J^*$. In the first case both principles imply that productivity can be maximized by jobs having the minimun average task content compatible with the extension of the market. In the second case the Gioia-Babbage principle yields the same conclusion whereas the Smithian principle implies that productivity can be increased by increasing the average task content of a worker's job above the minimum value compatible with the extension of the market.

(iii) The "workers preferences principle" implies that the task content of jobs J, the preliminary learning L and the future learning acquired by doing influence the job satisfaction per worker function:

$$s = s[J, L(J), L_f(J)] \qquad (6)$$

Assume workers dislike a too low task content of jobs and the too limited amount of preliminary and future learning associated with it. Then a maximum of (6) is likely to occur for $J > 1$.

(IV) An optimal division of labour or an optimal task content of jobs requires the maximization of the benefits due to present and future productivity and to job satisfaction; that is the maximization of the weighted sum of y, $y_f$ and s. Or, it requires the maximization of a function W such that:

$$W = ay[(J), L(J), h - L(J)] + by_f[L_f(J)] + cs[J, L(J), L_f(J)]$$

where a, b and c are the optimal social weights given respectively to present productivity, future productivity and job satisfaction.

The weights a, b and c are also the weights given respectively to the Gioia-Babbage principle, the Smithian principle and the workers' preferences principle [See (4),(5) and (6)] . Thus, an optimal division of labour requires the joint application of all these three principles. The greater the weight of a relatively to b and c, the smaller are the values of J, L and $L_f$ which maximize W. If b and c are equal to zero and a is equal to 1, then the maximization of W implies J equal to 1 and the minimization of learning associated with the application of the Gioia-Babbage principle. Any

departure of a, b and c from the optimal social weights is referred in the text as an underapplication or an overapplication of one of these three principles.

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