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## Competence, knowledge, and the labour market: the role of complementarities

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## discussion paper

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### **Competence, Knowledge, and the Labour Market** The role of complementarities

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## **Abstract**

This paper develops a theoretical analysis of training regimes as outcomes of a complementarity between organizational and institutional factors that determine firms' and workers' incentives as regards skills. Specifically, the paper proposes that, on the one hand, knowledge embeddedness within firms is the determinant of firms' preferences concerning training, while, on the other, labor market institutionalization provides the framework for workers' preferences. Applying a criterion of coherence between firm and worker incentives, two stable configurations are singled out. The former is shown to correspond to the Japanese model of training, while the latter conforms more to the German experience.

Journal of Economic Literature Classification Numbers: D21, I20, J51, P51.

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## **Zusammenfassung**

In dieser Studie wird eine theoretische Analyse der institutionellen Regelungen zur beruflichen Bildung vorgestellt. Sie werden als Ergebnis einer gegebenen Komplementarität organisatorischer und institutioneller Faktoren verstanden, die für Unternehmen und Arbeitnehmer als Anreize für Aktivitäten wirken, die sich auf berufliche Fähigkeiten beziehen. Die Analyse legt nahe, daß für Unternehmen die Anpassung der Wissensbestände an ihre spezifischen Anforderungen besonders wichtig ist, während es für die Arbeitnehmer die institutionellen Regelungen auf dem Arbeitsmarkt sind.

Wird ein Parameter eingeführt, der das Maß der (Nicht-)Übereinstimmung zwischen den Anreizen für die Unternehmen und für die Arbeitnehmer abbildet, dann lassen sich zwei stabile Konstellationen herausfinden. Eine entspricht mehr dem japanischen Modell der beruflichen Ausbildung, das andere mehr den deutschen Erfahrungen.



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## I. Introduction

An understanding of the nature of workers' competence is increasingly regarded as crucial for a comprehension of both micro- and macro-economic performance. With the diffusion of new production techniques and modes of organization, skills have today undoubtedly become the new and essential „factor of production“. For this reason, economic literature has long been dealing with the topic of workers' competence by investigating the determinants of skill levels and the *amount* of training provided to workers by firms and/or the state.

Specifically, the economic debate has mainly focused on reasons why some firms seem to be more willing than others to carry out a considerable amount of training. In other words, economists have mainly been investigating a choice between two alternatives: will firm A invest in training or will it not? These analyses generally focus on firm-specific training, the only type easily appropriated by firms. However, more recently a new debate has emerged which stresses the crucial role of general training within organizations. Several authors have indeed shown that firms have a direct interest in financing general training in spite of its low direct appropriability.

In this paper I combine these two debates and investigate firms' choices between the following three options: investing in firm-specific training, investing in general training or and not investing in any training. I mainly refer to the growing body of literature on „comparative institutional analysis“<sup>1</sup>.

The crucial concept underlining contributions in this field is that industrialized economies should be represented as distinct varieties of capitalism. These varieties of capitalism are built on equally different institutional frameworks. Institutional frameworks involve both the internal organization of firms and the macro-institutional structure, namely the relationships between firms and the nature of product, labor and capital markets. This framework defines the incentives that socio-economic actors face when making economic decisions.

Given the experiences of countries such as Germany and Japan, a major challenge for comparative institutional analysis is in fact an understanding of the complex system of compatible incentives that allows training to be such a success story within some (although not all) of the existing institutional frameworks. In this paper I investigate the issue of compatibility of incentives from a theoretical point of view and then show how my results reflect the main stylized facts from cross-country comparisons of some major OECD countries – France, Germany, Japan and the US.

I do not use a formalized economic model, but nonetheless make explicit the necessary game-theoretical incentive requirements for each of the above choices to assert itself as a stable solution. I do this by analyzing the coherence between firms' and workers' incentives as determined by the organizational and institutional structure. I thus identify the necessary institutional/organizational complementarities for each different form of training to prevail. Specifically, I stress how the embeddedness of knowledge within firms plays its role in determining firms' appreciation of the profitability of (different forms of) training; and I also illustrate the



fact that the attitude of workers towards training is not neutral, given that the structure of the labor market greatly contributes to determining their incentives as regards skills formation.

The paper is organized as follows. In the first part I introduce the theoretical model. Section II sets up my framework of analysis and introduces my notion of institutional complementarity. In Section III I define the crucial variables at the organizational and institutional levels, that is, „knowledge embeddedness“ and labor market institutionalization respectively. In Section IV I apply the criterion of complementarity between incentives at the organizational and institutional levels and single out two coherent configurations sustaining alternative training regimes. In the second part of the paper I draw on indirect evidence from four OECD countries to test my theoretical results. This is done in Section V, where I first describe the main features of training in France, Germany, Japan and the US, and then confront the two coherent institutional/organizational configurations resulting from the theoretical analysis with indirect evidence on national institutional frameworks and training regimes. Section VI concludes the discussion.

## **II. The Model**

### **II.1 Outline of the Model**

Training is far from homogenous across countries. Different forms of training coexist and, as I have already mentioned, the economic debate has stressed the crucial distinction between general and firm-specific training. However, the definition of general training being somewhat loose, here I will make use of the more precise concept of *standardized* training. Following the existing literature, one can define standardized training as training that leads to a clearly certified skill linked to a specific occupation (see Streeck, 1996b, for instance). Then firm-specific training can easily be defined as training that leads to non-standardized competence.

In the following I investigate the institutional and organizational requirements – on the labor market and within the firm – that are necessary for ensuring compatibility between workers' and firms' incentives as regards these two different forms of training. To this end I adopt an efficiency wage perspective similar to that developed by S. Bowles (1985) and assume that: i) firms want to increase their workers' effort by either intensifying monitoring of work activity or increasing the workers' cost of job loss; ii) workers reduce their risk of remaining unemployed by acquiring standardized rather than firm-specific training.

Concerning (i), one must note that investing in firm-specific training is indeed one way for firms to impose on workers a higher cost of job loss because specific competence can hardly be transferred outside the firm where it was acquired. In this respect, therefore, the choice for firms is whether to increase effort by increasing monitoring or to increase effort by investing in firm-specific competence. Concerning (ii), one should stress the role of workers' organizations as an indispensable prerequisite for workers being able to organize collectively and have some chance of receiving standardized training.

Thus, within this framework the problem of compatibility of incentives becomes crucial because workers and employers indeed have opposite interests: workers prefer standardized training, which allows them to transfer their competence from firm to firm; conversely, firms prefer firm-specific training, which allows them to prevent external poaching. The role of the organizational and institutional setting is that of bringing together these opposite incentives in order to i) make training a valuable investment for firms and workers, ii) coordinate firms' and workers' incentives in such a way that they ultimately do converge in the common choice of one form of training.

## II.2 The Notion of Complementarity

Recent contributions have strongly emphasized the point that a close interplay exists, within the institutional framework, between institutional and organizational levels. A. Lam's work (1998) offers an interesting attempt to integrate these two levels in a coherent framework, yielding stimulating insights on their respective roles as knowledge providers.

Proceeding from a similar approach, I develop a framework of analysis based on the notion of *complementarity* between organizational and institutional aspects. I assume that for a complementarity to occur the composition of social actors' incentives determined by existing institutions and organizations must be consistent and coherent and should provide a stable (equilibrium) configuration for their strategies as regards training.

Specifically, I will analyze the possible complementarities between the aspects of knowledge embeddedness within firms and institutionalization of labor markets. These aspects combine and interplay to sustain different configurations of worker and firm incentives, which in turn lead to different preferences on the part of these socio-economic actors as regards training. These preferences can be combined either in consistent ways or not. However, only in the former situation will the outcome be stable and will the complementarity between the organizational and institutional level indeed arise.

On the basis of the above framework, in the following sections I start with a closer analysis of the aspects of knowledge embeddedness and labor market institutionalization.

## III. Organizations and Institutions

### III.1 Knowledge embeddedness

Discussions on firm organization generally focus on the dimension of work organization. And yet, at the same time, it is often recognized that firms' modes of organization can only be defined as the outcome of the interplay between *work organization* and *knowledge embeddedness*. The importance of jointly analyzing

these two issues is stressed by Coriat and Dosi: „we have tried to show that the explanation of a particular set of routines can be traced back to the co-evolution between corporate patterns of knowledge distribution and mechanisms of coordination and governance“ (Coriat and Dosi, 1995).

If work organization mainly concerns how workers are coordinated and decisions taken inside the firm,<sup>2</sup> the dimension of knowledge embeddedness is bound to reflect the way knowledge is *distributed* inside the firm. Hence, a good way to grasp this notion is to start with a clear contrast between individual and collective knowledge. If individual knowledge prevails, each piece of knowledge can be seen as a distinct attribute of individual workers. Conversely, under a collective knowledge scenario, know-how is spread throughout the firm: workers are led to share in the firm's stock of knowledge and ultimately become a building block of their firm.

To clarify the issue further, the extent of collective knowledge can be related to workers' involvement within a firm. In fact, involvement is generally seen as a form of cooperation, or *coworking* among workers, which eventually leads to the exchange of knowledge by fostering: „an ability to 'feel themselves' into new situations, 'understand' how specific work activities fit in the organizational context and learn from more experienced fellow-workers“ (Streeck, 1996b, p. 149). By this very process, knowledge loses its individual character and ultimately becomes an organizational embedded asset. As Okuno puts it: „workers contribute to [...] production in two ways. They either work directly to produce output or work to augment the stock of operational and organizational knowledge and the level of [their] and other workers' work skills“ (Okuno, 1984).

This argument is reproduced in Figure 1 below.

(Figure 1 about here)

Since, as I have just argued, collective knowledge is generally accompanied by a high level of worker involvement in various company activities not exclusively restricted to work duties, directly monitoring these activities would be extremely difficult and highly costly. Thus, in these cases firms do not usually turn to direct monitoring to enhance workers' productivity.

As a consequence, the extent to which knowledge is indeed collectively embedded emerges as a crucial determinant of firms' distrust of direct monitoring as an effort-enhancing device. This leaves firms with the problem of implementing an alternative device to increase worker effort. In this respect one must note that the process of knowledge collectivization itself is an essential means to offset individual competence and substitute it with firm-specific skills, which indeed offers a solution to the problem above (see Section IV.1).

### III.2 Labor Market Institutionalization

In this section I analyze how the dimension of labor market structure comes into play to ensure (or hinder) the stability of a given form of training. This mainly takes place through the crucial impact of labor market structure on the organization of workers' interests.

To tackle this point I focus on the concept of labor markets' „institutionalization“. I use this term to mean a large set of institutional factors shaping the operation of the labor market: mainly the role of trade unions and state regulation. Indeed, several authors have recently suggested that there may well be a link between the degree of labor market institutionalization and training systems.

The role of labor market institutionalization with respect to training is investigated in theoretical works such as Frank and Soskice (1994) and Acemoglu and Pischke (1997). In both cases the authors underline how institutional constraints on the labor market may promote firms' investment in general, portable training, such as standardized competence, despite what economic theory would normally predict.<sup>3</sup> These analyses mainly deal with the impact of institutions on firms' incentives, while a second important aspect is overlooked, namely the role of labor market institutions with regard to the organization of workers' interests and the shaping of their incentives.

In this context Soskice and Hancké (1997) develop a different argument based on the following important observation: coordination between involved actors is a necessary precondition for any collective agreement on standards. The authors apply this idea to skill standards and argue that the presence of strong social actors is indeed indispensable for guaranteeing the process of skills certification necessary for standardization. Hence, organized social actors – such as the state, business associations and unions – are necessary in that they play the role of guarantors in the standardization of training.

Building on this argument, one can assert that standardization indeed requires a sufficiently institutionalized environment to prevail – for at least two main reasons. First, because institutionalized labor markets guarantee a wide social acceptance of qualifications as true signals of a worker's competence, which makes standardization viable. Second, because they provide a suitable way to convey workers' interests and thus establish standardization in the socio-economic arena. The latter point is indeed crucial in this paper because it stresses the role of unions (and the state) as institutions that are likely to give voice and „concreteness“ to workers' demands which would otherwise lie dormant.

## IV. Establishing Complementarities in Training

To understand the essential role played by the organizational and institutional levels explored above as regards training and competence, we shall first reconsider the way knowledge embeddedness affects firms' requirements with respect to

competence and, second, make sure that the required consistency between firm-level and institutional-level incentives is indeed satisfied.

#### IV.1 Knowledge and Competence

As we have seen in the previous section (III.2), involvement should indeed be taken as an indication that collective knowledge has been implemented within a firm. As a consequence, we have previously argued that a firm where collective knowledge prevails is indeed likely to rely little on monitoring as an effort-enhancing device. This leaves the firm with the problem of implementing an alternative device to improve worker effort. However, the solution to this problem may indeed be quite simple, for involvement itself implies a process of socialization of knowledge that is likely to favor the acquisition of firm-specific skills by „involved“ workers. Hence, in this case firms would increase effort by investing in a suitable form of training rather than in monitoring.

The link between involvement and the formation of firm-specific competence is pointed out, among others, by Okuno, who makes the following observation concerning coworking in Japanese firms: *„helping other employees learn skills and/or making suggestions for increasing productivity can be interpreted as investing in firm-specific capitals which take the form of accumulated knowledge of work skills and stock of technical, organizational and managerial know-how“* (Okuno, 1984).

In fact, one essential feature of organizations strongly relying on worker involvement is that workers' ability to communicate within the firm becomes a valuable asset. Workers are then led to develop important relational skills, which are an intrinsically firm-specific component of the skills packet. Hence, the impact of knowledge collectivization on skills stems from the fact that this process requires workers to develop good relational competence, which in turns implies skills being made specific to the firm, at least to some extent.

The above arguments indeed point to collectivization of knowledge as the crucial element that creates, within the firm, the need for a profound re-modeling of workers' competence. It is then straightforward to note that, within the alternative option of individual knowledge, completely different consequences as regards worker competence are to be found. Rather roughly, one could say that, lacking the incentive offered by knowledge collectivization, firms indeed decide against actively re-modeling worker competence and ultimately prefer to organize their internal structure around existing workers' skills.

#### IV.2 The Interplay between the Organizational and Institutional Level

A twofold result can be deduced from the analysis elaborated in the previous sections concerning the structure of preferences – over (various forms of) training – resulting from the possible organizational/institutional configurations.

The first conclusion is that collectivization of knowledge is the crucial „push factor“ at the firm level, which leads firms to require a broad re-modeling of worker competence that ultimately make skills firm-specific. This does not happen when individual knowledge prevails within firms.

A second conclusion concerns the role of the institutional framework and states that standardized competence requires highly institutionalized labor markets in order to prevail. Hence, labor market institutionalization is the second push factor – this time on the worker side – contributing to making workers’ preferences for standardized competence a concrete demand within the economic arena.

Building on this twofold result, we can now deduce four different incentive configurations that stem from the four institutional/organizational frameworks created by combining the two alternative forms of knowledge within the firms with the two alternative forms of institutionalization on the labor markets. The result of this exercise is summarized in Table 1 below.

*(Table 1 about here)*

Table 1 reproduces the four organizational/institutional options and the structure of incentives that each of them sustains. By combining them we can define four possible scenarios for training, which I analyze in the following.

In Case (1), highly institutionalized labor markets allow workers to demand a process of certification of competence, which easily builds on the loose competence requirements of firms characterized by individual knowledge: standardized training is then one incentive-compatible solution. The second such solution is depicted in Case (3), where collectivization of knowledge within firms combines with weak workers’ demands from poorly institutionalized labor markets, which indeed favors a broad re-shaping of competence in a firm-specific direction. Within the two remaining scenarios training is indeed unlikely to take place – either because of a lack of clear incentives (Case (4)) or because of an institutional/organizational conflict (as in Case (2)).

Hence, the previous analysis leaves us with only two coherent organizational/institutional configurations respectively supporting a standardized and a firm-specific training regime. In the former case the complementarity of incentives is exploited between individual knowledge and highly institutionalized labor markets, while in the latter case investments in training emerge out of the alternative complementarity between collective knowledge and loosely institutionalized labor markets. The next step is to confront these theoretical results with stylized facts on national training regimes in some OECD countries: France, Germany, Japan and the US. This exercise can provide insights as to whether the theoretical model previously developed can be usefully applied to interpret the existence of different training regimes across major developed economies.

## V. From Institutional to National Models

In this section I tentatively answer the question as to whether the theoretical model above can indeed help us understand the differences in training regimes across four developed countries (France, Germany, Japan and the US). To do so, I first have to describe the main features of the training systems in these countries.

### V.1 Four National Systems of Training

Widespread evidence on the Japanese model describes it as a combination of a strong general education system delivering widely recognized diplomas and a fragmented professional training system organized on a company-group basis.<sup>4</sup> No economy-wide system of training exists, and formal firm-based training is actually combined with more informal on-the-job training to generate very firm-specific competence.

As regards the US, the fragmentation of vocational training is generally stressed in the literature. This fragmentation acts to prevent the emergence of economy-wide vocational diplomas. No developed system of firm-sponsored training exists; indeed, external observers often stress the lack of investment in training by American firms.<sup>5</sup>

According to most scholars, the German model of training and labor market organization is a good example of a truly different solution to the problem of competence formation.<sup>6</sup> A well-established system of firm-sponsored training delivers generally recognized diplomas and qualifications. There is a well-developed skills market that can provide firms with the required qualified workers.

Finally, the French experience is often described as one of widely accepted professional diplomas awarded by a state-based vocational training system coupled with a strong general education system.<sup>7</sup> Both of these are recognized as indications of a worker's potential. Therefore, actual competence is a mixed product of general and vocational education (possibly) combined with on-the-job training.

Building on these brief observations, we can describe the prevailing training systems in each of the above countries by positioning them along the two axes ranking the nature of competence from low to high standardization and the nature of training from weakly to highly firm-sponsored (see Figure 2 below).

*(Figure 2 about here)*

This figure shows that a difference exists among the countries observed regarding both the extent of sponsoring by firms and the standardization of competence. In particular, firm-sponsored training is well established in Germany and Japan (but not

in France and the US), while standardized competence exists in Germany and France (but not in Japan and the US).

The unanswered question, then, is to what extent these results support (or distort) my previous theoretical analysis. To answer this question I will tentatively summarize the stylized facts from indirect literature as regards knowledge embeddedness and labor market institutionalization in the four countries studied.

## V.2 Knowledge Embeddedness in OECD Countries

The notion of knowledge embeddedness can be usefully applied to understand the modes of organization prevailing in countries such as the US, France, Japan and Germany. In fact, a large body of literature has been recently devoted to collecting and presenting evidence on the nature of firms' organization in both national and comparative perspectives. Although this evidence mainly focuses on issues related to work organization, it also delivers insights on workers' involvement and, hence, knowledge embeddedness.

In this respect, many authors have pointed out (see Aoki, 1986; Okuno, 1984) that the typical Japanese firm is a clear example of a horizontal organization of work relying on a strong form of worker involvement. This stresses the crucial role of collective knowledge within Japanese firms, and this result should be contrasted with evidence from the German codetermination system. This latter production model is built on formal coordination among distinct categories of workers, which is far from the „informal empathy“ typical of cooperation among Japanese workers. Organization within German firms builds on a system of coordination among workers who refuse to undergo a process of involvement (see Streeck, 1996a, on this point). In this sense, knowledge here is an individual attribute. The same type of evidence can be provided for French and American firms, where indeed no involvement is found.

These arguments allow me to establish a tentative cross-country ranking as regards knowledge embeddedness, summarized in Figure 3 below.

*(Figure 3 about here)*

We can conclude that one should distinguish between, on the one hand, the Japanese experience of collective knowledge and, on the other, the French, German and American (heterogeneous) forms of individual knowledge.



### V.3 Labor institutions in OECD countries

Broad agreement exists among economists as to the presence of strong „binding“ institutions on most European labor markets, mainly due to the role of different kinds of employee organizations and/or the state. Hence, with respect to the four countries dealt with here, it is straightforward to say that both France and Germany, unlike Japan and the US, are typical examples of highly institutionalized labor markets. This is synthesized in Figure 4 below.

*(Figure 4 about here)*

In fact, Germany represents a clear example of the role played by institutions on the labor market to favor skills certification. Thelen and Kume observe: „*In Germany, the state actively organized the artisanal sector and endowed it with parapublic authority in the area of skills formation...German unions emerged in the early Weimar years as potential allies in support of a solidaristic [i.e. standardized] skill formation regime for industry*“ (Thelen and Kume, 1999, p.5). The same kind of role has also been played by the state in France (see Verdier, 1998).

In the next section I will combine the empirical observations made in the previous sections and see how the organizations and institutions in the four countries observed shape the nature of their training regimes.

### V.4 National Models

In fact, if we now apply the theoretical results in Table 1 above to the characterizations of national organizational/institutional settings given in Figures 3 and 4, we can describe our four national configurations as follows. Japan represents an example of a company-driven training regime, where collective knowledge pushes firms to successfully invest in firm-specific competence without experiencing resistance from workers on poorly institutionalized labor markets: this indeed corresponds to my second consistent configuration, i.e. Case (3) in Table 1.

Germany (and to some extent France), by contrast, exemplifies highly institutionalized labor markets in a context where firms merely rely on individual knowledge, which indeed sustains a standardized training regime: this is my first coherent configuration envisaged in Case (1) in Table 1.

Finally, an organizational and institutional vacuum is particularly evident in the US, where the absence of knowledge collectivization at the firm level combines with poorly institutionalized labor markets (as predicted in Case (4) in Table 1). This may indeed partly explain why the US is trapped in a poor training equilibrium – as suggested in Section V.1. These observations are summarized in Figure 5 below.

*(Figure 5 about here)*

It clearly appears from the above that the theoretical model developed in the first part of the paper does provide us with suitable categories for understanding some components of national training systems.

## **V.I Concluding Remarks**

This paper argued that the stability of training regimes depends on the consistency between workers' and firms' incentives as determined by the organizational and institutional structure. Specifically, I have shown that a standardized (or, by contrast, firm-specific) form of training can actually be sustained as the outcome of a stable institutional/organizational configuration relying on individual (collective) knowledge within firms coupled with highly (poorly) institutionalized labor markets. This stresses the role of complementarities between organizations and institutions within the economic system in shaping social actors' incentives and sustaining consistent economic choices, such as investment in training.

To conclude, one should note that the alternative between firm-specific and standardized competence is crucial in that the result will affect workers' cost of job loss and might therefore impact on macro-economic variables such as the equilibrium rate of unemployment.<sup>8</sup> In so doing, the nature of competence may indeed have an important feedback effect on the institutional/organizational structure itself. This feedback might precisely act to reinforce the corresponding institutional/organizational configurations. If this is the case, the two coherent configurations set out in Table 1 would then define distinct models that should indeed be looked at as long-term institutional trajectories.

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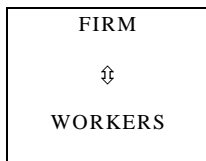
## Table and Figures

		FIRMS' KNOWLEDGE		
			<i>Individual</i>	<i>Collective</i>
			Standardization = firm-specific	Standardization $\leq$ firm-specific
LABOR MARKET INSTITUTIONALIZATION	<i>High</i>	Standardization $\geq$ firm-specific	(1) Standardized training	(2) Conflict
	<i>Low</i>	Standardization = firm-specific	(4) Vacuum	(3) Firm-specific training

Table 1

Collective knowledge

high worker involvement



Individual knowledge

low worker involvement

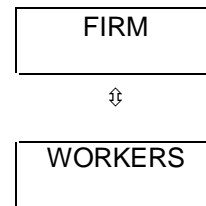


Figure 1

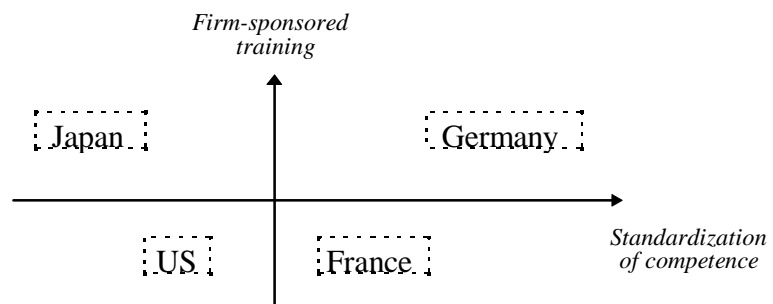


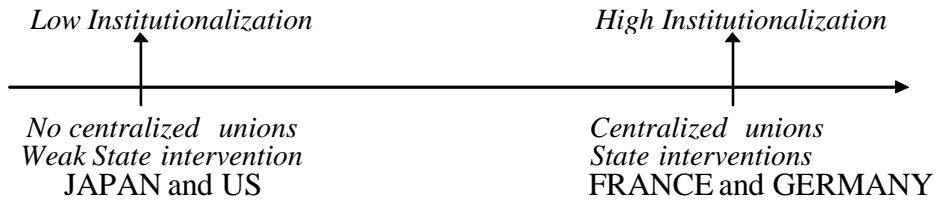
Figure 2

*Knowledge embeddedness*

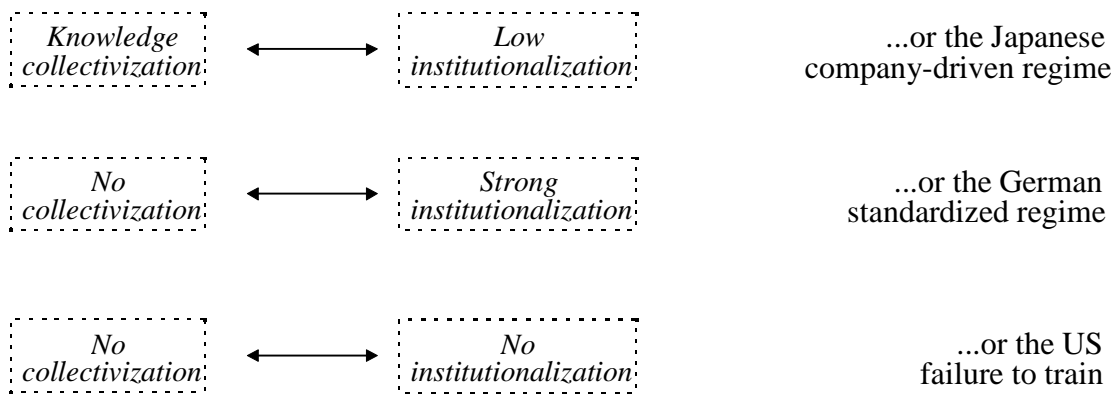


*Figure 3*

*Labor market institutionalization*



*Figure 4*



*Figure 5*

## Notes

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- <sup>1</sup> The following authors and works are all useful references in this field: Aoki, 1986; Boyer and Hollingsworth, 1997; Soskice, 1990; Streeck, 1996a and 1996b.
- <sup>2</sup> Two polar solutions are generally proposed: *vertical* and *horizontal* organization of work. In the vertical model a central authority is in charge of all decisions and guarantees coordination inside the firm, whereas in horizontal models decision-making is often a workers' matter and coordination is highly decentralized.
- <sup>3</sup> See Becker (1962) on this last point. Acemoglu and Pischke's argument stresses the role of labor market institutionalization as a way to implement „beneficial distortions“ in the structure of wages that make general training profitable for private actors (i.e. firms). The authors show theoretically that in the presence of a wage structure compressed from below, general training becomes advantageous for firms. In fact, in this case firms find it profitable to train workers up to the level where their productivity equals the minimum wage level fixed by institutional constraints.
- <sup>4</sup> See, in particular: Aoki, 1986; Asanuma, 1989; Caroli, 1995; Maurice, 1993; Müller and Shavit, 1998; Okuno, 1984; Soskice and Hancké, 1997; Streeck, 1996b; Thelen and Kume, 1999.
- <sup>5</sup> One can usefully read: Allmendinger, 1989; Berg, 1994; Caroli, 1995; Lynch, 1994; Müller and Shavit, 1998; OECD economic surveys on the US, 1993-1996. Data on training in the US versus Europe and Japan can be gathered from different sources: OECD (1994, Table 4.7) reports for the US a significantly lower percentage of young workers receiving formal training than for the other countries (10.2% for the US versus 23.6% for France, 67.1% for Japan and 71.5% for Germany). Berg (1994) provides data from case studies evidencing the same or similar results.
- <sup>6</sup> Interesting works here are: Allmendinger, 1989; Berg, 1994; Brauns et al., 1997; Caroli, 1995; Lane, 1989; Marsden, 1990; Maurice, 1993; Maurice et al., 1982; Müller and Shavit, 1998; Soskice and Hancké, 1997; Streeck, 1996a and 1996b; Thelen and Kume, 1999.
- <sup>7</sup> One can read the several comparative works on the German versus the French training model cited above. In addition, see: Caroli, 1995; Eyraud et al., 1990; Lane, 1989; Müller and Shavit, 1998; Soskice and Hancké, 1997.
- <sup>8</sup> Gatti (1998) and Gatti (1999) propose, for instance, two efficiency wage models where institutional settings (i.e. worker competence, firm organization, business coordination and competition) affect both the unemployment rate and firms' innovation trajectories.





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