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*Skill formation, internal labour market and payment systems  
An Institutionalist perspective*

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## **Skill formation, internal labour market and payment systems** **An Institutionalist perspective**

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### Abstract

The aim of this paper is to analyse the interrelations among internal labour markets, the role of the firm in the development of skills, training and systems of payment of employees. The key idea of this contribution is that wage determination is always related to the allocative function of labour, skills and capabilities in internal labour market. A distinction between the notions of skill and capability is essential for the purpose of this paper. This analysis is based on two different theoretical approaches. First of all, the paper draws on the competence-based theory of the firm, elaborated in an evolutionary approach to economic analysis (Hodgson, 1998). Secondly, the paper is based on the institutionalist analysis of internal labour market developed by Doeringer and Piore. Particularly, the paper investigates the role of internal labour markets in the process of skill formation. This paper supports the idea that internal labour markets do not only allocate labour, but also skills and capabilities. The paper develops a taxonomy of firms, which are classified according to characteristics of both training provided and tasks to perform. Payment system is embedded and interacts with both the system of skills formation and features of tasks. Remuneration system fits in labour organisation and vice versa, giving rise to a specific institutional equilibrium, whose stability cannot be taken for given. The final section points out the features of these institutional equilibria, in terms of both labour organisation and compensation system.

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## *Introduction*

Aim of this paper is the analysis of the interrelations among internal labour markets, the role of the firm in the development of skills, training and the system of payment of employees.

The first part of the paper is devoted to a survey of the competence-based theory of the firm. This approach is very much at odds with the standard theory of the firm, which views the firm as a network of contracts and, for this reason, has been called by Geoffrey Hodgson (1999) contractarian theory of the firm. This part is focused on a discussion of the seminal contributions by Knight (1921), Coase (1937) and Penrose (1959). In this section the notion of firm as a means to enhance employees' skill plays a pivotal role.

The second part of the paper analyses the concepts of knowledge, skill and capability in the field of economic theory. This part is based on both Loasby's (1996) and Hodgson's (1967) reflections. After a discussion of the nature of skills, the problems related to measurability of both skill and productivity are introduced, as well as a distinction between skill and capability.

The third part of this contribution analyses the role of internal labour market in modelling and developing skills. In this section the importance of internal labour markets in the allocation of skills, and not only of labour, is outlined.

In the fourth part the analysis focuses on a taxonomy of labour markets, stemming from a couple of contributions due to Pagano (1995) and Guidetti (1999). In this section the role of both organisational and occupational rights is investigated. Besides, this part addresses the connections between these two kinds of rights and the characteristics of both skills and training. Features of three different typologies of internal labour organisations are examined, each one giving rise to a specific relationship between skills, rights and training.

The paper concludes with a preliminary analysis of the relationship between alternative remuneration systems and the three different forms of internal labour organisations, with the aim of showing that there is at least one sustainable system of compensation for each labour organisations.

### *1. The competence-based theory of the firm*

The starting point of this contribution is an analysis of the competence based theories of the firm (Penrose, 1959, Hodgson, 1998a, 1998b). This approach will be contrasted with a more standard analysis, connected to a contractarian notion of the firm and of production (Hodgson, 1999). This

framework of analysis is focused on skill formation, which is considered a crucial element in the analysis of the firm. If we consider that this process must be analysed in a context of uncertainty, this paper supports the view that it is quite problematic to base the analysis of firms' organisation on contractarian relationships solely, as in standard models.

The seminal paper by Coase (1937) can be considered to provide the bases for competence-based theories of the firm. The paper analyses the reason why production activities are centred on firms and not on a network of short-term contracts among a number of producers whose relationships are regulated by market price mechanisms. Coase's explanation is centred on the relevance of transaction costs: "The main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism. The most obvious cost of organising production through the price mechanism is that of discovering what the relevant prices are. This cost may be reduced but it will not be eliminated by the emergence of specialists who will sell this information". In another paper (1960) the cost of using the price mechanism was substituted for by the phrase "the costs of market transactions" and, at last, these have come to be known as "transaction costs". Finally, as Coase asserts, "Dahlman crystallized the concept of transaction costs by describing them as "search and information costs, bargaining and decision costs, policing and enforcement costs". In conclusion, the firm supersedes the price mechanism because it allows saving on transaction costs. The entrepreneur is a key element in Coase's analysis. This figure is in charge of designing the organisation and of directing and co-ordinating the productive resources in order to save on transaction costs. This legitimates her role and explains the overcoming of price mechanism in production activities within the firm. A consequence of the existence of the entrepreneur is a decrease in the numbers of contracts needed to carry out production. "A factor of production (or the owner thereof) does not have to make a series of contracts with the factors with whom he is co-operating within the firm as would be necessary, of course, if this co-operation were the direct result of the working of the price mechanism. For this series of contracts substituted one."

In order to save on contracting costs, the employer <sup>1</sup> may well activate a series of long-term contracts. These contracts cannot specify completely the activities of the seller of the productive factor <sup>2</sup>. Coase states clearly that "owing to the difficulty of forecasting, the longer the period of the contract is for the supply of the commodity or service, the less possible and, indeed, the less desirable it is for the person purchasing to specify what the other contracting party is expected to

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<sup>1</sup> From now onwards the terms employer and entrepreneur will be used indifferently.

<sup>2</sup> The idea of employment contract as an example of incomplete contract was firstly treated by Simon (1951). In a more recent analysis Simon (1991) defines an incomplete contract as a contract where "some of its term are unspecified. Employees agree to do over the life of the contract, what they are ordered to do; but the orders will not be issued until

do". Therefore, the task of the entrepreneur is to organise the activity of productive factors linked to the firm by lasting relationships. Finally, Coase stresses the authoritative and co-ordinating role of the entrepreneur when he says that "The contract is one whereby the factor, for a certain remuneration (which may be fixed or fluctuating), agrees to obey the directions of an entrepreneur within certain limits".

Of course, the employment relationship typifies this long-term relationship between the firm and the seller of productive factors. This employment relation is characterised by two conditions:

"i) The servant (i.e.: the employee) must be under the duty of rendering personal services to the master (i.e.: the entrepreneur) or to others on behalf of the master, otherwise the contract is a contract for sale of good or the like. ii) The master must have the right to control the servant's work, either personally or by another servant or agent. It is this right of control or interference, of being entitled to tell the servant when to work (within the hours of service) and when not to work, and what work to do and how to do it...which is the dominant characteristic in this relation and marks off the servant from an independent contractor or from one employed merely to give to his employer the fruits of his labour."

The importance of Coase's contribution is that he views both the organisation of the firm and the employment relationship not as a consequence of the operation of continuous exchanges between employer and employees or between independent producers, but as a lasting relationship in which the entrepreneur directs the employees' work. Unfortunately, Coase tends to overlook the centrality of the firm in the process of the employees' skill formation. The problem with Coase's analysis is that he assumes that the entrepreneur can always find on the external market the skills she needs. As a matter of fact, he asserts that "Every business buys the services of a host of advisers. We can imagine a system where all advice or knowledge was bought as required". In conclusion, the employer can hire the required skills by means of a contractual relationship with skills' providers.

The Coasian approach lays down the foundations for an analysis of the firm based not only on exchange between two parties. He realises that employment relationships based on long-term incomplete contracts characterise the organisation of the firm. Furthermore, he rightly stresses that employees' activity happens within the organisation and is not strictly directed by contractual specifications. However, the main drawback of his analysis is that he ignores the role of firms in forging employees' skills. He simply conceives the organisation of productive activities within a firm as an allocation of static resources, recruited from the external market and co-ordinated by the authority of the entrepreneur and not by the price mechanisms. In Coase's treatment the source of

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some time after the contract is negotiated".

organisational change is always the entrepreneur who, on the basis of his own forecasts, recombines the factors of production. As a consequence, Coase does not make a distinction between the resources and the services that the different resources can provide. As it will be seen in the following paragraphs, this is a key distinction for a competence-based theory of the firm.

Penrose (1959) gave a definition of the firm consistent with our approach. She stresses that “The business firm... is both an administrative organisation and a collection of productive resources; its general purpose is to organise the use of its own resources together with other resources acquired from for the production and sale of goods and services at a profit outside the firm. The organisation of the firm is not fixed; as a matter of fact “it can, in principle, always be adapted to the requirements of the firm- expanded, modified and elaborated as the firm grows and changes.”

Contrarily to Coase, Penrose distinguishes sharply between resources and “services that the resources can render”. The crucial point in Penrose’s analysis is that a given collection of resources within the firm can expand and develop its services. The services rendered by human resources tend to expand automatically through learning-by-doing. Furthermore, these can be increased voluntarily through the growth of objective (or transmissible) knowledge, which consists in a formal and conscious process of learning. This expansion of services rendered by the personnel is inherent in the operation of the firm. “...both an automatic increase in knowledge and an incentive to search for new knowledge are, as it were, built into the very nature of firms possessing entrepreneurial resources of even average initiative.” In addition, available resources (both human and material) shape this process of continuous learning and, at the same time, the services that those resources provide depend on the knowledge of employees. For illustrating these feedback effects, which link the different resources within a firm, Penrose states clearly “The services that resources will yield depend on the capacities of the men using them, but the development of the capacities of men is partly shaped by the resources men deal with”.

Unlike Coase, Penrose argues that the source of organisational change is not only the entrepreneur, but also the interaction between ever changing services rendered by factors of production. Therefore, one can conclude that organisational change depends on the firm’s social structure, as both management (the entrepreneur, using the terminology of Coase) and employees belong to the resources of a firm.

Penrose’s analysis of skills is consistent with Knight’s (1921) approach to the study of firm’s behaviour. If one assumes that the firm operates in an uncertain environment, as Knight (1921) does, then the problem of recruiting the required skills arises. Basically, uncertainty gives rise to two different problems. First of all, in an uncertain context the entrepreneur may well be unable to

measure accurately the value of skills attached to individuals, because she lacks the proper competences. Knight claims that “We form our opinion of the value of men’s opinion and powers through an intuitive faculty of judging personality, with relatively little reference to observation of their actual performance in dealing with the kind of problems we are to set them at”. Therefore, the procedure of skills’ evaluation is always based on conjectures. As far as the problem of a-priori skill evaluation is concerned, Hodgson (1998b) rightly quotes Arrow’s assertion (1962) “we do not know the value and nature of information until after it is purchased”. Secondly, in an uncertain and ever changing environment, the entrepreneur cannot always forecast with statistic rigour the skills which will be needed. Not only has the entrepreneur great difficulties in assessing the skills of other individuals, but also she cannot really define what she actually needs. Accordingly, Loasby (1995) maintains that "capabilities involve a double conjecture about the kind of future that is reasonable to prepare for, and about the appropriateness of particular capabilities to those kind of future".

As a result, if skills cannot be properly assessed because of uncertainty, it seems rather difficult to imagine a market for skills. As Hodgson (1999) asserts “Knight thus suggested that not all economic competences... are contractible. As a result, a complete market for skills is impossible in principle". The conclusion seems to be that the problem of skill formation and development cannot be solved out of a contractarian framework of analysis.

Conclusively, the approaches of both Knight and Penrose develop an idea of the firm as a productive unit, which is crucial for the process of skill formation. This happens because the firm operates in an uncertain environment. Uncertainty makes problematic the development of a market for skills for two reasons. First of all, it is difficult to give a proper evaluation of individual skills; secondly uncertainty complicates dramatically a definition of the skills demanded. Therefore, the skills that the firm demand cannot be entirely acquired in the external market, as in Coase’s analysis, but are developed within the organisational structure of the firm. This provides skill formation and development with a social dimension as Nelson (1982) underlined. In his view, learning in a firm is not a mere individual experience. The firm is a learning organisation whose knowledge endowment goes beyond the sum of the individual knowledge of its members (employees). This contrasts sharply with the notion of market for skills, because it worsens the problem of evaluation of individual skills out of a social context (the firm).

Of course, this does not mean that the process of skill formation is fully internalised within the structure of the firm. This is a question that will be addressed more deeply in the following paragraphs, but for the moment it should be remembered that there is a huge amount of knowledge which can be learnt in the formal education system, mainly. However, it is important to stress that

the formation of skills is a dynamic phenomenon that cannot be completely left out of the boundaries of the firm.

## *2. An analysis of knowledge, skills and capabilities.*

### *2.1 The categories of knowledge*

Recent developments in non-orthodox economic theory have been focused on the idea of learning economy (Lundvall, 1998). Following Lundvall, "The term the learning economy signifies a society where the capability to learn is critical to economic success... the outcome of learning i.e. knowledge, is a much wider concept than information. Information is the part of knowledge which can be transformed into bits and easily transmitted through a computer network, while learning gives rise to know-how, skills and competencies which are often tacit rather than explicit and which cannot easily be transmitted through telecommunication networks".

In this realm of recent economic literature, the definition and the analysis of concepts such as skill, capability, knowledge and competence plays a key role. A thorough survey of this complicated literature goes far beyond the scope of this contribution. However, for our purposes we need to concentrate our attention on three different topics. Firstly, a brief discussion of the different facets of knowledge will be outlined. Secondly, the distinction between skill and capability will be introduced. Thirdly, a brief conclusion concerning both the observability and the measurability of skills and labour productivity will terminate this section.

Following both Loasby (1996) and Lundvall (1998), one can point out four different categories of knowledge: a) know-what; b) know-why; c) know-how; d) know-who<sup>3</sup>. Loasby aggregates know-what and know-why under the label know-that. Basically, know-that refers to knowledge of facts, principles and laws. As a first approximation, one can assert that this type of knowledge is imparted and developed in educational and research institutions such as schools, universities and Research and Development departments. Know-how refers to both skills and capabilities. It indicates the ability to perform the proper action for the achievement of a desired result. Know-how also includes the ability to recognise the timing for that specific action. Loasby stresses the autonomy of know-how, with respect to know-that: "Knowing how to achieve a desired result may be quite independent

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<sup>3</sup> Know-who is irrelevant for the aims of this paper. This concept, therefore will not be analysed (see, Lundvall, 1998).



of any understanding of the reason why the procedure appears to work; all of us make use of procedures that we do not understand".

It is interesting to notice that, according to Loasby, know-that and know-how entail two different learning processes. As said previously, know-that is linked to learning processes in which the learner acquires information <sup>4</sup>. Differently, know-how is founded on learning procedures based on trial and error and practice. As Lundvall affirms, know-how is a form of knowledge that is stored and developed within the boundaries of the firm <sup>5</sup>. Know-how is also linked to the idea of tacit knowledge, introduced firstly by Polanyi (1967). According to Hodgson (1999), tacit knowledge means knowing how rather than knowing that. Polanyi affirms that "we know more than we can tell", referring to that set of skills that we are not aware of and that we cannot easily define or transmit.

Loasby's assertion concerning the diversity of learning processes is quite convincing. Know-how can be independent from the development of know-that, but this may not always be the case, as it will be seen in the following paragraph. A growth of know-how can be linked to an enlargement of know-that. An example can be illuminating. Let us consider a mason in charge to prepare enforced concrete for the building of a house. He may well know how to combine properly the proportions of materials needed to produce enforced concrete, but if he cannot run the complex calculations for the static structure of the building, he does not know what to do until an engineer has given him instructions. As a matter of fact, the mix of materials depends on the static structure of the building. In order to know the right mix to prepare, the results of these calculations are essential. Therefore, if the mason wants to know what sort of mix to prepare, he needs to enlarge his knowledge-that. Consequently, a relationship between know-how and know-that exists. Of course, one can conceive of a widening of the range of know-how, based only on trial and error and on practice, nevertheless it is not easy to imagine some know-how which does not depend on some form of know-that, even a basic one. It seems more appropriate to say that know-that limits the amount of know-how that the individual can accumulate. More importantly, know-that limits the awareness of practices and tasks that the individual performs. Know-that limits the awareness of know-how. The example of the mason can clarify this idea. As mentioned earlier, the mason possesses the know-how required to prepare enforced concrete. However, he does not know the proportion of the mix he has to prepare, until an engineer has instructed him. Even though he has the skills (know-how) to prepare enforced

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<sup>4</sup> For an interesting and useful discussion of learning process, see Hodgson (1999).

<sup>5</sup> This affirmation is too sharp-cut. If one thinks of vocational training, it seems difficult to maintain that know-how can be developed within the boundaries of the firm, only. It is perhaps more correct to state that know-how can be developed within the limits of the firm or in strict connection with firm activity.

concrete, the mason lacks of the relevant know-that he would need to be both fully aware of what he does and completely autonomous in decision-making.

## *2.2 Hodgson's approach to the analysis of skills and capabilities*

Hodgson (1999) has recently provided an interesting development of this type of analysis. He makes the distinction between a capability and a skill. A capability is a task that the individual performs, using a set of tools and machinery; a skill is the contribution of the human component, which is needed for the performance of that task. Hodgson sketches the example of an accountant who has to run some simple arithmetical calculations. If he uses a calculator, he can do without the skills needed to run mental arithmetic. The adoption of a calculator keeps his capabilities unchanged, but it makes the skills to run mental arithmetic useless.

With reference to the discussion developed in the previous section, one can think that capabilities lead to the idea of know-how, whereas skills can be connected to both know-how and know-that. It is not easy to draw a distinction between skills and capabilities only on the basis of the dualism between know-how and know-that. The notion of aware behaviour, sketched in the previous paragraph, has to be taken into account, if one wants to understand the difference between skill and capability. Therefore, capability regards the ability to perform a task, without any reference to the degree of awareness implied by this performance. On the other hand, skills involve the awareness of the task performed<sup>6</sup>. Capabilities can be developed without awareness, while skills cannot.

In order to understand the relative autonomy of the notions of skill and capability, let us consider the example of the mason, again. Definitely, the mason has the capabilities to perform the set of tasks to produce enforced concrete, but he does not possess the relevant know-that related to the production of this material. So, he has the capabilities needed to produce enforced concrete, but not the skills. On the other hand, the engineer possesses the know-that to produce enforced concrete, but this does not entail that he has the skills since, for instance, he may lack the practical training (know-that) required for the production of that material.

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<sup>6</sup> The distinction between capability and skill does not coincide with the distinction between theory and practice. In both the example of the mason and of the accountant, a development of their skills implies an increase in both their practical and theoretical knowledge.

The idea of routine, which plays a key role in the analysis of organisational memory <sup>7</sup>, seems to be closer to the notion of capability than to the concept of skill, especially if one intends routine as “standard operating procedure” <sup>8</sup>.

From a dynamic perspective, the development of capabilities can be determined either by some forms of automatic learning such as increase in dexterity due to repetition of the same task (learning-by-doing) or by more structured forms of on-the-job training such as apprenticeship. However, the development of capabilities can also be associated to more organised learning processes, involved in off-the-job training. In that case, the development of capabilities entails an increase in know-how, without an increase in corresponding know-that on which that specific know-how is based. As far as skills are concerned, their increase appears to be primarily related to either formal off-the-job training, or formal school education. However, since skill implies the performance of one or more tasks, the formation and development of a skill also require some form of practical training. Of course, this may not always be the case, because inductive mechanisms of reasoning can enhance skills independently of any formal or structured training. In conclusion, both skills and capabilities can be enhanced in different ways and one cannot discriminate between capability and skill development, only on the basis of the place where these learning processes take place.

The relationship between developments of skill and capability is not straightforward. The key idea is that there is not a monotonic functional relationship between skills and capabilities. On the one hand, this means that an increase in skills does not necessarily bring about a growth of individual capabilities and, on the other hand, an increase in the level of capabilities does not entail an increase in the level of skills. However, the non-existence of a monotonic functional relationship does not mean that no relationship between capabilities and skills exists, at all. Hodgson identifies two different scenarios, each of which entails a specific relationship. First of all, Hodgson mentions a scenario, which he calls "Braverman scenario". According to Braverman (1974), the capitalist productive system manifests an inherent tendency toward de-skilling of the workforce. The introduction of new machinery and productive processes tends to lower the skills' requirements of employers. Employees are more and more segregated into jobs that require a lower and lower level of skills. Technical and organisational innovations strengthen employees' capabilities but, at the same time, they decrease the level of skills needed to carry out the productive tasks. In the

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<sup>7</sup> See Nelson and Winter (1982).

<sup>8</sup> In evolutionary economic theory the term routine has different meanings. The parallel between capability and routine is appropriate only if we consider the meaning mentioned in the text. For a discussion, see Nelson and Winter (1982) and Winter (1995).

Braverman scenario the increase in the level of capabilities brings about a decrease in the level of skills<sup>9</sup>. Fortunately, this is not the only possible scenario. As a matter of fact, one can conceive a scenario in which an upgrading of skills causes an improvement in the level of capabilities<sup>10</sup>. This is the learning scenario. It is worth noticing the different causal relationships entailed in these two scenarios. In the Braverman scenario the increase in the level of capabilities causes a lowering in the skills required, whereas in the learning scenario the strengthening of skill endowment determines an upgrading of capabilities.

The distinction between skill and capability is consistent with Loasby's analysis of the notion of capability (1995). In this paper Loasby discusses the relationship between know-how and know-that. As discussed previously, he states that know-how and know-that are two different learning processes. However, this does not mean that they are independent one from each other. Truly, "Knowing how to achieve a desired result may be quite independent of any understanding of the reasons why the procedures appear to work". However, as Loasby asserts "The price that we risk paying for using procedures without knowing why they work is unpredictable failure; for if we do not know why our actions produce the desired results how can we identify which particular parts of our procedures, or which particular features of the circumstances in which we act, are crucial to that result?"<sup>11</sup>. The conclusion is that the development of know-that does not necessarily lead to an increase in know-how, but it gives rise to a stronger awareness of the procedures which govern the productive process.

More recently, Koike (1999) has stressed the importance for employees of both on-the-job and off-the-job training. Actually, Koike asserts that on-the-job training plays a pivotal role and that off-the-job training is limited to a supplementary role. The higher technological development, the greater the weight of off-the-job training. However, Koike's notion of on-the-job training is not limited to a simple process of learning based on informal training. On-the-job training is aimed at developing a deep knowledge of the whole productive process, so that the worker can intervene in case of either productive problems or changes and can also design new operational procedure. That is exactly what is meant in the previous paragraphs where the idea of awareness of tasks to be performed is introduced. Interestingly, Koike adopts the expression "intellectual skill" to refer to this form of knowledge, which is consistent with the notion of skill developed by Hodgson.

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<sup>9</sup> This scenario is consistent with the example of the accountant.

<sup>10</sup> This is the case of the mason.

<sup>11</sup> Loasby's ideas are based on a paper by Marshall (1994). According to Marshall, the human mind has two levels of control of actions. A lower level establishes a network of connections between external stimuli and a set of actions; whenever certain stimuli reach the individual, she reacts by performing a well specified set of actions. Problems arise when it is not possible to establish satisfactory connections. In that case, the higher level of control intervenes. The

The problem with the Hodgson approach concerns the way he measures skills. He claims that "the measure of a skill is the amount of time it takes to achieve that level of skills". This cannot be considered entirely satisfying. The existence of tacit knowledge and of organisational learning is at variance with Hodgson's idea. It does not seem to be very easy to measure the amount of time needed to develop either a skill whose content cannot be explicitly expressed or a skill which is based on shared knowledge.

### *2.3 The contractarian approach*

The so-called contractarian approach is linked to recent developments of neoclassical economic theory. This paragraph cannot provide a deep and thorough treatment of this kind of economic literature; this would go beyond the aim of this contribution. Hodgson (1998b) contains an excellent and brief survey of the methodological implications of this literature. Nevertheless, it is quite important to underscore some features of the methodology followed by this stream of the literature, in order to realise how far the approach adopted in this paper is from a more standard way of analysing issues such as skill formation, wage determination and economic organisations.

The contractarian approach is rooted in Coase's analysis on the nature of the firm, too. In this standard approach the relevance that Coase assigns to contracts in finding skills is extended to all aspects of the relationship between an employer and the individuals who work for her. Basically, the idea is that all the relationships within the firm can be conceived in terms of contracts and exchange. Furthermore, the contractarian approach shares the Coasian idea that skills can be found on the external labour market. Nevertheless, contrarily to Coase's analysis, this literature maintains that skills can also be formed within the firm, provided that a scheme of appropriate monetary incentive is designed. Therefore, the firm can be conceived as a network of contracts linking and constraining the agents.

Two streams of this literature must be taken into account. First of all, the contributions based on the principal-agent model; secondly the human capital theory. As Hodgson notes (1999), the problem with principal-agent-based models is that these do not consider some feature of the employment relationship<sup>12</sup>. As a matter of fact, most principal agent models deal with problems of monitoring employees' effort without specifying the nature of the link between the entrepreneur and the

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individual analyses the range of actions and their consequences through a conscious process of analysis.

<sup>12</sup> See Hodgson (1999)

individuals who work in the firm. Principal-agent models are compatible with a long-term employment relationship between employer and employees. In spite of this, these models are also consistent with an organisational structure of firm consisting in a network of contracts between the entrepreneur and self-employed individuals. Neither any coordination problem nor any technological constraint seems to prevent this sort of organisational arrangement. In conclusion, the existence of an employment relationship is irrelevant in this kind of analyses. This is also at odds with Coase's analysis in which the relevance of the employment relationship is explicitly stated.

The human capital theory cannot be considered completely satisfactory, too (Becker, 1964, Chapman, 1993). Even though skill formation is taken into account, human capital theorists neglect the relation between skill, as conceived in the competence-based approach. In addition, their analysis of skill formation is focused on the individual employee without any reference to the social mechanisms that mould the learning process. Furthermore, as Hodgson (1999) rightly notices, human capital theorists assume that "skills are readily measurable in monetary terms and generally tradable on the market".

In more standard approaches the market for skills/capabilities tends to coincide with the market for occupational groups. However, the latter does not overlap with the former. Markets for occupational groups involve groups of individuals with roughly defined homogeneous sets of competences, educational backgrounds... On the other hand, markets for skills/capabilities refer to clusters of tasks to be performed by one or more employees. As mentioned previously, a market for skill/capability can be hardly defined. Vice versa, a market for professionals is easier to conceive; the educational attainment of an individual and her previous working experience can indicate both to which segment of the labour force the individual belongs to and to which type of jobs she can aspire. This kind of market can be more or less structured according to the institutions that govern it and can be considered as a proxy of a market for skills. Basically, the problem with the idea of market for occupational groups is that it neglects the process of skill formation that takes place within the firm. Quite interestingly, in the economic literature skills are mainly measured indirectly. An analysis of the idea of skill developed in the empirical literature goes beyond the scope of this paper, nevertheless it is interesting to mention a couple of papers which give the idea of the dominant approaches in the empirical analysis of market for skills. In a survey of the human capital approach Mincer (1994) points out length of training/education and experience as approximations of the skill level of employees. In his analysis of change in the demand for skill Machin (1996) adopts two different proxies for the variable skill such as a broad definition of the type of productive

activity (manual and non-manual employment) and employment category (i.e.: managers, professional, supervisor,).

#### *2.4 Skills and productivity measurement*

The analysis of skills and capabilities brings us to analyse the problem of observability of individual productivity. Roughly speaking, individual productivity can be appraised in two different ways. First of all, one can evaluate individual productivity a-priori. This means that the employer can try to figure out the level of individual productivity, before the individual itself is involved in any productive operation. For that purpose, the employer can use some indirect indicator such as the educational level or previous working experience. However, both uncertainty (in the sense of Knight) and the tacitness of some skills make a-priori assessment of individual productivity extremely problematic.

Secondly, it can be extremely difficult to provide an evaluation of individual productivity, even ex-post. The reason for this leads to two different features of production in firms. First of all, production within firms is always team-oriented (Alchian and Demsetz, 1972). As a matter of fact, according to Alchian and Demsetz, one of the necessary conditions for the emergence of firms is that team-oriented production increases the level of productivity. Consequently, team production is an inherent characteristic of firm production. As the two American economists state “With team production it is difficult, solely by observing total output, to either define or determine each individual’s contribution to this output of the co-operating inputs.” The problem is that team production is not the mere sum of individual productions, since “individual co-operating inputs do not yield identifiable, separate products which can be summed to measure the total output”<sup>13</sup>. The effect of team production is to increase the level of costs to measure individual productivity. Besides, the problem of free riding in production worsens the difficulties in assessing individual productivity. In Alchian and Demsetz’s analysis, the role of the entrepreneur is to continuously adjust the contract terms, which link employer to employees, in order to design a network of agreements and incentives that prevent shirking and free-riding problems. This process of continuing contractual adjustments depends heavily on monitoring the use of inputs which “is a

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<sup>13</sup> Analytically this means that, if one defines the production function as:  $Z=z(X_1, X_2)$ , then the following inequality holds:  $\frac{\partial^2 Z}{\partial X_1 \partial X_2} \neq 0$ .

method of metering the marginal productivity of individual input to team's output.<sup>14</sup> There seems to be a contradiction in Alchian and Demsetz's analysis. On the one hand, they maintain that it is not possible to distinguish individual productivity in teams, on the other hand, they assume that appropriate monitoring allows an assessment of individual marginal productivity; the only problem is the level of monitoring cost. Furthermore, this process of continuous adjustments of contractual terms does not seem really feasible and would give rise to exceeding bargaining costs. In conclusion, team production can pose serious limits to productivity evaluation.

The second relevant feature of production leads to the concept of complementarity<sup>15</sup>. Unlike team production, complementarity refers not to two or more productive inputs, but to different groups of related activities whose returns are interconnected. One can think of two different departments of a firm. Consequently, if the effect of an increase in the level of a group of activities is the increase of productivity of another group, then it becomes more and more difficult to evaluate what happens to the individual productivity of single inputs.

As a conclusion, if one wants to evaluate the productivity of individual inputs, then one has to consider both the productivity of the single factor with respect to other factors, which operate within the same activity (team production), and the effects of the level of other groups of activity. This makes measurement of productivity extremely problematic, if not unfeasible.

The idea of productivity that is compatible with the competence-based notion of the firm can be traced in Lester Thurow's (1972) model of job competition. In this model productivity is attached to jobs and not to individuals. Each job position entails a set of tasks to be performed and, in this sense only, is associated to a given level of productivity, not in terms of marginal revenue. The problem of the employer is to recruit individuals whose endowment of skills/capabilities allows the minimisation of the expected training costs needed to reach the productivity corresponding to that specific job position. It is a problem of matching the job characteristics with the development of individual skills/capabilities. The matching process between these two elements does not necessarily imply that both skill and capability formation is entirely controlled by the employer. As Knight asserted, the employer may lack the proper competences to assess an employee's skills. Of course, this also applies to skill/capability development.

The underlining idea of the American economist is that individual productivity cannot be considered per se. The expected productivity of the job position, the process of skill development and the match

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<sup>14</sup> The aim of Alchian and Demsetz's contribution is also to answer "Coases's question" Why do firms exist? Their answer is that firms exist because production is inherently team-based and, therefore, it must be organised by a central authority in order to supervise the arrangement of team production.

<sup>15</sup> See Milgrom and Roberts (1990).



between the latter process and the job position are crucial to determine the level of individual productivity. In conclusion, the interaction between job design and uncertain skills are essential to evaluate the individual performance of an employee.

It is important to stress that Thurow's analysis of productivity does not imply that productivity can be easily measured. In this context, productivity is the result of job design and can be conceived as the features and the amount of tasks, associated to a specific job position. Nevertheless, even though a job position can be described thoroughly in terms of task, this does not mean that one can know the marginal revenue of the employee associated to that specific job position. The serious problems stemming from both team production and production complementarity persist, regardless of the existence of accurate job design.

### *3. Internal labour market and the development of skills*<sup>16</sup>.

In the seminal contribution of Doeringer and Piore (1971)<sup>17</sup>, the internal labour market<sup>18</sup> is defined as "an administrative unit, such as a manufacturing plant, within which the pricing and allocation of labor is governed by a set of administrative rules and procedures".

Internal labour markets perform two different and related functions. First of all, they allocate labour by both designing the degree of openness to the external market and establishing the rules for inner mobility of employees. The degree of openness depends on the so-called ports of entry and exit, which are job classifications connecting the internal and the external labour markets. Therefore, a port of entry is a job position in proximity of which new hirings take place<sup>19</sup>. The higher the proportion of ports of entry with respect to the total positions which can be numbered in the internal labour market, the higher its degree of openness. Furthermore, the higher the degree of openness of the internal labour market, the lesser the employees' chances for upward mobility in the hierarchy of the firm. Secondly, internal labour markets define the structure of absolute and relative wages of a firm on the basis of both the external labour market conditions and the allocative structure.

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<sup>16</sup> In the following sections when the distinction between skill and capability is not explicitly made, the term skill will be used to refer to both skill and capability.

<sup>17</sup> The idea of internal labour market was firstly conceived by Kerr (1954) in his paper about the balkanisation of labour markets. However, Doeringer and Piore were the first economists who developed an articulated and complete analysis of this notion.

<sup>18</sup> For a discussion about the correctness of using the term market in this context, see Hodgson (1999).

<sup>19</sup> An analogous definition can be provided for ports of exit.

In the analysis of the two American economists the rising and evolution of internal labour markets depends on both capability specificity <sup>20</sup> and customary law <sup>21</sup>. In each firm, employees tend to develop specific capabilities, which can be used solely in that specific firm. Specific capabilities bring about an increase in the level of training costs, since they imply some form of specific training. Therefore, the employer can find it convenient to establish a long-term employment relationship with employees, which results in a decrease in the level of turnover. In this way, employees are protected by the competition of the unemployed. As far as customary law is concerned, according to Doeringer and Piore “custom at the workplace is an unwritten set of rules based largely upon past practice or precedent”. Besides, “these rules can govern any aspect of the work relationship from discipline to compensation”. Custom and habits play an important role in both the process of wage determination and in the allocation of labour. They determine a sort of inertia in the behaviour of both employers and employees.

However, if one takes the analysis developed in the previous paragraph into account, then the story concerning internal labour market origins can be quite different. The essence of the story told by Knight about skills entails that it is very problematic to conceive a market for skills, due to the existence of uncertainty <sup>22</sup>. As a complement to Knight's analysis, Penrose underlines the relevance of the firm in skill formation.

Given this, internal labour markets arise in order to manage the process of both capability and skill development within the firm. This reverses the causal relation between skill development and internal labour market implied in the analysis of Doeringer and Piore. As mentioned earlier, the two institutionalist economists claim that capability specificity gives rise to internal labour market. In the approach proposed here, internal labour markets originate from the collapse of a market for skills due to uncertainty. Therefore, the acquisition of capabilities and skills in a firm is a process which is not brought to an end through the recruitment of a specific individual, with a well specified endowment of formal education and work experience. As Penrose stated clearly, skill formation and development are inherently dynamic processes which take place in an uncertain context. Therefore, internal labour markets aim at managing this complex process. If one adopts the competence-based model of the firm, outlined in the beginning of this contribution, capability specificity is a consequence of internal labour market specificity and not vice versa, as Doeringer and Piore

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<sup>20</sup> Doeringer and Piore use the expression skill specificity. Following the discussion elaborated in the previous section, it seems more appropriate to use capability specificity.

<sup>21</sup> Doeringer and Piore treat skill specificity and on-the-job training separately. However, given the strict link between these two elements, it seems more convenient to investigate their influences jointly.

<sup>22</sup> Knight's analysis of skills can be extended to capabilities.

maintain<sup>23</sup>. As mentioned in the previous section, this interpretation of internal labour market does not entail that skill formation is an employer-driven process. Even though the employment relationship implies that the employer can exercise some form of authority on the employees, this does not mean that skill formation is exclusively managed by the employer.

If the firm belongs to an industrial district the analysis of the learning process cannot be restricted within the boundaries of the single firm (Albertini, 1999). The process of formation and development of both skills and capabilities can take place in the industrial districts and not within the limits of a firm. The single firm can be considered as a node of an inter-firm internal labour market. Each node is an open internal labour market. The analysis of both the allocative and the wage determination functions should not neglect this aspect and should also take into account the relationships among the cluster of firms belonging to the industrial district. Similar considerations apply for employees' mobility and all the dimensions of internal labour market analysed until now. The analysis of internal labour market in industrial districts would deserve special attention. This would lead us beyond the aim of this paper. However, the approach followed in this paper, based on the analysis of both skills and capabilities, seems more fruitful than the traditional analysis focused solely on individual employees and it can be an interesting starting point for an analysis of labour markets in industrial districts.

This interpretation of the origins of internal labour markets changes the meaning of the functions which these have to perform. In this framework of analysis, the role of internal labour markets is not only to allocate labour, but, and primarily, to allocate and develop both skills and capabilities. Of course, labour allocation is a function that internal labour markets continue to carry out, because both skills and capabilities are always attached to individuals. However, skill and labour allocation perform two different functions, which do not necessarily coincide. If one thinks of the notion of multi-tasking, according to which the same employee has to perform two or more different tasks, then one can realise that the same allocation of labour is consistent with different allocations of both the skills and the capabilities attached to the employee. Consequently, ports of entry cannot be simply defined as job positions in proximity of which new hirings take place. In an uncertain and dynamic context, ports of entry can be considered as conjectures on skills and on their developments, devised by the employer, in proximity of which recruitment takes place. The key idea is that the employer formulates expectations concerning the mix of skills and capabilities required with the limitations stressed by Knight as far as the employer's ability to forecast is concerned. In

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<sup>23</sup> Of course, one can conceive feedback effects of capability specificity on structuring and consolidation of internal labour market.

addition, the employer formulates some conjectures on the endowment of skills and capabilities associated to the applicants for a job position. Also in this case the limitation analysed by Knight apply. The hiring of a new employee is founded on the match between the expectations on the skills required and the conjectures on the applicants' characteristics. Basically, this corresponds to the recruiting process described by Thurow.

The idea that internal labour market arise in order to manage the process of both capability and skill development stems from Loasby's (1995) analysis of the firm. According to the British economist, the firm can be conceived as "one way of organising the [interdependent] capabilities of a collection of people". Loasby applies the Smithian idea of the division of labour to the process of acquiring skills within firms; the division of labour entails a division of knowledge that gives rise to a deepening of specialised competences.

It is also interesting to analyse internal mobility, taking into account this notion of internal labour market. In this context we are referring to mobility of both skills and capabilities, not to mobility of labour. One can observe either upward mobility or downward mobility. Upward mobility takes place either through learning-by doing or through some form of more or less structured training. However, it is important to stress that upward mobility of both skills and capabilities does not always entail an analogous movement in the job position of the employees to whom skills are attached. Therefore, upward mobility of skills and capabilities can take place regardless of career mobility. In addition, downward mobility of skills and capabilities can also be observed. This can happen either when certain specific skills or capabilities are marginalised from the productive process and become less and less important <sup>24</sup>, or when technical and organisational change causes an increase of the average quality of skills and capabilities used within the firm. In the latter case, downward mobility happens because a specific endowment of skills is surpassed by more updated or deeper knowledge, stemming from recruitment of new personnel. Therefore, downward mobility of both skills and capabilities of an employee depends on the relative position of both with respect to the total endowment connected to the firm.

To conclude with the analysis of the allocative function of skills and capabilities, it is important to examine the notion of openness/closeness of internal labour markets. Of course, the higher the number of ports of entry, the higher the degree of openness of the internal labour market and, accordingly, the higher the propensity to find skills and capabilities out of the firm <sup>25</sup>. However, this

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<sup>24</sup> For an analysis of de-skilling, see Braverman (1974). Product innovation can give rise to marginalisation of some skills or capabilities.

<sup>25</sup> When we refer to the process of finding skill, we always take into account the problems in skills recruitment pointed out by Knight.

affects the mobility of both. The direction of this type of mobility depends on which level of both skill and capability range ports of entry are situated. On the one hand, downward mobility processes can be assumed, if the employer has a certain propensity to hire employees endowed with skills or capabilities, whose level results much higher for the newly employed than for the older employees. On the other hand, if the employer is oriented to hire workers endowed with low skills and capabilities, then an appreciable degree of downward rigidity of both skill and capability mobility can be assumed to prevail. In contrast, the structure of the internal labour market tends to be closed, when the number of ports of entry is limited. In this case, formation and development of both skill and capability is mainly based on internal resources. This scenario is compatible mainly with upward mobility processes.

As far as the function of wage determination is concerned, in this very preliminary stage of the analysis, one can say that internal labour market define the structure of absolute and relative wages of a firm, on the basis of both external labour market conditions and the allocative structure. This coincides with the definition mentioned earlier in the outline of the approach developed by Doeringer and Piore. However, in our treatment, definition of allocative structure is different from the one given by the two American economists. As it should be clear, Doeringer and Piore refer to an allocative structure of labour, whereas we refer to an allocative structure of both skills and capabilities. A deeper analysis of wages will be developed in the following parts of this contribution. For the moment we say only that the structure of wages depend on the allocative structure of both labour and skills.

### *3.1 Internal labour market in a dynamic context*

In a dynamic context, where changes in both skills and capabilities can be observed, mobility of both can take place in different ways. As outlined earlier, one can observe either an increase in capabilities which gives rise to a process of de-skilling (Braverman scenario), or an improvement in the level of skills which causes a raising in the level of capabilities (learning scenario). Of course, internal labour markets and their allocative structure operate differently, according to which scenario tends to prevail.

Three different ideal types can be pointed out.

a) Prevalence of the Braverman scenario: in this case, the attachment of labour to the internal labour market collapses, because the performance of productive tasks entails decreasing skill levels which

can be easily found on the external labour market. Problems in the recruitment of skills described by Knight are minimised because of both the simplicity of the skills involved and the short duration of the employment relationship. The allocation of both skills and capabilities tends to coincide with the allocation of labour, since the decreasing level of skills does not allow either multi-tasking learning or job rotation. Tasks consist of simple routines; the choice of the routines to apply is straightforward and entails the interpretation of simple "signals". Learning processes are based either on imitation or on learning by doing or on unstructured on-the-job-training.

b) Prevalence of the learning scenario. A long-term employment relationship dominates this kind of internal labour market, because skills are developed within the firm. Problems of recruitment can arise and the function of allocation of both skills and capabilities diverges from the allocation of labour. Coordination of skills, capabilities and labour become crucial functions of the internal labour market. Tasks involve increasingly complicated routines whose use depends on the interpretation of increasingly complex signals. Finally, the development of skills is based on structured on-the-job and off-the-job training activities.

c) Segmented internal labour markets <sup>26</sup>. In this case, the two internal labour markets mentioned in a) and b) coexist.

#### *4. A taxonomy of the firm in terms of labour organisation*

Following some work of Aoki, Sestito and Trento (1997) define four different ways of arranging information flows within firms:

- a) centralised information systems collect all information and communicate vertically and not horizontally;
- b) hierarchical decentralisation, where the centre provides the different departments with behavioural rules to follow in case of idiosyncratic shocks;
- c) horizontal hierarchy which is characterised by horizontal exchange of information between departments and joint definition of strategies to implement in response to external shocks.
- d) a model based on differentiated information which entails horizontal exchange of information together with both high degree of decentralisation and autonomy of departments. Available information is decentralised and each department reacts individually to external shocks.

Each of these models tends to require to employees a specific endowment of skills:

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<sup>26</sup> A definition of segmented internal labour markets will be introduced in section 4.

- a) Centralised model. This kind of organisation requires employees able to perform highly specific tasks. The skills and capabilities needed are quite general and can be used in other firms;
- b) Decentralised hierarchical model. In this case highly specialised skills are demanded;
- c) Horizontal hierarchy model. In this case more general skills are used;
- d) Model based on differentiated information. In this case specialised skills are required, which can be acquired mainly outside the firm.

This taxonomy of models implies that skills differ primarily according to both the way in which they are acquired and the degree of task specialisation. As far as acquisition of skills is concerned, we refer to the classic distinction between on-the-job training and off-the job training.

An interesting development of Sestito and Trento's analysis combines the two kinds of acquisition of skills and the degree of specialisation of tasks. Four combinations can be pointed out.

- a) Off-the-job training and poorly specialised tasks. No firm-specific training implies that tasks are very easy to perform. Employers can easily find the skills needed in the external labour market.
- b) Off-the-job training and highly specialised tasks. In this case the recruitment of the required skills is made easier when an occupational labour allocation exists. According to Marsden (1986), an occupational labour allocation <sup>27</sup> “may be defined as relating to persons endowed with a particular skill or qualification, validated by a diploma or by the opinion of their peer group...”
- c) On-the-job training and highly specialised tasks. In this case skills can be developed through an internal labour allocation system;
- d) On-the-job training and poorly specialised tasks. This combination entails that workers can move from one group of tasks to another. This arrangement requires an internal labour allocation system and well structured learning processes. Some type of formal training, which takes place during the employment relationship, may be necessary. Table 1 summarises these four kinds of arrangements.

The complexity of tasks does not depend on the degree of specialisation of the task itself. The complexity of tasks depends on the interaction between specialisation and training. Off-the-job training along with poor specialisation gives rise to simple tasks to perform. Any employees with minimum educational background and a poor knowledge of productive processes can carry out those tasks. On the other hand, off-the-job training along with highly specialised tasks imply that the latter are quite complex. In the case of on-the-job training things turn upside down. On-the-job training along with low specialisation lead to a set of tasks which can be carried out only if the employee has knowledge of different stages of the productive process. In that case, poor

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<sup>27</sup> Actually, Marsden refers to occupational labour market. However, in this context, it seems more appropriate to refer to occupational labour allocation.

specialisation indicates that the employee can easily shift from one set of task to another one. On the contrary, this type of mobility between different tasks cannot be observed when there is on-the-job training and high specialisation of tasks.

#### *4.1 Pagano's taxonomy of labour allocation systems*

In a similar analysis, Pagano (1997) proposed a taxonomy of labour allocation system based on employees' rights. He refers to two different kinds of rights that employees can enjoy: organisational rights and occupational rights. The former is the right to a lasting employment relationship in a firm; the latter is the right to a specific job. In the first case the employee has the right to some unspecified job in the same firm. Employees can be easily shifted from one set of tasks to another one, but they cannot be sacked. On the other hand, when occupational rights prevail, the employee has the right to perform a very well specified set of tasks. This range of tasks is bargained between the unions or a labour corporatist association and the employers' association. However, the employee does not have the right to a long-term employment relationship and can easily be fired.

It is interesting to observe that the trade-off between organisational and occupational rights coincides with the trade-off between functional and numerical flexibility<sup>28</sup>. If organisational rights prevail, numerical flexibility is negligible, whereas functional flexibility is quite intense. In contrast, if occupational rights prevail then the level of numerical flexibility is quite high, but functional flexibility is very low. Consequently, the firm's internal flexibility is well developed in case of organisational rights, but the labour market is rather rigid, while the labour market is flexible but the firm quite rigid in the case of occupational rights, because of the constraints that the firm face to internal mobility of employees.

Pagano points out two other arrangements. In the first one organisational and occupational rights coexist; this is the case of classic socialism<sup>29</sup>. In the second one employees have neither

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<sup>28</sup> Flexibility has three different dimensions: functional, numerical and pay. Functional flexibility implies that the same worker can do a wide range of different tasks. This kind of flexibility allows the firm to change the quality and the level of production with negligible additional costs. It implies highly skilled workers and an appropriate allocative structure of labour. Numerical flexibility implies that the firm can adjust the level of working hours in the short-run in response to fluctuations of the demand. This implies that the employer has not relevant problems in hiring and firing workers or in changing the working time. The requirement for numerical flexibility can give rise to secondary job arrangements within the firm such as outwork, part-time... Pay flexibility implies that the level and the internal structure of wages can be modified in the short-run.

<sup>29</sup> This arrangement will not be investigated further on .



organisational nor occupational rights. This second case is characterised by a high level of both numerical and labour market flexibility. The operation of this allocation system resembles a competitive labour market and for this reason it has been labelled spot allocation for labour. The four cases pointed out by Pagano are summarised in table 2.

Each of these four cases identified by Pagano is characterised by a specific way of developing skills. When organisational rights prevail, one can observe a well structured system of on-the-job training within an internal labour market. As a matter of fact, both the employees and the employer have the incentive to develop firm-specific skills, because of the existence of a long-term employment relationship. This explains the reason why functional flexibility is quite high when organisational rights dominate. Long-term employment relationship is compatible with incomplete contracts as mentioned in Coase's analysis of the firm. Therefore, a high degree of functional flexibility requires incomplete contracts. This case is denominated internal labour allocation.

In the case of occupational rights, employees have the right to decide the contents of their jobs. Task assignment to employees tends to be quite rigid and internal mobility low. Since employers can quite easily fire employees, then the latter have a low propensity to invest in specific skills and a higher propensity to invest in general skills, which can be used in other firms. In this case contracts are designed so as to be as complete as possible and this results in considerable problems of bargaining costs. This is the case of occupational labour allocation. In the third case, employees do not enjoy any right. Firms enjoy a high degree of numerical flexibility, but do not have incentives to invest in specific training. Of course, this last assertion is also valid for employees. This case is denominated spot allocation of labour.

All different labour organisations can be considered as specific internal labour markets. In fact, each of these organisational arrangements specifies both an allocation of skills and a system of remuneration. Basically, an occupational labour allocation is a perfectly open internal labour market, which recruits skills from the external labour market. A spot labour allocation is an internal labour market in which ports of entry are set up in proximity of low skills. This organisation of labour attempts to solve difficulties in recruiting skills through a specific job design, which entails simple tasks. Finally, an internal labour allocation is an internal labour market with a limited number of ports of entry. In this organisational structure skill formation and development occurs within the boundary of the firm.

The taxonomy developed in the fourth paragraph and the one developed by Pagano are strictly connected. In the following paragraphs, it will be discussed how each cell of table 1 corresponds to

a cell of table 2. In this way the relation between skill development, internal/external labour market and flexibility is made explicit.

#### *4.1.1 Internal labour allocation*

It should be quite clear that cell c of table 1 corresponds to cell c of table 2. Actually, cell c of table 2, which refers to the condition when organisational rights prevail, gives rise to structured internal labour allocation and internal mobility of employees. As said earlier, this is consistent with cell c of table 1; non specialised tasks and on-the-job training entail an internal labour allocation system. Cells c of both table 1 and 2 lead to the same organisational structure of the firm.

In this case pay flexibility can be observed. Internal mobility of employees and numerical rigidity, implied by organisational rights, require a certain degree of pay flexibility. However, two different situations should be taken into account: a) all employees enjoy organisational rights. In this case, a decrease in the level of wages is required if the firm faces a sudden and unforeseen decrease in product demand, in order to keep a given level of profitability. This wage decrease may not involve all employees, or can hit employees differently, according to internal rules or custom prevailing in the firm such as seniority, job grade, and skill grade. b) not all employees enjoy organisational rights. In this case, due to a decrease in product demand, the firm can fire some of the employees who do not have organisational rights. This is consistent with the idea of Coriat (1991) that numerical and functional flexibility are closely related<sup>30</sup>. In that case, some employees are re-allocated to different tasks. An a-priori assessment of the consequences of these shifts is not feasible, since they depend on many factors, including the duration of product demand decrease and the relevance of re-skilling processes needed for the internal re-allocation of employees. However, this scenario can also require pay flexibility.

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<sup>30</sup> In his analysis Coriat implies the existence of a segmented internal labour market. This allows the firm to enjoy functional flexibility. In the same firm two different internal labour markets coexist. One of these internal labour market adjusts according to product demand fluctuations (secondary internal labour market) and is functionally complementary to a second internal labour market (primary or core internal labour market). Due to a decrease in product demand, the employer is forced to fire some employees belonging to the secondary internal labour market. In order to continue to produce, a few employees belonging to the primary internal labour market have to perform the tasks which were previously carried out by the fired employees. Therefore, some employees are re-allocated to different task, so that production on a smaller scale can take place. In this sense, functional and numerical flexibility are intertwined.

#### *4.1.2 Occupational labour allocation*

Table 1 shows that occupational labour allocations arise when labour organisation is based on specialised tasks which can be carried out by employees with an appreciable degree of off-the-job training. Moreover, Pagano's taxonomy has shown that occupational labour allocations require a considerable degree of numerical flexibility (external labour market flexibility). Cells b of both table 1 and 2 point to different features of the same phenomenon. They jointly describe the link among labour organisation, skill formation and flexibility (functional and numerical). This is the "pure" form of occupational labour allocation.

Occupational labour allocations are not incompatible with internal labour allocation arrangements. As it should be clear from both Knight's and Thurow's analysis, adjustment of skills to job position is always needed. Knight stressed the role of uncertainty in finding skills. Uncertainty can result in further training for two reasons. Firstly, employee's skills are discovered thoroughly after the employment relationship has started. Those skills may not be completely suitable for the specific job position and hence further training is needed. Secondly, it is quite difficult to conceive a job position whose content depends only on employee's characteristics. The analysis by Thurow is illuminating to understand the role of employer in job design.

Therefore, both development of skills and capabilities can take place in an occupational labour allocation, even though it will be claimed later on that the function of strengthening capabilities is more important. In this organisational structure, the amount of firm-specific learning results in a rising of organisational rights; the more intense learning, the stronger organisational rights. In conclusion, internal labour allocation can also develop in occupational labour allocation; the relevance of internal labour allocation arrangements depends on both intensity of learning and the role played by numerical flexibility in firm adjustment.

It is important to notice that in this type of labour organisation wage rigidity can prevail. Rigidity of tasks and acknowledgement of a professional status to employees support this statement.

#### *4.1.3 The spot allocation for labour*

Finally, it should be clear that cell d of Pagano's taxonomy (table 2), in which both organisational and occupational rights are absent, is compatible with cell a of table 1. When no type of right exists, then non specialised tasks prevail. For the performance of these tasks no on-the-job training is

required. In that case any individual recruited from the external labour market will do. Employees and unemployed are perfect substitute. However, a spot allocation for labour (cell d of table 2) is also compatible with the minimum amount of on-the-job training that permits an employee to carry out some very narrow and simple tasks. In this circumstance, investment in on-the-job training is very low for both the employer and the employee and therefore employees can easily be substituted. Training is provided by an internal labour allocation through informal apprenticeship. Conclusively, a spot allocation for labour is consistent with both cell a (non specialised tasks and off-the job training) and cell d (on-the-job training and specialised tasks) of table 1.

#### *4.2 Labour allocation and development of skills and capabilities*

It is rather important to match the analysis of the two different scenarios discussed in the previous section with the three labour allocation arrangements pointed out in this section.

The spot allocation for labour is the simplest case to analyse. When a minimum amount of on-the-job training is required and the employment relationship tends to be of limited duration, skill and capability development is not a crucial function of the firm. Of course, learning is based on both informal on-the-job training and on learning-by-doing. Since tasks get simpler and simpler, the latter causes a shortening in performance time. Skill development is irrelevant; learning is focused on capability development. Coordination of tasks is based on very simple and standardised routines, which leave little room for employees' decision-making. In conclusion, the spot allocation for labour is consistent with the Braverman scenario and with the analysis of the fordist factory.

In the case of occupational labour allocation, things are more complicated. In the "pure" case of occupational labour allocation, employees have an endowment of skills that permits the performance of tasks, without further training. However, as said previously, internal labour allocations develop in occupational labour allocations, too. Nevertheless, in the case of occupational labour allocation, the relative rigidity of work organisation constrains the development of both skills and capabilities. Actually, the professional status of employees in occupational labour allocations guarantees that their skill endowment is quite high. Therefore, the focus is not so much concentrated on developing skills as on strengthening the level of capabilities. Internal labour allocation arrangements within occupational labour allocation can give rise to a certain development of capabilities, mainly. As a consequence of that, upward and downward mobility can be quite limited.

Occupational labour allocations are consistent with the learning scenario, even though the learning process of skills takes place outside the firm.

It is quite important to underscore that when occupational labour allocations prevail, a crucial role is played by the education and training systems outside the firm. A system of formal validation of skills is required so to decrease the inherent uncertainty associated to employers' activity of skill finding.

It should be quite easy to realise what happens when internal labour allocations prevail. Given the long-term employment relationship between employees and employer, the firm play an important role in developing both skills and capabilities. Because of that, the internal structure of the firm is much more mobile than in presence of occupational labour allocations. Therefore, the firm needs a very well structured management of both skill and capability. The internal labour allocation hypothesis is compatible with the learning scenario. In spite of that, it should be remembered that segmented internal labour allocation systems can be observed within this organisation of work. For those employees who do not enjoy employment stability, the analysis resembles the one which has been discussed in the case of the spot allocation for labour. For these employees the Braverman scenario tends to prevail.

In this case a system of formal validation of skills is important, too. However, because of lasting employment relationships, it is more important to develop a system of screening, aimed at selecting employees. Segmentation of internal labour allocation system can be used for this purpose. Ports of entry can connect the two different internal labour allocation systems. Through these ports of entry an employee can gain access to the primary labour allocation system, after a spell of examination and training spent in the secondary labour allocation system.

## *5. Payment Systems*

As it will be seen in the final part of this paper, wage determination is analysed in most standard models without jointly considering the organisation of labour and the development of skills. On the contrary, in this paper, wage determination interacts with both the allocation of labour and the formation of skills. Basically, this entails that wage fixing also depends on the organisation of skill development. Therefore, each typology of firm defined in the previous sections tends to develop payment systems which is consistent with its internal structure.

The problem of stability in the relationship between the internal structure and the payment system of a firm will be addressed. These questions will just be mentioned and not analysed in depth. Generally speaking, a system of payment and an organisational structure are stable, if both tend to reinforce each other through feedback effects <sup>31</sup>. The formation of both skill and capability, the system of rights, the length and the degree of completeness of contracts, and the degree of centralisation of bargaining make up an integrated system. They reinforce each other and give rise to an institutional equilibrium. Change in the components of this equilibrium can alter it, leading to a different, and not always predictable, situation.

It is very important to mention that the wage structure of a firm plays two essential roles. First of all, the level of wages is a factor of adjustment for a firm. This aspect is tightly connected to pay flexibility. An external shock makes adjustments in the wage structure necessary, giving rise to a decrease in wages, for some employees at least. This adjustment can be related to a re-allocation of tasks. Secondly, wages can play a crucial role in the development of both skills and capabilities. As Koike (1994) states “Without appropriate incentives, few workers are willing to acquire intellectual skills. There is no particular way to encourage them to do so other than by orthodox measures, that is, fair assessment and fair compensation for skill development”. These functions carried out by the wage structure are intertwined and related one to each other. In the following section the relationship between systems of payment and work organisation will be analysed taking the two roles performed by both the structure and the process of determination of wage into account.

Three different remuneration systems will be taken into account: piecework wage rate, hourly wage rate and profit-related scheme of compensation. Piecework wage rates are perhaps the oldest remuneration system and can take various forms <sup>32</sup>. This system can be quite problematic, if individual productivity cannot be assessed, properly. The hourly wage rate has appeared more recently and is related to centralised bargaining. Finally, profit-related payment systems are integrated with one of the two other remuneration systems and, as Mancinelli and Pini (2000) claim, is aimed at pursuing three targets, namely increases in effort, risk-sharing and participation in management’s decision.

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<sup>31</sup> For an analysis of institutional equilibria, see Pagano (1991)

<sup>32</sup> See Dobb (1959).

### *5.1 The spot allocation for labour*

The spot allocation for labour is the form of work organisation nearest to perfect competition. In this case the skill content of work is quite poor and so are opportunities for skill or capability development. Two forms of wage compensation can prevail: a) piecework wage rate; b) hourly wage rate. In fact, a profit-related system of compensation is hardly consistent with this labour allocation. a) Since spot allocation for labour is associated to both narrow tasks and a minimum amount of on-the-job training, this form of compensation develops incentives to an increase in speed of execution to the detriment of the quality, which is straightforward because tasks are simple. Accordingly, piecework wage promotes a rise in employees' capabilities.

It is interesting to observe the causal relationship between this system of compensation and the learning processes linked to a spot allocation for labour. On the one hand, easiness of tasks minimises problems of measurability of performance of employees and, therefore, permits the adoption of this compensation system. On the other hand, the adoption of a piecework wage tends to increase capabilities in terms of speed of execution of simple tasks; in a sense this compensation system promotes this kind of automatic learning. Therefore, these feedback effects strengthen both the allocative and the payment system. Conclusively, an organisational form in which piecework wage and spot allocation for labour coexist is highly stable, because of these feedback effects.

From an organisational perspective, this remuneration system increases problems of coordination of productive activity of the employees and requires a well-structured inventory for raw materials and unfinished products. Another aspect, pointed out by Dobb (1959), is worth mentioning. Since this organisational arrangement is compatible with a high degree of numerical flexibility, employees' turnover is expected to be quite high. The piecework wage can be considered an efficient solution to provide employees, whose attachment to job is quite low, with incentives<sup>33</sup>. Feedback effects, as those discussed before, can link this compensation system to numerical flexibility. In fact, from the one hand, piecework wage rate provides with incentives employees with no organisational rights and, on the other hand, the adoption of this remuneration system requires numerical flexibility for the maximisation of its effects on the level of effort of the employees. Obviously, piecework wages and high numerical flexibility, implied by the absence of organisational rights, minimise problems of both pay and wage bill flexibility.

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<sup>33</sup> For a survey about empirical evidence concerning the effect of piecework on the level of wages and productivity, see Prendergast (1999).

b) The narrowness of tasks and the lack of autonomy of employees in the productive process can give rise to standardisation of job positions. It is not difficult to conceive that standardisation of job positions can lead to unionisation of employees. Dobb (1959) emphasises the resistance of unions of employees against a number of forms of piecework systems of payment. A compensation system based on hourly wage rate can emerge, as it was the case in most industrialised countries after the 50s. Apparently, this can give rise to a deceleration in the process of automatic learning, mentioned earlier. However, this may not always be the case. Of course, employees have fewer incentives to speed up the production process and to acquire capabilities than in the case of piecework wage. However, if the degree of autonomy of employees is very low and they cannot curtail the pace of production under a certain floor, the allegedly negative effects on automatic learning of the introduction of an hourly wage system may well be not very significant.

As to profit-related compensation schemes, absence of organisational rights in spot labour allocations contrasts with the risk implied by this kind of remuneration.

As far as the role of wage as a factor of adjustment is concerned, the existence of unions can provoke a certain rigidity of wages. Obviously, if rigidity is perfect, the role played by wage as a factor of adjustment is nil and the burden of adjustment lies solely on the level of employment. This is clearest example of a trade-off between pay and numerical flexibility. The degree of rigidity of wages is tightly connected to industrial relations and, in general, to the level of cooperation between unions and firms.

### *5.2 Occupational labour allocation*

Occupational labour allocation is based on a centralised system of bargaining between unions of employees and associations of employers. Furthermore, they require both a system of validation of skills and a well-structured educational and training apparatus. Validation system and centralisation of bargaining are quite convenient for employers. As a matter of fact, both of them can reduce problem of uncertainty in the recruitment of skills, which can be quite serious for highly skilled employees.

As to wages as factor of adjustment, in the “pure” occupational labour allocation model, wages show an appreciable degree of downward rigidity, because of centralisation of bargaining. Therefore, adjustments in the level of employment should dominate. In this context, wages do not promote development of capabilities; tasks are a-priori well-defined and this can hinder the



development of skills, regardless of the level of wages. There is no room for wages as incentives in this organisational structure. This difficulty in promoting capabilities, coupled with the aforementioned requirement of a minimum amount of on-the-job training to develop firm-specific capabilities, can make the pure occupational labour allocation framework quite unsteady.

Centralisation of bargaining should favour a payment system based on hourly wage rate rather than piecework remuneration. Moreover, since employees' skills are quite high, production processes and tasks can be quite complicated and problems in measuring productivity worsen. Therefore, an hourly wage rate seems to be the prevalent remuneration system in the pure occupational labour allocation. Actually, a profit-sharing compensation system is not easily compatible with this form of work organisation. Profit sharing remuneration is not compatible with contracts which should be as complete as possible, as those designed in pure occupational labour allocation. Additionally, absence of organisational rights and centralised bargaining give rise to the same problems as those observed for spot allocation of labour.

It should be clear that the unsteadiness of the pure occupational labour allocation can give rise to internal labour allocation arrangements within occupational labour allocation. Of course, the relevance of off-the-job training remains quite high in this spurious form of occupational labour allocation. However, some features of this arrangement are less compelling than in the "pure" case. Differences with the organisational structure analysed previously are twofold. First of all, some organisational rights have to be acknowledged to employees. Basically, this means that some limitations on numerical flexibility are imposed. Secondly, occupational rights are weakened. Essentially, this means that job content is not strictly defined and some form of contract incompleteness is inserted in the relationship between employer and employees. In this way functional flexibility is strengthened<sup>34</sup>. This is the most distinct example of the existing trade-off between either functional and numerical flexibility or occupational and organisational rights. Another consequence of slackening of occupational rights is that centralised bargaining is partly substituted for, or integrated, by some form of decentralised bargaining between employees and employer.

In this case the role played by wages changes. Contracts are incomplete and employees can be interested in developing capabilities, if appropriate wage incentives are provided. In this model, a major role is devoted to capability development. This remains an occupational labour allocation.

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<sup>34</sup> It is interesting to notice that functional flexibility is not excluded in the pure occupational labour market arrangement. Functional flexibility was the object of bargaining between the associations of both employers and employees. Hence, its extension is specified by the terms of the contract. However, the professional status of employees in the pure form of occupational labour market tends to limit functional flexibility.

Therefore, employees are quite skilled and a system of validation continues to exist. Furthermore, centralised bargaining is still a crucial factor of this arrangement. Hence, development of skills within firms is much less important than development of capabilities which, however, is still constrained by contractual definition of job content. In this case, development of capabilities is primarily focused on the acquisition of firm-specific capabilities, without any change in the professional status of the employee.

The small adjustments in both organisational and occupational rights widen the range of sustainable wage-fixing processes. Problems of unobservability make problematic the adoption of piecework remuneration, as previously. Probably, hours wage rate remains the dominant compensation system in this organisational structure, too. Nevertheless, as it should be clear at this point, the introduction of internal labour allocation features in occupational labour allocation can make attractive to both employers and employees profit-related wage schemes.

### *5.3 Internal labour allocation*

Development and allocation of skills, capabilities and labour play a key role in the analysis of internal labour allocation. Measurement of skills is one of the most problematic aspects connected to internal labour allocation. The analysis developed in the very first part of the paper has shown that an appraisal of skills can be quite difficult. Accordingly, Koike (1999) has recently claimed that “no attempt to measure the level of workers’ skills quantitatively in the field of economics has been successful”. Definitely, if wage-fixing depends on both the organisation and the development of skills and capabilities, those problems of measure are very relevant. Internal labour allocation represents an attempt to solve this question. Actually, provision of both on-the-job and off-the job training can be considered as means to assess skill and capability formation. Quite interestingly, the economic literature focused on the role of skills for firm’s efficiency has devoted much more attention to skill development inside the firm than to problems of skill recruitment.

Organisational rights are an essential pre-requisite for the internal development of skills, because they imply both an incomplete contract and a long-term employment relationship. Furthermore, the lack of occupational rights also plays a pivotal role, because it slackens the constraints of centralised bargaining. A compelling form of centralised bargaining is scarcely compatible with incomplete and long-term employment contracts. Of course, this does not entail that any form of centralised bargaining disappears, at all. Simply, that means that there is enough room for decentralisation of

bargaining, especially for direct bargaining between the single firm and its employees or a company-based union.

In internal labour allocation development of both skills and capabilities can be observed. As a matter of fact, internal labour allocation can promote the development of both skills and capabilities in many different ways. Firstly, automatic acquisition and deepening of capabilities can be reached through those processes of automatic learning already discussed. Secondly, both skills and capabilities can be strengthened by means of on-the-job and off-the-job training. This result can be reached through a wide range of learning processes, including apprenticeship, job rotation and structured courses held either within or outside the firm. The nature of prevailing learning processes affects the sustainable remuneration system.

Development of capabilities, through either automatic learning or any form of training, is consistent with piecework remuneration. As a matter of fact, some form of piecework remuneration can provide employees with the appropriate incentives to acquire skills. Moreover, it can also be conceived as an ex-post indirect indicator of the efficiency of policies aimed at enhancing skills. However, it should be remembered that piecework remuneration can be applied only if problems of measurability of performance are minimal. This could be the case for the secondary component of the internal labour allocation system.

Internal labour allocation is consistent with hourly wage rate, too. Development of broad skills may cause the rise and consolidation of employees endowed with an acknowledged professional status. Similarly, this development of skills can give rise to a hierarchy of skills. Therefore, clusters of employees can emerge. This seems to be compatible with a remuneration system based on hourly wage, because employees belonging to the same cluster can unite and introduce a mild form of collective bargaining within the firm.

Finally, it should be clear that internal labour allocation can also be compatible with profit-related remuneration. If employees have organisational rights, they can be available to share market risks with the employer. Furthermore, the existence of organisational rights seems to be a crucial prerequisite for the introduction of participation schemes.

In conclusion, this organisational structure can be compatible with all three payment systems mentioned earlier, i.e. piecework remuneration, hourly wage and profit-sharing.

Internal labour allocations are characterised by a high level of upward and downward mobility of skills, capabilities and labour. Mobility is very relevant to understand the internal dynamics of wages. As mentioned in previous sections, mobility depends on both the internal process of skill formation and the degree of openness of the internal labour market. If the process of skill

development is very intense, then both absolute and relative wages have to be adjusted frequently. Particularly, the structure of relative wages has to be adjusted according to upward and downward mobility of both skills and capabilities. The dynamics of wages also depends on how ports of entry are situated. For instance, if ports of entry are situated in proximity of low skills, then internal skill development is quite intense and wages have to be adjusted frequently. Contrarily, if ports of entry are dispersed along a wide range of skills, internal skill development is less intense and, therefore, wage adjustment is less frequent.

Conclusively, internal labour allocation needs a certain degree of flexibility of both absolute and relative wage, which is favoured by decentralised bargaining. A solution could be provided by the adoption of a remuneration system based on piecework, hourly wage and profit-related compensation grouped together (mixed remuneration system). Nevertheless, one should not think that adjustments in the structure of wage do not face any constraint. Firstly, there can be problems of balance among components of the mixed remuneration system. Problems of stability can arise, if a certain component grows too much with respect to the others <sup>35</sup>. Moreover, it should be remembered the role of habit and custom in internal labour markets. As said in paragraph 3, they can give rise to some inertia, which might also constrain the dynamics of the wage structure. In order to deal with those problems of stability and of inertia, a cooperative atmosphere between employer and employees or company-based union is strongly needed.

As to the role of wages as factor of adjustment, two different situations should be taken into account. If all employees enjoy organisational rights, wages have to be flexible, in order that a given level of profit is maintained. In that case, flexibility can be reached either through the adoption of a mixed remuneration system, or through an agreement between company-based union and the employer. Vice versa, if segmentation prevails, adjustments on the level of employment can occur and employees, especially those belonging to the primary internal labour market, can enjoy a certain degree of wage rigidity.

In order to investigate in depth wage determination in internal labour allocation, it is important to discuss two different, but not necessarily contrasting, approaches developed in the realm of institutionalist economics. Firstly, the analysis carried out by Koike (1994) will be discussed. Koike's contribution is interesting because it allows to understand how different wage determination processes can coexist in the same internal labour allocation. Secondly, the attention

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<sup>35</sup> For instance, employees could oppose excessive growth of the profit-related component, according to their degree of risk aversion. On the other hand, if hourly wage component is too high, employees might favour development of job and skills clusters, strengthening skill/job unions within the firm. This could introduce occupational labour market characteristics in the internal labour market.

will be focused on a recent development by Leoni et al. (1998). This paper addresses the relationship between skill unobservability and wage-fixing. The authors propose a new remuneration scheme.

The analysis made by Koike is interesting in two respects. First, it provides useful theoretical insights. Secondly, it is crucial to understand wage structures in Japanese firms, which can be considered the most-widely known example of firms based on internal labour allocation. Generally speaking, Koike points out four components of the wage structure: a) basic rate; b) age rate; c) job grade rates; d) merit rates. The analysis of these components is quite simple. Basic rate is the fixed component of wage. Age rate is consistent with the idea that in internal labour allocation skill and capability development takes place and therefore wages increase with seniority. Job grade rate refers to those clusters of employees, defined previously. Finally, merit rates refer to both individual and collective bonuses <sup>36</sup>. Basically, Koike and, in an important contribution Aoki (1988), show that Japanese firms have adopted a mixed remuneration system based on piecework, hourly wage and profit-related compensation.

Leoni et al. (1998) develop the so-called competence model, which is based on analyses carried out in the management literature <sup>37</sup>. A pivotal role is played by the concept of competence, which is the sum of three employee's characteristics of employee such as individual knowledge, skills and behaviour. In this framework of analysis, wages do not depend directly on output or on profits. Wages depend negatively on the difference between the level of competence expressed by the employees and the level required by the firm; of course, the smaller the gap, the higher wages. Leoni et Al. try to solve the problem of competence assessment through a complicated system of self-evaluation and both peers' and superiors' assessment. Basically, this compensation system is founded on measurement and development of skills, but it simply ignores the role of wages as factor of adjustment.

#### *5.4 The contractarian approach*

A thorough analysis of wage determination in standard approach goes far beyond the aim of this paper <sup>38</sup>. However, it can be interesting to stress the role of wages in recent developments of this kind of literature. The main problem is that standard approaches seem to put a lot of emphasis on

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<sup>36</sup> See, also Aoki (1988).

<sup>37</sup> See Spencer, Spencer (1993).

the role of wages in allocating human resources, but they tend to overlook their role in skill formation <sup>39</sup>. For instance, let us consider Lazear's (1995) explanation of upward-sloping wage profile. According to Lazear this wage profile is designed to provide incentives and not to induce skill accumulation. Employees are induced to exert high level of efforts by higher wage prospects. "Senior workers are paid high salaries in the firm not so much for their current productivity but as a reward for past productivity and as a motivator for current productivity of their more junior counterparts".

More recently, Lindbeck and Snower (1999) have developed a very interesting model that represents the most advanced attempt in standard economics to analyse the relationship between allocation of skills and wages in an integrated framework of analysis. This paper addresses some of the points raised by Holmstrom and Milgrom (1994). Particularly, Lindbeck and Snower claim that "The intuitive idea is that increasing the incentive for just one task could cause a worker to devote too much effort to that one task while neglecting other aspects of the job, and that increasing incentives for all of the agent's activities avoids that cost".

Basic assumptions are straightforward. Employees are exogenously segmented in two different groups according to their endowment of skills. The production process consists of two different and complementary tasks. Employees receive wages  $w_1$  and  $w_2$  at task 1 and 2, respectively. Given these wages, they are free to choose their time allocation between the two tasks; in this sense the internal organisation of the firms is endogenous. Basically, the employer decides the number of tasks in which the production process is articulated, but she can never fix the amount of time that employees allocate for each task. The employer fixes the level of wages, so to induce both groups of employees to offer profit-maximising time allocations. In this model skills develop according to time devoted to each task. This is consistent with the notion of automatic on-the-job learning.

This model presents some problems. First of all, the feasible organisations of work are unlimited; employees have no constraints in time allocation. Moreover, the employer has limited ability to influence the production process. Secondly, the informational structure of the employer is quite bizarre. On the one hand, it is assumed that the employer cannot monitor the allocation of time that each workers devotes to each task. Job design is irrelevant for the provision of incentives <sup>40</sup>. On the other hand, the employer knows the level of wages, which gives rise to the optimal allocation of

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<sup>38</sup> For a recent survey, see Prendergast (1999).

<sup>39</sup> In this part attention is concentrated on model based on principal- agent framework of analysis. However, it should be said that human capital model cannot be considered completely satisfying, too, as they focus mainly on skill development, ignoring allocation of skills.

<sup>40</sup> This contrasts with Holmstrom and Milgrom's (1991) assertion that "In general, in multi-task principal-agent problems, job design is an important instrument for the control of incentives"

time. In this way, it is assumed that the employer knows workers' reaction functions. Finally and more importantly, wages determine the allocation of both time and skills, but are not relevant in skill formation. Actually, wages determine allocation of time and, therefore, they affect the process of on-the-job learning. Yet, the wage structure is not designed with the purpose of developing either skills or capabilities, but only to provide an efficient allocation of time.

## *6. Conclusion*

The competence-based theory of the firm emphasises the importance of formation and development of skills within firms. It also allows to study in an integrated framework of analysis issues like skill formation and allocation, labour organisation and remuneration system. The notions of skill and capability are very important to understand how this framework is articulated. Generally speaking, more standard approaches, such as principal-agent model and human capital theory, develop very sophisticated models, but they focus their attention on limited aspects of the relationship between firms and employees. The competence-based approach favours a broader perspective for the analysis of the firm and its workforce.

Based on this non-orthodox approach, the relationship between labour organisations and remuneration systems has been investigated. Remuneration system fits in labour organisation and vice versa, giving rise to a specific institutional equilibrium, whose stability cannot be taken for granted. On the contrary, the contractarian approach considers the remuneration system only as a means to provide employees with incentives. Therefore, it should not be surprising if, from this approach, piecework wage rate turns out to be the most efficient device for the provision of incentives in firms. The analysis developed in this paper claims that investigation on payment systems should be focused not so much on efficiency issue, as on institutional stability.

The analysis has pointed out three different labour organisations, namely the spot allocation for labour, the occupational labour allocation and the internal labour allocation. These have to be taken as Weberian ideal types, i.e.: stylised representations of factual reality that do not refer directly to concrete facts. In the real world, a wide range of organisational arrangement can be observed containing a lot of “noise” with respect to the ideal type. The analysis of these ideal types has left out a lot of extremely relevant aspects for understanding the determinants of skills in firms. Particularly, it would be very useful for our purpose to analyse the role of some components of the institutional framework. The analysis of both the educational and the recruitment systems with

respect to labour organisation would be very interesting to enhance our knowledge of skill formation process in each organisational arrangement. These two factors are also rather crucial for understanding the stability of institutional equilibria in the firm. Despite these limitations, this paper has tried to show how a discussion on compensation system should not be carried out regardless the allocative structure of skills and certain elements of the institutional framework.

The lock in of remuneration systems in the allocative structure of skills has very important policy implications. Deregulation programmes in the labour market, aimed at increasing the degree of numerical flexibility of firms, can provoke the collapse of an institutional equilibrium, based on internal labour allocation. In particular, employers' propensity to invest in some form of training could decrease, giving rise to an increase in the number of both ports of entry and exit. The equilibrium founded on the existence of organisational rights would collapse and the effects could be far from desirable. As a matter of fact, this collapse could be extremely harmful, especially for unskilled workers, since chances for training of unskilled workers could decrease. As Gregg and Manning (1997) have asserted, this can give rise to an increase in wage inequality and in income distribution. Finally, it should be said that these deregulation policies could have disruptive effects on occupational labour allocation, too. Marsden (1986) has shown that this organisational structure needs very well structured regulation, if stability of this allocation system has to be maintained.



## References

- Albertini S. (1999), Networking and division of labour –The case of industrial districts in the North-East of Italy, *Human Systems Management*, vol. 18, pp. 107-115.
- Alchian A.A., Demsetz H., Production, information costs, and economic organization, *American Economic Review*, vol. 62 n. 4, December, pp. 777-795.
- Aoki M. (1988), *Information, Incentives and Bargaining in the Japanese Economy*, Cambridge, Cambridge University Press.
- Aoki M. (1992), Decentralization-centralization in Japanese organization: a duality principle, in Kumon S, Rosovsky H (eds.), *The Political Economy of Japan*, vol. 3, Stanford, Stanford University Press, pp. 142-169.
- Aoki M., Dore R. (1994), *The Japanese Firm*, Oxford, Oxford University Press.
- Becker G. (1964), *Human capital: a theoretical analysis with special reference to education*, New York, Columbia University Press.
- Booth A., Snower D. (1996), *Acquiring Skills: Market Failures Their Symptoms And Policy Responses*, Cambridge, Cambridge University Press.
- Braverman H. (1974), *Labour and Monopoly Capital: The Degradation of Work in the Twentieth Century*, New York, Monthly Review Press.
- Chapman P.G. (1993), *The Economics of Training*, Hemel Hempstead, Harvester Wheatsheaf.
- Ciocca P. (a cura di) (1997), *Disoccupazione di fine secolo*, Torino, Bollati Boringhieri.
- Coase R.H. (1937), The Nature of the Firm, reprinted in Coase R.H. (1988), *The Firm, the Market and the Law*, Chicago and London, The University of Chicago Press, pp. 33-55.
- Coase R.H. (1960), The Problem of Social Cost, reprinted in Coase R.H. (1988), *The Firm, the Market and the Law*, Chicago and London, The University of Chicago Press, pp. 95-156.
- Coriat B. (1991), *Penser a' l'envers*, Christian Bourgois Editeur.
- Dobb M. (1959), *Wages*, Cambridge Uk, Cambridge University Press.
- Doeringer P., Piore M.J. ( 1971), *Internal labor markets and manpower analysis*, Lexington Mass., Heath and Company.
- Gregg P., Manning A. (1997), Skill-biassed change, unemployment and wage inequality, *European Economic Review*, vol. 41, pp. 1173-1200.
- Guidetti G. (1999), *Flessibilità e mercati del lavoro*, Working Paper of Dipartimento di Economia, Istituzioni, Territorio of the University of Ferrara, no. 17.

- Hodgson G.M. (1998a), Evolutionary and competence-based theories of the firm, *Journal of Economic Studies*, 25 (1), pp. 25-56.
- Hodgson G.M. (1998b), Competence and contract in the theory of the firm, *Journal of Economic Behaviour & Organization*, vol. 35, pp. 179-201.
- Hodgson G.M. (1999), *Economics & Utopia*, London & New York, Routledge.
- Holmstrom B., Milgrom P. (1994), The firm as an incentive system, *American Economic Review*, vol. 84 no. 4, pp. 972-990.
- Holmstrom B., Milgrom P. (1991), Multitask principal-agent analyses: incentive contracts, asset ownership, and job design, *Journal of Law, Economics and Organization*, vol. 7, pp 24-52.
- Kerr C., (1954), The Balkanisation of labour markets, in Bakke E.W. (ed.), *Labour Mobility and Economic Opportunity*, Cambridge Mass., MIT Press, pp 92-110.
- Kerr C., Staudohar P.D. (1994), *Labour Economics and Industrial Relations*, Cambridge Massachusetts, Harvard University Press.
- Knight F.H., (1921), *Risk, Uncertainty and Profit*, New York, Houghton Mifflin.
- Koike K. (1994), Learning and incentives systems in Japanese industry, in Aoki M., Dore R. (1994), *The Japanese Firm*, Oxford, Oxford University Press, pp. 41-65.
- Koike K. (1999), *Intellectual Skills and Competitive Strength*, paper presented to the plenary session of the national conference of Italian Labour Economists' Association (AIEL), held in Milan, Italy on the 7<sup>th</sup>-8<sup>th</sup> October, 1999. Downloadable in [www.aiel.it](http://www.aiel.it).
- Lazear E.P. (1995), *Personnel Economics*, Cambridge Mass., The MIT Press.
- Leoni R., Tiraboschi L., Valietti G. (1998), Contrattazione a livello di impresa: partecipazione allo sviluppo delle competenze versus partecipazione ai risultati finanziari, Università degli Studi di Bergamo, *Quaderni del Dipartimento di Scienze Economiche*, no. 10.
- Lindbeck A., Snower D.J. (1999), Centralized Bargaining and Reorganized Work: Are They Compatible?, *IZA Discussion Paper n. 56*, September.
- Loasby B.J. (1995), *The concept of capabilities*, Colloquium in Honour of G.B. Richardson, Oxford 4-6 January, mimeo.
- Loasby B. J. (1996), *Knowledge, Institutions and Evolution- 1996 Graz Schumpeter Lectures*, mimeo.
- Lundvall B.-Å. (1998), The learning economy: challenges to economic theory and policy, in Nielsen K., Johnson B. (eds.), *Institutions and Economic Change*, Cheltenham UK, Edward Elgar, pp. 33-54.

- Machin S. (1996), Changes in the relative demand for skills, in Booth A., Snower D. (1996), *Acquiring skills: market failures their symptoms and policy responses*, Cambridge, Cambridge University Press, pp. 129-146.
- Mancinelli S., Pini P. (2000), Incentivazione, suddivisione del rischio e partecipazione: la letteratura teorica, in Pini P. (2000) (a cura di).
- Marsden D. (1986), *The end of economic man?*, Brighton, Wheatsheaf Books.
- Mincer J. (1994), Human Capital: A Review, in Kerr C., Staudohar P.D. (1994), *Labour economics and Industrial Relations*, Cambridge Massachusetts, Harvard University Press, pp. 109-141.
- Milgrom P., Roberts J. (1990), The economics of modern manufacturing: technology, strategy and organization, *American Economic Review*, vol. 80 no. 3, pp. 511-528.
- Nelson R. R., Winter S. G. (1982), *An Evolutionary Theory of Economic Change*, Cambridge MA, Harvard University Press.
- Nelson R.R. (1995), Recent evolutionary theorizing about economic change, *Journal of Economic Literature*, Vol. XXXIII (March), pp. 48-90.
- Pagano U. (1991), Property rights equilibria and institutional stability, *Economic Notes*, vol. 20, pp. 189-228.
- Pagano U. (1997), Workers' Rights and Economic Flexibility, in P. Arestis, G. Palma, M. Sawyer (eds.), *Markets, Unemployment and Economic Policy*, Routledge, London and New York, pp. 354-363.
- Penrose E. (1959), *The Theory of the Growth of the Firm*, Oxford, Basil Blackwell.
- Pini P. (a cura di) (2000), *Premio di partecipazione o premio di risultato? La contrattazione aziendale in Emilia-Romagna dopo il 1993*, Bologna, Clueb.
- Polanyi M. (1967), *The tacit dimension*, London, Routledge and Kegan Paul.
- Prendergast C. (1999), The provision of incentives in firms, *Journal of Economic Literature*, Vol. XXXVII (March), pp. 7-63.
- Sestito P., Trento S. (1997), Tecnologia, Organizzazione e domanda di lavoro; in Ciocca P. (a cura di), *Disoccupazione di fine secolo*, Torino, Bollati Boringhieri, pp. 157-202.
- Simon H.A. (1951), A formal theory of the employment relationship, *Econometrica*, vol. 19, pp. 293-305.
- Simon H.A. (1991), Organizations and Markets, *Journal of Economic Perspectives*, vol. 5, no. 2, Spring, pp. 25-44.
- Spencer L.M., Spencer S.M. (1993), *Competence at Work. Models for Superior Performance*, New York, John Wiley & Sons Inc.

**Table. 1**

| <b>characteristics of training</b> | <b>characteristics of tasks</b>   |   |
|------------------------------------|---|---|
|                                    | <i>non specialised tasks</i>  | <i>specialised tasks</i>  |
| <i>off-the-job-training</i>        | (a)<br>external labour market   | (b)<br>occupational labour allocation                                 |
| <i>on-the-job-training</i>         | (c)<br>internal labour allocation; structured training (internal or external courses) | (d)<br>internal labour allocation (formal or informal apprenticeship) |

**Table. 2**

|                               | <b>Organisational rights</b>  | <b>No organisational rights</b>   |
|-------------------------------|---|---|
| <b>Occupational rights</b>    | (a)<br>Classic socialism  | (b)<br>Characteristics: internal labour market rigidity; external labour market flexibility |
| <b>No occupational rights</b> | (c)<br>Characteristics: internal labour market flexibility; external labour market rigidity | (d)<br>Spot market for labour<br>Fordist factory  |