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**INTERNET, MATCHING DEVICES
AND THE JOB SEARCHER'S BEHAVIOR**

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ABSTRACT

What are the the determinants of an effective and efficient Internet job search? The first part attempts to give a realistic view of the Internet job searcher's behavior. To that end, I first remind the model of action that underlies the "modern theory of job search". Then, relying on the analysis of a database of queries made by job searchers on a French Internet search engine, the article provides new insights into the job seeker's behavior and searching skills. In the second part, I consider the implications of the situated nature of cognition on the job searcher's behavior. I analyze the consequences of the Internet based labor market intermediaries' activity: they develop search tools that affect the job seeker's cognitive capacities and level of autonomy. This part relies on a continuous observation of French job boards' activity, and on interviews of web sites' managers.

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0. INTRODUCTION

Since Internet opens an easy and cheap gate to job opportunities, it is supposed to affect the dynamics of information flows in labor markets. At the micro level, the opening of this new communication channel could increase competition among firms to attract applicants by reducing the costs of search (Kandel and Simhon, 2002); it could also improve the matching quality (Freeman, 2002). At the aggregate level, the improvement of the matching function allowed by the migration of the labor market into Internet could have a positive impact by reducing frictional unemployment (Pissarides, 1990).

However, this migration could also increase the inequalities among job applicants. At a first level, access to electronic labor markets is simply determined by *the access* to the Internet, with possible cumulative effects : a higher level of education, which is usually associated with shorter unemployment durations (Kuhn and Skuterud, 2004), is also a good indicator of the "physical" access to the Internet (Hargittai, 2003). At a second level, Internet could provide a decisive advantage to the connected job seekers that make *an efficient use* of this new medium. This efficient use relies on factors, such as equipment, social support networks, motivation and other "cultural resources" that are not equally distributed among job seekers (De Haan, 2004). Still, my aim in this paper is not to list and measure these predictors. It is rather to find out which are the *specific digital skills*, "defined as the ability to use the new technology efficiently and effectively" (Hargittai, 2003, p. 829), that a job seeker needs in order to access to labor market information, and especially to employment opportunities. In particular, it deals with the following questions: which skills do job seekers need in order to get matched with jobs through Internet based formal channels, such as job search engines? Since search is the result of the interaction between the job seeker and matching tools, how does the newly Internet based intermediaries' activity affect the job seeker's behavior and his/her cognitive resources?

Job search is an information intensive, problem-solving activity. It can be said to be efficient and effective if the agent acts rationally. Rationality implies that the agent is able to specify the purpose of his search, and to use the adequate related means. Information intensity implies that he/she is able to gather, process and interpret the labor market information. Such operations obviously require *cognitive capacities*. Faced with the problem of assessing these capacities, one should meet two classical questions of the cognitive theory and problem-solving analysis. The first one concerns rational choice, and was first formulated by Herbert

Simon (1957). In the economic theory, a behavior is said to be rational when it is the result of an optimization procedure. Optimizing is possible as long as the environment in which the choice takes place is simple. But the rationality becomes limited – that is, optimizing is no longer possible – when the complexity of environment exceeds the cognitive capacities of agents. From this viewpoint, Internet might produce ambiguous effects on the job seeker's ability to adopt an optimizing behavior: admittedly, Internet facilitates and speeds up access to labor market information; but, it also raises the quantity of available informations and, thus, makes the environment of choice more complex. As a consequence, Internet might simultaneously raise the searcher's freedom of choice and require more cognitive capabilities. The second classical question is the so-called "attribution problem" (Hutchins, 1995). If the behavior is the result of the interaction between the agent and its environment, the rationality of the behavior becomes a property of this interaction. When situated, a rational action can not be attributed only to the individual agent. When looking at the Internet job searcher's behavior, two elements must be taken into consideration: he/she cannot perform his/her task without the help of mediating devices such as search tools and visual interfaces; these devices, that are instrumented by the labor market intermediaries, are resources – they might augment the searcher's cognitive capabilities – but also constraints – they limit the set of possible actions. Consequently, one must consider the fact that artifacts and other elements of the context affect the searcher's cognitive capacity.

The paper is organized around these two topics. The first part attempts to give a realistic view of the Internet job searcher's behavior. To that end, I first remind the model of action that underlies the "modern theory of job search" (Mortensen, 1986; Cahuc and Zylberberg, 2004). Then, relying on the statistical analysis of a database of queries made by job searchers on a French Internet search engine specialized on employment opportunities (*Keljob.com*) the article provides new insights into the job seeker's behavior and searching skills. In the second part, I consider the implications of the situated nature of cognition on the job searcher's behavior. I analyze the consequences of the Internet based labor market intermediaries' activity: they develop search tools that affect the job seeker's cognitive capacities and level of autonomy, understood as his/her ability to enter the market and to drive the search. This part relies on a continuous observation of French job boards' activity, and on interviews of web sites' managers.

1. THE WEB SEARCHER'S BEHAVIOR AND HIS/HER COGNITIVE SKILLS

Since the seminal works of George Stigler (1961; 1962), it is admitted that the dispersion of buyers and sellers, and the information costs that it entails, reduce market efficiency. From this point of view, the Internet is a remarkable innovation. New labor market intermediaries, called *job boards*, enable cheap advertising of job offers and costless access to them. Moreover, new businesses, called *job search aggregator sites*, afford the aggregation of information in a decentralized manner¹. Still, quasi-instant and decentralized access does not mean unmediated access. Offers are listed in hidden databases and parametrizable search devices are required to search for them. Obviously, the use of these tools requires specific skills.

When looking at the job searcher's behavior and digital skills, three questions are raised. How does he/she search? What is he/she looking for? Which resources sustain his/her searching efforts? The modern theory of job search offers an answer to these questions, which, as I shall show, remains unsatisfactory when assessing an individual's skills. The empirical analysis, though partial², gives new insights into some fundamental job search issues: the arrival process of offers is not random but greatly determined by the searching strategy; job searchers search for positions, and not for wages; search devices, and the information patterns that they incorporate, direct the seeker's behavior.

The model of action underlying the modern theory of job search

The job search theory draws the portrayal of an agent who must acquire information in a frictional environment³. The returns to this investment, though uncertain in the present, can be rationally anticipated and, thus, design the actual behavior of the unemployed job seeker. Critical reviews of the job search literature emphasize the lack of realism of some of its assumptions: focus on wages; exogenous arrival rate of offers (Devine and Kiefer, 1991;

¹ For example, the canadian web site *Simplyhired.com* aggregates more than 3 300 000 job offers stemming from different north american job boards (May 10, 2005).

² This partiality is both theoretical and empirical. In the job search theory, a job offer is a "real" offer. On job boards, an offer only offers the right to apply for the job. Otherwise, this empirical material gives an incomplete insight of the job searcher's strategy (cf infra, note 6).

³ Obviously, the job search theory was originally introduced in order to deal with the decisive issue of unemployment. However, it indirectly influences our representation of the job searcher's micro-behavior.

Granovetter, 1995). I will show that these assumptions enable a simplification of the context of choice and of the problem the job seeker faces.

First, admittedly, the job searcher adopts the cognitively most demanding behavior: he/she optimizes. That is, he/she maximizes utility subject to constraints, under the assumption of rational expectations. His/her program is the following: “the cost of search, for a consumer, may be taken as approximately proportional to the number of (identified) sellers approached, for the chief cost is time. (...) If the cost of search is equated to its expected marginal return, the optimum amount of search will be found” (Stigler, 1961, p. 216). Though quite simple, this strategy might require extensive calculation skills in an uncertain environment.

Nevertheless, the modern theory of job search assumes that work is an homogeneous good and focuses on the determination of wage rates. The worker receives a job offer that is in fact a wage offer. It is shown that, in such a case, the optimal policy is a reservation wage policy. It is optimal to accept the job (and stop searching) when the highest offered wage is equal or in excess of a critical number called the reservation wage (w^*): the first stage of the search consists in the determination of w^* . Obviously, the focus on wages contributes to enlighten the cognitive burden borne by the job searcher: ranking numbers is not difficult.

Another decisive problem is the determination of the arrival rate of offers. First generation models are non-sequential: facing an “optimal sample size problem”, the worker selects a wage sample of size n at cost c per wage in the sample. Second generation models are sequential: the worker receives one offer per period, which he/she rejects or accepts. The optimal strategy is to adopt a dynamic stopping rule: he/she keeps searching until a “good” wage offer arrives – a wage offer higher than or equal to w^* . So, it is assumed that the arrival rate is exogenous: it is not determined by the searcher’s strategy; on the contrary, it is the outcome of an external random process⁴. Consequences on the job searcher’s behavior are huge: cognitive skills are of no use, and although searching is considered as a productive activity – alternative to work and leisure – that requires time and resources, the job searcher adopts a passive attitude towards the market.

What differentiates job searchers? Obviously, the reservation utility of individuals – that is the respective values of time spent in searching, working and leisure – might differ. Moreover, some models (see for example Pissarides, 1990) introduce an endogenous search effort. These variables can explain differences among job searchers. But none of them refers

⁴ In Stigler’s model, the wage sample is random.

to specific searching skills. Suppose now that a new matching technology, say Internet, is available. If it is assumed to reduce search costs, the job seeker will adopt it. As a consequence, workers will either raise their reservation wage or shorten their unemployment duration. But, is it realistic to suppose that offers arrive sequentially, if the searcher is able, through this technology, to identify many employers in the same period? And is it possible to reveal new digital skills if searching requires only algebraic skills? One possible answer is that the new technology helps the job searcher to calculate quicker and better, with the consequence that it moves the market closer to its competitive equilibrium – and thus invalidates the job search theory (Kandel and Simhon, 2002). I will show that this result is unsatisfactory.

Internet job search: empirical evidence

I now turn myself to a concrete Internet based platform, *Keljob.com*, that enables a very extensive search: 150 000 job ads⁵ are accessible from one unique virtual gate. With evidence stemming from these empirical sources⁶, I consider the arrival process of offers, the purpose of searching and the relation between the job seeker and the search engine in an alternative way. I shall focus on the candidate's required skills to use efficiently this new channel.

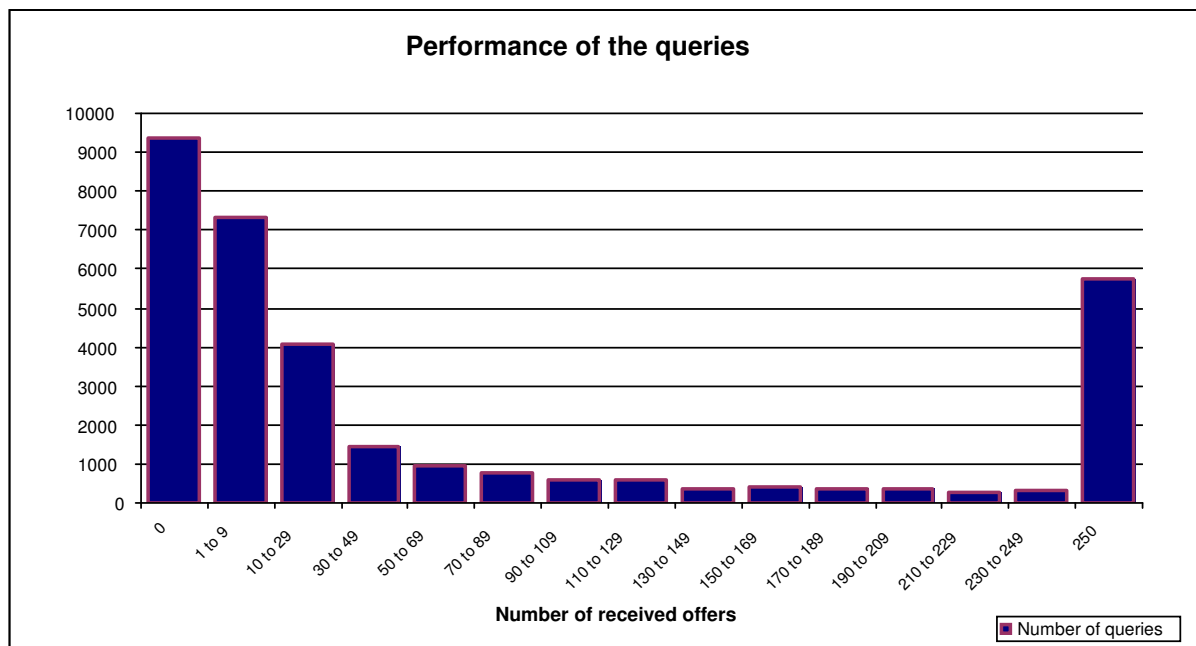
The first issue is the arrival rate of offers. It is possibly determined by factors that are unrelated to individual search decisions: a coordination failure results then from the absence of offer in a particular market segment. But it is not enough to explain that almost one third of all queries don't match any job offer (cf table 1). Since they are the result of inadequate queries, many coordination failures can be attributed to the job searcher's behavior: a spelling mistake or an inconsistent query, but also a too accurate demand lead to bad results. Symmetrically, high returns are not synonymous with successful queries: 17 % of all queries reach more than 250 offers. It means that 17 % of all queries reach between 250 and 150 000 offers, but that, for each query, only 250 offers are randomly chosen by the search engine –

⁵ These ads are stored in job boards', temporary agencies' and companies' databases: Keljob is an aggregator web site. By comparison, about 150 000 job offers are, on average, accessible on the French public employment service's job board. The french PES pretends to hold between 30 and 35 % of market shares in job advertising.

⁶ In 48 hours, 33 044 queries were made on the search engine. They were recorded and compiled in a database. The detail of these queries – that is the search criteria –, and an insight into their performance – for each query, we have the number of offers received, but not their content – were analyzed. No information is available on the job seekers' identity and characteristics. The data were gathered in February 2004.

the number "250" is a technical limitation embodied in the search algorithm. Then, the offers are displayed at a rate of 25 offers per pages. Screening a large sample of datas requires time: web searching studies show that search engines' users rarely go beyond viewing one or two pages (Jansen and ali., 2000). Clearly, the connected job seeker has the power to modify through his/her search criteria the size of the market he/she explores. Not only this power leads to misuses of the search engine, but it is restricted by the limited rationality of the job applicant. His/her strategy is governed by the question: how to manage uncertainty if a too selective search drains the market and a too unselective search floods the market?⁷

Table 1



Obviously, the arrival rate of offers is not the result of a random procedure, and it is greatly determined by the job searcher's behavior. In order to explain what an effective cognitive strategy is, we need to know how he/she parametrizes the search engine⁸. The web site enables two types of queries: the simple 'key word' query⁹, and the multi-criteria query – with up to five different criteria (key word; location; domain; experience level; type of contract). Table 2 shows that most queries (77 %) are combinations of several criteria. More precisely, 62 % of all queries are reasonably complex, using two or three criteria. It's quite logical, since

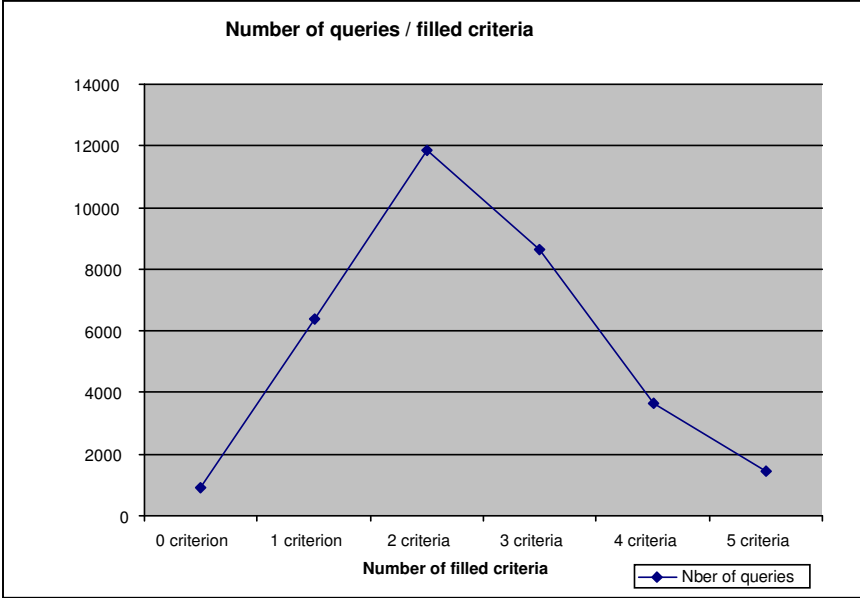
⁷ Note that asking this question implies that I place myself in the "limited rationality" framework: the rare resource is attention, not information (Favereau, 2001).

⁸ In fact, the most relevant unit of analysis is the "web session", which is made up of several successive queries by the same user. Indeed, an inadequate query can be marginally modified in order to enlarge or to restrict the search. Unfortunately, it was not possible to piece together individual sessions from the queries' database.

⁹ In an empty field, the job seeker writes the word(s), using possibly the whole language. For example, key words may refer to occupations (florist; butcher; financial analyst; ...), to skills and tasks (german; computer maintenance; inventory control; ...) or to products (Oracle; networks; polymers; waste; ...).

all "zero criterion" queries reach all the market (empty search) and 80 % of "five criteria" queries don't match any offer. So, there is a continuous and negative relationship between the degree of complexity of the query and the size of the received offers' sample.

Table 2



But this simple quantitative result isn't enough to assess what is an effective cognitive strategy. Is there an optimal combination of criteria? It seems possible to hierarchise them. Criteria such as the job location, the type of contract or the level of experience don't suffice to calibrate the search engine. In fact, two criteria rule the search: employment domain¹⁰ and key word. Table 3 shows the performance of queries depending on whether they incorporate one, both or none of those two dominant criteria. First, the results confirm that these criteria are a necessary condition for an effective search: 67 % of the queries using neither of them match at least 250 offers. Second, these criteria are mutually exclusive: 64 % of the queries using simultaneously the "domain" and "key word" criteria don't reach any offer. Finally, each dominant criterion can be associated with a different market size: key word searches reach a tighter market than domain searches. It's quite understandable since the employment domain is an enlarged cutting-out of the labor market, while the key word enables a more targeted search. The best strategy might differ, depending on the market scope the job seeker's is targeting.

¹⁰ The "domain" criterion is an hybrid and finite list of 30 job categories, such as: marketing; automobile industry; finance; tourism; healthcare; executive; etc.

Table 3: performance of different combinations of criteria

	All queries	"Domain" queries (D)	"key word" queries (KW)	D + KW	neither D nor KW
Performance	%	%	%	%	%
0 offer	29	6	31	64	4
1 to 19 offers	30	30	37	26	11
20 to 249 offers	24	42	25	9	18
250 and more offers	17	22	7	1	67
Total	100	100	100	100	100

Different searching strategies are implemented by the connected candidates that make an efficient use of the search engine. However, the high number of unsuccessful queries – almost one half – tends to show that these procedures have not become more commonplace. In fact, the searching rules revealed above are not codified or made explicit anywhere. They are the outcome of a trial-error process carried on by the job seeker. A certain combination of criteria (the input) leads to certain results (the output). The job searcher learns by using insofar as he/she tries new combinations. He/she progressively drops inefficient search routines, selecting the efficient ones. The distribution of the results (table 1) can be explained by the simultaneous coexistence of expert and novice users of the search engine. Nevertheless, this may tell us that the capacities of innovation – exploring new combinations – and of learning – selecting the good routines – are not equally distributed among job applicants. Yet, it is not possible to isolate and measure these two factors.

Another consideration of utmost importance is the fact that the job seeker's behavior seems not to be driven by price incentives. The wage is virtually never observed in the "searching" part of the search process. As shown by George Akerlof (1970), in the presence of quality uncertainty, price mechanisms don't suffice to guarantee an efficient clearing of offers and demands. In the labor market, frictions result not only from agents and prices dispersion, which is the working hypothesis of the job search theory, but also from the incomplete categorization of goods. In such an imperfect environment, qualifying work and positioning oneself inside the market become major concerns for the job applicant (Callon and al., 2002). Consequently, a good search relies on a more complex behavior than just looking for the best offered wage. The question raised is: which words connect the job seeker to jobs he/she is looking for? First, this reminds us that the Internet is an intellectual technology that was originally designed for researchers and requires literary skills (Guichard, 2002). Second, it implies that a successful "key word" search relies on the job seeker's ability to place himself

inside different representations of the labor market – markets for skills, for professions, for products, etc. The ability to mobilize a plurality of information patterns and to move from one to another is a decisive digital skill of the Internet job searcher. Considerations of relevance are essential, and rely on the individual's judgment, rather than on his/her calculative rationality (Laville, 2000).

The design of an efficient strategy on the job search engine *Keljob.com* relies on demanding cognitive skills. Different digital skills could therefore lead to an unequal access to jobs. If this fact affects workers taken individually, it is also a major concern for Internet based labor market intermediaries (LMI). Indeed, an efficient searching strategy is the produce of the interaction between a human agent and technical devices. The second part of the paper considers the implications of the implementation of matching tools and artifacts by LMIs on the job searcher's ability.

2. DISTRIBUTED COGNITION AND THE JOB BOARD'S FRAMING OF INTERACTIONS

Frictions resulting from search costs can be drastically reduced by the regulation of information flows. Anticipated by Stigler (1961), this principle was formalized by Rubinstein and Wolinski (1987). "Middlemen" emerge if they can facilitate the meeting of potential buyers and sellers. These intermediaries reap the surplus associated with the reduction of search costs they enable. They are supposed to be neutral, since they don't modify the nature of the traded good. But, in the case of qualitative uncertainty, the middlemen have to make sure that applicants and available positions are properly identified so that these qualities converge during the matching process. Job web sites developpers all face the same kind of problem: how to attract simultaneously candidates and recruiters and how to favour "good" and prevent "bad" encounters?

Contrary to the "neutral" position, I assume that LMIs contribute to structure interactions between demand and supply. In order to reduce uncertainty, and to connect both sides of the market, they incorporate matching tools, such as search engines and nomenclatures. Thus, they enable the adoption of "coordination markers" by suppliers and demanders, prior to transaction. This framing of interactions has significative consequences on the agent's behavior. Since he/she cannot perform searching tasks without the help of mediating devices,

his/her problem-solving abilities are necessarily related to the local context in which he/she is embedded (Lorenz, 2001).

Adopting a comparative perspective¹¹, I will show that the Internet based coordination devices can affect the job searcher's capacity of action in varied ways. Two dimensions of the LMI's intervention are successively analysed. The first one is the determination of the framing *intensity*: it is possible to differentiate LMIs that operate a *soft* or a *hard* framing of the interactions, with important consequences on the job searcher's level of autonomy. The second is the choice of the matching markers. I put forward a distinction between LMIs who favour markers that *inform* the job seekers about the employment opportunities, and LMIs that *select* him/her on the basis of his/her profile.

From flexible to planified matching: the intensity of the framing

The parametrization of the search engine allows the LMI to direct the job applicant into the market. Diverse options are possible: is it necessary to give the job searcher scope or to control his/her actions? Is it necessary to favour entries by finite lists, by menus or by key words?

I have shown in the first part that an efficient query can be organised around the "key word" searching criterion. On *Keljob.com*, this criterion is the dominant one: about 70 % of all queries use it. This main use renders *Keljob.com* a flexible mediation device. With key words, the cognitive burden is borne by the job applicant: by choosing the words, he/she chooses the preferred categorization of occupations; he/she can easily move from one category to another and use all the language to get connected to ads. However, this freedom of choice is risky since it leads, as seen before, to many coordination failures. Why, then, favour a key word search engine? From the LMI point of view, this choice responds to a necessity. *Keljob.com* is an aggregator web site that redirects web users to job boards', companies', temporary and recruitment agencies' web sites. It cannot impose a unique format of information to these advertisers that display the job ads on their own web pages. In fact, the key word mediation gives evidence of the low contribution of *Keljob.com* in the matching process. However, low does not mean nonexistent. Advertisers who want to index their job

¹¹ The comparison is based on the observation of the functioning of employment web sites and on interviews of their managers. These sites include the job search engine *Keljob.com*, public employment services, recruitment agencies, temporary work agencies, non-specialized and specialized job boards.

offers in *Keljob.com* have to pay for it. Furthermore, they have to mention specific datas corresponding to the engine's search criteria, including the key words that shall match the ad. Indeed, the key word search isn't a full text search. In fact, the job searcher has to guess, in a myopic way, the sample of words chosen by the advertisers.

A very different mediation of information flows is observed when it is instrumented by a finite nomenclature. The effective intervention of the LMI leads then to a planification of matching. An example of such a mediation is given by the web site of the French Public Employment Service (PES), *Anpe.fr*. The search engine of *Anpe.fr* is completely organised on a unique nomenclature of occupations, called the Répertoire Opérationnel des Métiers et des Emplois (ROME). On the one side, all ads include a "ROME number" field that is systematically informed – either the recruiter or the PES officer does it. On the other side, a ROME number is allocated to each newly unemployed person when he registers at the PES. ROME is therefore a powerful "focal point" for the applicants and the recruiters. It enables the upstream control of the matching process by the LMI. As a consequence, the planified form of coordination contributes to reduce uncertainty and to lighten the cognitive load carried on by agents on both sides of the market. Of course, this matching device relies on heavy investments taken on by the agency: centralization of data and close regulation of the information flows. Yet, the planified matching may produce negative effects: though ROME pretends to be an exhaustive categorization of occupations it still remains unperfect, especially toward emerging and cross-skills. It could therefore reject out of the market those who do not fit with the categorization.

The intermediation can rely on variable intensities of intervention. On the one hand, a "soft framing" configuration is made possible by flexible matching devices such as key words search engines. These devices multiplie the matching chances but also the coordination failures, and require substantial searching skills on behalf of the job seeker. On the other hand, a "hard framing" of interactions reduces quality uncertainty by limiting the set of possible connective actions. The establishment of a unique nomenclature allows the LMI to operate by remote control: on the Internet job searcher's side, the cognitive burden is made lighter and the behavior routinized. Finally a halfway position is adopted by the majority of Internet based LMIs, in particular by job boards. It consists in displaying a multi-criteria search engine which incorporates pull-down menus – which mirror precisely the categories that design job ads. Thus, conventional coordination marks are put forward by the intermediary, though they're not made compulsory – with a "select all" box, for instance.

The outcome of the marking process: to inform or to screen?

The matching process implies that new Internet based intermediaries work on both sides of the labor market. I will show that it can lead to a strengthening of asymmetries between job suppliers and job seekers. Indeed, it is possible to differentiate between LMIs which favour matching markers that *inform* the job seekers about the employment opportunities, and LMIs that *select* him/her on the basis of his/her profile. Obviously, this distinction is irrelevant in the traditional job search framework, since the only recognized matching marker is the wage. An improvement of the matching technology will necessarily allow the job seeker to demand a higher wage and thus improve his/her condition. The analogy is made with a consumer facing more goods. Still, the analogy is relevant as long as the job seeker is compared to the consumer and not to the good.

In the labor market, interests of suppliers and demanders partially converge. The representation of the matching process as a cooperative game where workers and recruiters equally benefit from the positive network externalities enabled by the Internet two-sided matching platforms is greatly shared by job boards' managers. They consider themselves as "facilitators": job seekers can easily go round the market and recruiters can easily contact pools of motivated and skilled applicants. This bilateral search process is revealed by the simultaneous presence of job ads' and cvs' databases. However, this "symmetric" practice is disrupted by the temptation of the LMI to close the market access to presumed unfitted workers and to operate a pre-selection of the applicants in favour of the recruiters. This logic of action can take different forms. For example, on the job board *Recrullex.com*, which is specialized in legal opportunities, the job seeker is invited to precise his/her experience level in order to access to job ads. On *Monster.com*, a pre-selection questionnaire is optionnally displayed just after the candidate has clicked on the "apply for the job" icon at the bottom of the advertisement. The consequence of these devices is to limit the access to the market: the matching marks describe professional or personal attributes of the job seeker, and not attributes of the position that is proposed to him. Moreover, on the web site of the temporary employment agency *Adecco*, the worker receives assignment's offers only after he has completed an application form which is made of detailed and closed lists of "know-how" and "work tools". This precise profiling enables a completely automated operationalization of the matching process. In other words, the job seecker's capacity of action – that is, his/her ability to enter the market and to search for opportunities – is not only limited by the required digital

searching skills, but also by some of his/her attributes as an applicant. The more these attributes are codifiable, the more the matching process can be automated. This observation concurs with Peter Kuhn and Mikal Skuterud' results on the outcomes of the Internet job search (2004). Using US cross-sectional CPS data, their analysis finds evidence that Internet job searchers are positively selected on observable characteristics – and negatively selected on unobservables.

How can the job seeker reconquer initiative margins, from then on? Several factors must be taken in consideration. The first one is related to the individual searching strategy. The Internet job search relies not only on technical and semantic skills facing the computer, but also on the job seeker's capacity to decompose and recompose his/her profile in order to multiply the matching probability. Job boards often allow applicants to complete several resumes, and thus encourage such a strategy. In other cases, some non-profit LMIs tend to impose matching markers to employers: the offered wage, legal informations, or a complete description of the tasks. As a consequence, the LMI's intervention tends to counterbalance the asymmetrical relations between recruiters and applicants. Finally, the institutional context – that is the legal environment and the implicit conventions shared by the agents – determines greatly the forms of coordination and the use of matching technologies. Thus, a comparative study of the contents of thousands of Internet job ads in several countries (including France and Great Britain) leads to striking results: 90 % of the ads mention the wage in UK versus less than 50 % in France; allusion to the educational background appears in 24 % of all ads in UK and in 72 % of them in France (Marchal & al., under press). These figures give evidence that the matching markers differ according to the institutional context of the labor markets.

4. CONCLUSION

Recent works put the emphasis on the potentiality of information and communication technologies to deeply reshape the market structure and thus enhance economic performance. But the literature on the digital divide also stresses the risks associated with an unequal dissemination of these technologies among people. On both topics the labor market is a critical issue. The emergence and the rapid spread of electronic market places may induce positive and negative changes in outcomes with possible cumulative effects.

This paper focused on the determinants of an effective and efficient online search for employment opportunities. Internet job searching, that is a problem-solving activity in a

complex informational environment, requires capabilities: the use of matching devices relies on innovating and learning skills; efficient use of search engines depends on the job seeker's semantic skills and on his/her ability to place himself/herself inside different representations of the labor market. Still, more empirical work is needed, especially to identify how people's resources may lead to differential accesses to electronic labor markets: the level of instruction, general intellectual skills and the social background may be decisive resources for the Internet job seeker (De Haan, 2004).

In addition, the technical and institutional environment of the search has a decisive influence on the job searcher's behavior. In particular, LMIs contribute to the framing of interactions between the demand and supply sides of the market market – with significant implications for the job seeker. First, the search artifacts distribute the cognition among the agents, and may reduce or increase the cognitive burden borne by him. Second, the choice of the matching marks may either favour an agent allowed to explore new employment opportunities or an applicant that has to be pre-selected before getting into the market. This point should be taken into consideration when assessing the role of the State in the regulation of labor markets.

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