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An Econometric Study**

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ECONOMICS DEPARTMENT

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MATCHING PROCESSES IN THE LABOUR MARKET IN MARSEILLES.
AN ECONOMETRIC STUDY.

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Abstract

This paper presents empirical results on matching process in the labour market in Marseilles (France). Using a sample of meetings, organized by the National Agency for Unemployment, between employers and workers we observe a selection among applicants on the basis of their level of education. The strength of this selection is the consequence of a channel effect caused by the poor quality of the screening performed by the agency. Employers appear also to discriminate against women, the youngest applicants, long term unemployed people and those of North-African extraction. These effects are alleviated when employers face a tension on the labour market.

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Introduction.

In this paper, we shall give an empirical analysis of matching processes in the labour market in Marseilles, France. Labour market is a two-sided market where agents belong to one of two disjoint sets : workers looking for a job and employers searching for applicants for the vacancy(ies) they are offering. A matching procedure try to match two agents of opposite sides so as to obtain a stable couple (worker,firm) where the worker is employed by the firm. There exist a wide literature on this topic and several matching procedures and algorithms have been implemented on several labour markets .

Employers and workers can meet each other in the labour market using several recruitment channels such as private or public employment agency, newspapers, personal acquaintances or employees referral, employers can also look for their labour force at some particular places such as colleges or public places, and workers can also present themselves to employers . We could expect that agents have a prior idea or a belief about the type of agent they could meet via each recruitment channel, and that their strategies against an agent met via a particular channel will vary according to the beliefs associated with this channel. We will call the effect of these beliefs on agents' strategies a channel effect. We could also expect that agents will select the channels which promise to be the most fruitful for their purpose. However, by French law, firms should declare the jobs they are offering to the National Agency for Employment, (A.N.P.E., Agence Nationale Pour l'Emploi), which selects applicants in the file of unemployed people registered in the agency and presents them to employers. Therefore, employers face an institutional stream of applicants and their behaviour against these candidates will depend on the channel effect resulting from the ability of the agency to present acceptable candidates in regard to their requirements.

We have information on a sample of meetings organized by a local office in Marseilles of the National Agency of Employment. This agency was notified of a set of vacancies offered by 356 firms, and presents to these firms a set of 2492 workers. Each of these workers meet one or several employers, and each meeting ends with either an agreement, or a refusal, or a postponed decision. As we know some characteristics of both paired agents and the result of their meeting, we can try to explain this result by the available characteristics of the pair (applicant, employer). As the matching procedure is such that applicants are presented to employers, we can assume that the workers are rather willing to get the job they apply to . Hence the outcome of the meeting could be viewed as being mainly an employer's decision.

The economic theory provides some elements to explain employers' decision. Intuitively a firm would recruit a worker whose productivity is at least higher than a reservation level of productivity by analogy with the concept of reservation wage used in job-search theory. This reservation productivity could be defined as the level of productivity of an applicant

¹See Roth and Sotomayor for a detailed presentation of these models.

²See Braudel (1979) for a historical survey of the meetings in the labour markets.

³Moreover the rate of unemployment in Marseilles is twice the national average, i.e around 20 per cent. This implies that applicants have a strong incentive to get one of the rare offered jobs.

such that the expected marginal income received by the firm after hiring this applicant is equal to the marginal cost of an additional period of time of search for another applicant. As this productivity is either unobservable or costly⁴ to evaluate, employers will infer it from educational credentials⁴, assuming that this productivity is positively correlated with the level of education because academic education is a profitable investment for only the most productive workers. If this inference is validated by the experience of previous job contracts, we obtain a signaling equilibrium which separates applicants in homogenous groups of productivity. However, the lowest qualified workers may also modify or conceal their real level of education but we will assume that these strategic aspects of the information transmission have few importance in our case, though even such phenomena have been sometimes actually observed. Hence, we could expect that the result of a meeting will depend on applicant's level of education.

Furthermore employers could also evaluate this productivity from applicant's professional path such as previous job, professional training, or previous duration in unemployment : Blanchard and Diamond (1990) have proposed a model where employers infer this productivity using the duration of previous unemployment spells. Therefore we will also verify their impact on the result.

Besides employers could also⁶ infer this productivity from individual features such as age, gender, race, etc. However a decision founded on race and gender may also be relevant to discrimination phenomena.

Some empirical previous studies brought to the fore that employers' search behaviour depends on the duration of the position and the skill required for it, the difficulty of firing a worker, or the wage rate : these variables have a positive effect either on the duration of the vacancy or on the number of screened applicants. We could expect that employers' recruitment decision will also be influenced by these variables.

Finally, employers' strategies could be influenced by the state of the market, in particular by the availability of likely applicants. Wolinsky (1987) proposed a theoretical model of matching and bargaining in which both sides of the market have the option of leaving their current bargaining partner and beginning bargaining with a new one. This has close relevance for the labour market. As Shaked and Sutton show, the availability of these outside options gives agents bargaining power. Therefore a high number of applicants for a position increase employers' bargaining power. Conversely, the firm reduces this power by offering several identical positions. The ratio of the number of identical vacancies offered to the number of applicants encountered represents a tension on the labour market captured by the firm, and we could expect that this tension will have an effect on employers' strategies.

This work is organized as follows. In section I we will present the matching procedure, the main interesting features of the data and the econometric model which we will use. Section II will be devoted to the validation of the effects presented above and the discussion of the estimation results.

⁴ See Spence (1973 and 1974), and Riley (1979).

⁵ See Crawford and Sobel (1982), Osborne and Rubinstein (1990), and Admati and Perry (1987).

⁶ See Spence (1974).

⁷ See Beaumont (1978), Barron, Bishop, and Dunkelberg (1985), Roper (1988).

I : The matching procedure, the data and the econometric model.

A : The matching procedure.

The initial move of the matching procedure is the decision of the firm to offer a vacancy on the market. This implies that the new job is not filled directly by internal promotion inside the firm, but is officially declared by the firm. The firm uses several recruitment networks such as acquaintances or informal recruitment channels, private unemployment agency, newspapers etc, but by French law it is enforced to declare also the job to the local office of the National Agency for Employment. Hence some administrative information are given to this office about the characteristics of the position and the profile of the requested applicants. On the basis of this information an administrator of the office chooses some applicants from the file of unemployed people registered in the agency. Besides this vacancy is also advertised on a notice board in the agency and the interested people should meet the administrator before applying. This means that the firm has no information about the available labour force and delegates to the agency the responsibility to choose the applicants. However selected applicants know the overall set of offered vacancies and their characteristics, but cannot apply without administrator's approval. At this node of the description of the process, we should refer briefly to the existing matching mechanisms.

In the prevailing matching procedures in two sided-markets, agents of both side of the market have information about the agents of the other side and transmit their preferences over agents of the other side to a central institution which, using algorithms, matches the agents in a stable way, i.e. no pair of agent or no coalition of agents of both sides of the market are in a better position with a matching different from the one proposed by the matchmaker. The set of stable matchings coincides with the core of the matching game, i.e. the set of undominated outcomes. If the matchmaker is able to generate such stable matchings, no agent will have an incentive to look themselves for a partner of the other side of the market.

Hence, in our case firms will have an incentive to choose their workers to-be only through the Agency if the local office is able to propose such optimal matchings, which implies that the agency selects applicants taking into account the preferences of firms on the applicants. But it is not really the case. Only agency's administrator knows the potential applicants and select or gives his approval to some of them on the basis of his opinion about their ability to obtain the position. This prior idea could be false if the administrator has no precise idea about the attributes and the content of the proposed position. Moreover, the National Agency for Employment is a governmental agency. If French government decides for some political reasons, such as the proximity of a poll, to promote a category of unemployed people (young entrants in the labour market, people with long unemployment duration, women, etc...), then it recommends the agency to give priority to these people. Therefore the selected applicants could be completely unacceptable in regard to employers' requirements. Furthermore some suitable workers could have been discarded by this selection procedure.

⁸ The algorithms used for the matching problem use the properties of special graph structures called bipartite graphs. See Knuth (1976), Roth and Sotomayor (1990) or Sedgewick (1992).

As employers and workers can use other channels to meet each other, the main consequence of a misallocation by the Agency is that employers will only formally declare the jobs to the agency, most of the hiring processes taking place outside the agency and perhaps before the vacancy was really advertised to the office. This really occurs in France where these the National Agency represents only from 10% to 20% of the total recruitments. The consequence of this recommendation policy is a loss of credibility of the agency. In 1991, the National Agency for Employment decided to reverse this phenomenon, and administrators have to contact systematically employers in order to improve the screening quality of the agency.

Once this selection is performed, each selected applicant meets one or several employers until he is employed or he is not selected because there are no longer suitable positions for him in the sample. As the agency gave us most of the available information of both side of the market, i.e. the sample of all offered vacancies opposed to the selected sample of applicants and the result of the meeting, we can analyze quantitatively this process, being aware that we will model also the channel effect associated with the quality of the screening of the agency.

Now, let's us present the main features of our data set.

B : The available data.

i : *The vacancies* : Our sample of vacancies has been offered by 356 firms from August 1987 to March 1988. Since some firms are offering several identical positions, our sample contains 440 vacancies. Each offered position is defined by a set of characteristics such as the offered wage in Francs per month (more precisely the minimum offered wage and sometimes the maximum offered wage which represent the lower and upper limit of the wage that employer is willing to pay), the type of job which is mainly a work contract or a temporary job for young entrants in the labour market. The former job is a usual traditional job with status, contract and conventional wage, right to social protection and unemployment insurance, thus a job recognized by people as a convenient occupation. The latter job, labelled SIVP is an initiative of the French Government in order to bring down the level of unemployment among young people. These temporary jobs (for three months) are intended for these people who are looking for a first job and hence are without professional experience, and are aimed to provide these young unemployed people with a professional experience enabling them to find a stable job more easily. We should also note that employers have financial incentives to offer these jobs, since the Government pays from 79% to 86% of the salary, and exempts employers from social charges (social insurance, social security) and fiscal charges. These jobs are subject to a prior agreement between the employer, the young worker and the administration in order to fix some professional objectives for this training period. Therefore, the worker to-be could be selected by the employer before the job is officially declared to the agency. There exist another jobs (mainly training jobs which are also subject to a trilateral agreement between an employer, an applicant and the administration) but they are few in comparison with the previous jobs. We also know the working time of the job,

⁹ 50 % of the hirings take place via informal channels. As mentioned by van Ours (1990), these networks provide good initial screening of applicants and firms, and generates more stable matchings.

(full-time or partial-time job), and the minimum level of education required by employers.

This level is split in four cases : level of "baccalauréat" which is the examination giving university entrance qualification, or level of middle school, or level of upper school, or level of "certificat d'études". These four categories are not very precise. There are several types of "baccalauréat" of which values are extremely different, the level of the "certificat d'études" means only that its owner is able to read and to write because this old diploma is quite no longer passed. Lastly the level of middle school or upper school are extremely heterogeneous, but correspond to a low scholarly background. In our sample less than 25 per cent of jobs require the highest level of education recorded, the majority of offered jobs need only the upper school level. We can deduce that most of the offered positions are not very qualified, and we could expect that the selected labour force will be little qualified. In any case, the used scale for the level of education is not suitable to a selection process intended for high qualified jobs.

Some other characteristics such as knowledge of foreign language, working travels, place of work etc, are also recorded. Most of these positions are offered in Marseilles. This labour market is local.

Finally employers request the agency to send them a minimum quota of applicants. We know also the number of applicants actually met. The main characteristics of these data are presented in tables 1,2 and 3 in appendix.

ii : *The selected applicants.* We know a lot of applicants' characteristics. They include applicant's name and surname, age, gender, marital status, the number of dependant children. In addition, we know the degree of priority (if the applicant is disabled or handicapped), his nationality (mainly French, but 8.5% of the sample has an Algerian, Tunisian or Moroccan nationality), the level of education, his professional qualification and professional path (reasons for the termination of previous job contract, previous job, number and duration of recorded unemployment spells, attendance on training courses) until the date of observation of the data (January 1989) if he remains unemployed. We observe that all the selected applicants have a level of education at least equal to the one requested by employers. This means that agency satisfies at least one of employers' requirements. But this doesn't imply that all the selected workers are acceptable by the firm because these requirements are not very precise. We know also if the applicant was directly selected by the agency.

Our sample contains a quite equal number of men and women. Most of these applicants are young, with rather a low level of education, less than 10 per cent have a level greater than the "baccalauréat". Table 5 in appendix shows us that women have on average a better level of education than men : the distribution of the highest diplomas (Engineer, PhD, Graduate or Undergraduate and "baccalauréat") is in their favour . They are also more often observed among the population of highly skilled workers than men, but few of them have a professional qualification of manager, technician or supervisor, i.e. white collar workers. However our sample contains few white collar workers. The selected applicants have on average a low professional

¹⁰ With the restriction that diplomas with an identical label are extremely heterogenous. In France, the repartition of technical or scientific diplomas is in favour of men.

qualification and are without professional experience. This is a consequence of both the high number of temporary job proposed (SIVP) which are intended for young people, and the structure of the offered vacancy which request on average a low level of education. Besides, high qualified people would prefer to use other recruitment channels such as private of public employment agency for white collar workers. We should note that the National Agency for Employment considers implicitly that this level is obsolete when applicants are older than 30 years because it is not recorded in this case. (See main details in appendix, tables 4,5,6,7 and 8).

111 : *The meetings* : Once an applicant is selected, he meets the employer offering the position. The result of this meeting is either an agreement, i.e the employer is hired, or a refusal, or a postponed decision, i.e. the final decision will be made later. If the applicant is not offered the job, he may have the opportunity to meet another employer if he is selected again. The following table gives us the distribution of the meetings in our sample of 2492 applicants.

		Number of employers met.										
		1	2	3	4	5	6	7	8	9	10	13
Number of applicants		1856	428	111	57	18	8	3	6	3	1	1

As it is shown in this table the majority of applicants meet only one employers, a few of them have the opportunity to be selected for more than three vacancies.

We know also the chronological order of each meeting and the observation of the results following this order shows us that only 164 workers are hired after their first interview, 2 after their second one, the remainder applicants stay unemployed though even they have had the opportunity to meet several potential employers. The path of the selected applicants until the date of observation show us that no applicant who had faced a deferred decision was employed. Then we can deduce that a postponed decision is a polite refusal. We can conclude from this first result that the exit from unemployment is extremely brutal for the selected applicants, either they exit immediately from unemployment or they remain unemployed.

This result doesn't imply that only 166 jobs are actually filled, since applicants from another recruitment channels can be employed. This small number of success may be a consequence of the above mentioned bad reputation of the matching procedure implemented by the agency which could prejudice applicants who try to get a position through it. They could be considered as people unable to find an occupation themselves or to establish a personal network so as to get a job.

As the repetition of meetings doesn't change his chance of being hired, we can assume that only the first meeting of each applicant is informative

about his ability to obtain a job. As we want to explain the probability of each possible result, we will therefore retain in our analysis only the first meeting of each applicant, thus our sample will contain these 2492 first meetings.

C : The econometric model.

Our aim is to explain each of these observable results by the available characteristics of each couple of agents (employers, workers) paired by the National Agency for Employment. Since this result is a discrete event, we can represent it by a polychotomic variable and we model the probability of realization of these three possible results using qualitative variable models such as a multinomial logit or a nested logit model. These models differ on the hypothesis of independence between the possible results. If we consider that they are independent, we use a multinomial logit model. The observation of the results of our matching process suggests us that two of the possible events, i.e. a refusal or a postponed decision, are close, and this feature leads us to the choice of a nested logit model, where these two events will be assumed to be correlated.

We will follow a two step method proposed by Amemiya and Shimono (1989) which amounts to a decomposition of the joint probability of all the events in marginal and conditional probabilities which will be estimated using simple binomial logit models.

In a first step, we define the sub-sample of the observations X_i which do not end with an agreement, and we note this sub-sample by NA. A deferred decision is an event conditional on the event that no agreement has occurred, and we write the probability of this event as follows :

$$P(\text{Deferred decision}) = \left[1 + \exp\left[\frac{-X_i\beta_1}{\rho}\right] \right]^{-1}, \quad X_i \in \text{NA},$$

where ρ is an association parameter or dissimilarity parameter, which should belong to the interval $] 0, 1]$, such that the correlation between the events deferred decision and refusal is equal to $1-\rho^2$ (Amemiya 1985).

We can express this probability under the form of a logistic function Λ by multiplying the numerator and the denominator by the quantity $\exp(X_i\beta_1)$, and we obtain the following equality :

$$P(\text{Deferred decision}) = \Lambda\left(\frac{X_i\beta_1}{\rho}\right), \quad X_i \in \text{NA}.$$

We estimate this model on the sub-sample NA and we get an estimate $\left(\frac{\beta_1}{\rho}\right)^*$.

We use this obtained value for the second step of estimation, where we compute the probability of the event "agreement" which is a marginal probability given by the following expression :

$P(\text{Agreement}) = \left[1 + \exp(-X_1\beta_0) \left[\exp\left(\frac{X_1\beta_1}{\rho}\right) + 1 \right]^\rho \right]^{-1}$, that we identify with a logit model, and we obtain :

$$P(\text{Agreement}) = \Lambda \left[X_1\beta_0 - \rho \log \left[\exp\left(\frac{X_1\beta_1}{\rho}\right) + 1 \right] \right].$$

We estimate this latter model on the complete sample using the estimate of the previous step that we transform so as to obtain an additional explanatory variable $\log \left[\exp\left(X_1 \left(\frac{\beta_1}{\rho}\right)^*\right) + 1 \right]$.

Next we insert this variable in the latter model, and we estimate by maximization of its likelihood the parameters β_0 and ρ . We complete this account by giving a measure of the effect of the variation of the two variables, these quantities will then allow us to refine the interpretation of their effects.

¹¹ We estimated concurrently a standard multinomial logit model. The choice of the nested logit model was founded on two criteria. We compared the log likelihood of both models assuming that the the model with the highest value has the better fit to the data. A second possibility is to use a criteria proposed by Cox (1962) and generalized by Vuong and Rivers (1990). Let M_f and M_g be two competing models, i.e. respectively the nested logit model and the multinomial logit model, γ_f and γ_g be the respective parameters of interest of these models, and $\hat{\gamma}_f$ and $\hat{\gamma}_g$ be the estimated values of these parameters. Let f be the density of M_f and g be the density of M_g . If we assume that our sample is of size n , and is independent and identically distributed we define the statistic noted by T_n as follows :

$$T_n = \frac{\sqrt{n} \left[-\frac{1}{n} \sum_{i=1}^n \log \left[\frac{f(X_i, \hat{\gamma}_f)}{g(X_i, \hat{\gamma}_g)} \right] \right]}{\left[\frac{1}{n} \sum_{i=1}^n \left[\log \left[\frac{f(X_i, \hat{\gamma}_f)}{g(X_i, \hat{\gamma}_g)} \right] - \frac{1}{n} \sum_{j=1}^n \log \left[\frac{f(X_j, \hat{\gamma}_f)}{g(X_j, \hat{\gamma}_g)} \right] \right]^2 \right]^{\frac{1}{2}}}$$

Next we define the size α of the test and the critical values $z_{\alpha/2}$ and $-z_{\alpha/2}$ for a standard Normal distribution. If the statistic T_n belongs to the interval $\left[-z_{\alpha/2}, z_{\alpha/2} \right]$ the two models are asymptotically equivalents, if $T_n < -z_{\alpha/2}$ then M_f is asymptotically better than M_g , if $T_n > z_{\alpha/2}$ then M_g is asymptotically better than M_f .

II : The results.

Our main objective is to explain the result of each meeting, which we assumed to be mainly an employers' decision, by applicants characteristics employers characteristics and the tension on the labour market. We extract from our data set the explanatory variables and sometimes we transform and combine some available data so as to obtain these explanatory variables.

We wish to detect first the effect of some applicant's characteristics which could be interpreted as a signal about his productivity. The first characteristic is applicant's level of education. We could assume that this level has a threshold effect such that an employer hires an applicant only if his level of education is higher than a threshold. Unfortunately this threshold is not declared. We know only that it is surely higher than the requirement communicated to the agency because all the selected applicants should fulfill this condition. Nevertheless, we can more or less determine if applicant's level is greater than this threshold. In a first step we approximate this threshold through the following reasoning : if a worker is hired, this imply that his level of education is greater than this unknown hurdle that we can approximate as the lowest element of the set of the level of education of all the applicants that have been hired for the job. Once this threshold estimated, we construct for each worker a dichotomous variable, which we note LEGH, and this variable is equal to one if worker's level of education is greater than this hurdle and zero otherwise. And if no worker is hired, the level of education of each applicant is necessarily lower than the unknown threshold, thus LEGH is equal to zero.

We proceed the same way for deferred decisions. We also assume that an employer's choice between a refusal or a deferred decision is made on the basis of a threshold. As previously, we estimate this level by the lowest level of education among the applicants who receive a deferred decision. Then, we define another variable called LINT which indicates that applicant's level of education is greater than this threshold and lower than the previous one linked to agreements. These variables allow us to reveal screening effects among workers on the basis of the level of education. Each threshold of level of education would be associated with a decision, regardless of the job remains vacant or is filled otherwise. These thresholds determine if an applicant is acceptable or almost acceptable.

The professional background of an applicant may also provide an employer with a belief on worker's abilities. The lack of professional experience could prejudice the employer against applicants who are lacking in experience or whose previous occupation is not well defined (this means that it that cannot be referenced by the two digit number which codifies the set of previous activities). Hence we set up the variable FR SJ which indicates that the applicant is looking for a first job, and the variable INDE which indicates that applicant's last position cannot be referenced. Moreover, the professional qualification can help employers to evaluate an applicant. Then we will also use two dichotomous variables which represent a high professional skill or a low professional skill. The reference group is unskilled applicants.

The worker's previous position towards unemployment may also supply an employer with an idea about his working abilities. Several studies bring out the effect of bad reputation associated with long unemployment spells, even if Jackman and Layard (1991) found no evidence about the hypothesis of state dependence in unemployment. Then we will estimate these phenomena using the number of previous unemployment spells recorded by the agency from the date of registration in the agency to the date of meeting. We could assume that

applicants were questioned about their previous positions during the recruitment interview. The employers can know directly or infer this number of unemployment spells from applicant's declarations.

In order to check discrimination between applicants, we use some observable individual features such as age, gender, marital status and name. We expect that age has a negative effect since this variable is synonymous with a loss of working abilities. Inclusion of gender will allow us to detect gender discrimination. Marital status is less straightforward to interpret. It represents an adhesion to a social norm, and also influences people behaviour in the labour market. Kooreman (1988) showed that a married person whose spouse is working has less incentive to participate in the labour force. Besides an employer's response to applicant's marital status is unpredictable. Then we will examine the effect of the characteristics 'single' and 'spouse working or registered unemployed' on the result of the match.

We use applicant's name on the basis of a local feature. At the end of the sixties French firms offered positions to workers from North Africa in order to cut the inflation of salary costs in France. This policy got the approval of French government after some internal discussions, but no insertion policy, i.e. educational and social program intended to the migrants, has been implemented for managing this migratory flow. Therefore we observed quickly the two consequences of this political failure: a low professional qualification and social insertion of these people and a strong prejudice against them.

We will consider an applicant as of North-African extraction if both his name and surname indicate a North-African origin. We group together not only applicants with an Algerian, Tunisian or Moroccan nationality, who represent only 8.5% of our sample, but also French citizens. The dichotomous variable NAPT which represents these people will allow us to test for the existence of the above mentioned phenomena. Discrimination phenomena have been studied by Spence (1974) within a model where an employer observes different levels of education between colored and white people, infers on this basis different levels of productivity and offers different wages to the two groups of individuals.

Lastly, several studies on employers' recruitment behaviour (Beaumont 1978) showed that employers hire more willingly an applicant for a low paid position than for a high paid position. Therefore we will verify if employers' decision depend on the wage they are offering. We could also expect that this decision will be influenced by the tension on the labour market captured by their vacancies. This tension will be measured by the ratio of the number of offered jobs to the number of applicants encountered via the agency: the greater this ratio, the higher the tension generated by the flow of vacancies offered by the firm. In this case, the firm will be more willing to hire one of the rare applicants met. Conversely, if this

¹² The causes of this migration were caused by economic reasons after the end of the seventies.

¹³ A political party, which claims explicitly for expulsion of North-African people if they are foreigner or the reconsideration of their French nationality, represents between 20% and 30% of the voters in Marseilles. This rejection is reinforced by the degradation of the economic situation in Marseilles where the unemployment rate is equal to twice the national rate.

ratio is low, the choice set of the firm is enlarged, and the individual probability for an applicant of being hired is reduced.

The following table shows us the means of the explanatory variables.

Variables :	Definition	Mean
AGE :	Age of applicant	26.992
MAN ^{*14} :	The applicant is a man	0.496
SGLE :	Single	0.816
MACT :	Married, spouse working or registered unemployed	0.099
NAPT :	North-African name and surname	0.279
NBUP :	Number of previous unemployment spells	2.756
FRSJ :	Looking for a first job	0.427
HQUAL :	Highly qualified workers (White collar, skilled and highly skilled worker, skilled employees)	0.557
LQUAL :	Low qualified workers (Unskilled worker, blue collar, unskilled employees)	0.436
LEGH :	Level of education greater than the higher threshold	0.264
LINT :	Level of education between the two threshold	0.085
TENS :	Tension on the labour market	0.103
MINW :	Minimum offered wage in French francs.	3900FF

B : The estimation results.

We presented here the obtained estimation results of the nested logit model¹⁵, with their T-statistic, and their mean and maximum effects. The estimation of the marginal model which explains the probability of the event 'agreement' provides us with the following results :

¹⁴ * : The variable is dichotomous.

¹⁵ We estimated concurrently a multinomial logit model and a nested logit model. The respective values of the log likelihood function are equal to -769.7462 and -763.1939. It appears that the nested logit model has the better fit with the data. However, Cox's statistics is equal to -1.81 and belongs to the interval [-1.96, 1.96] for a test of size equal to 5% and leads us to conclude that both models are asymptotically equivalents. However this statistic would lead us to conclude to an asymptotical superiority of the nested logit model for a test of size equal to 7%. Therefore, we choose the nested logit model.

Event : Agreement.				
Log-likelihood function : -445.753				
Variable	Coefficient	t stat	Mean effect	Max effect
AGE	0.7839e-1	4.63	0.0042	0.0195
MAN	0.3264	1.58	0.0174	0.0813
SGLE (Single)	-0.7829	-2.33	-0.0489	-0.1926
MACT (Married, spouse working or registered unemployed)	-0.5035	-1.18	***	***
NAPT (North-African name)	-0.8224	-3.67	-0.0393	-0.2027
NBUP (Number of previous unemployment spells)	-0.1327	-2.94	-0.0071	-0.0331
FRSJ (Looking for a first job)	0.6614e-1	0.13	***	***
UNSP (Previous job unknown)	-0.9768	-2.02	-0.0468	-0.2391
HQUAL (highly skilled worker)	-4.8554	-8.07	-0.3704	-0.8378
LQUAL (low qualified worker)	-4.7213	-7.88	-0.2566	-0.8275
LEGH (Level of education greater than highest hurdle)	3.5725	11.43	0.2513	0.7129
LINT (Level of education between the two hurdles)	-9.2882	-0.03	***	***
MINW (Minimum offered wage)	-0.115e-3	-1.59	-6.203e-6	-2.87e-5
TENS (Tension on the labour market)	1.2598	3.84	0.0678	0.3149
ρ (Dissimilarity parameter)	2.3709	4.26		

*** : The variable is non significantly different from zero.

The conditional model which explains the probability of the event 'deferred decision' conditional on the event 'no agreement takes place' gives us the next results :

Event : Deferred Decision.				
Log-likelihood function : -317.440				
Variable	Coefficient	t stat	Mean effect	Max effect
AGE	0.5339e-1	3.47	0.0020	0.0195
MAN	0.9356	3.57	0.0357	0.2283
SGLE (Single)	-1.3653	-4.21	-0.0701	-0.3286
MACT (Married, spouse working or registered unemployed)	-1.3591	-2.61	-0.0370	-0.3272
NAPT (North-African name)	-0.6919	-2.48	-0.0237	-0.1710
NBUP (Number of previous unemployment spells)	-0.1701	-2.82	-0.0065	-0.0425
FRSJ (Looking for a first job)	-0.8627	-1.83	-0.0288	-0.2123
UNSP (Previous job unknown)	0.1764e-1	0.04	***	***
HQUAL (highly skilled worker)	-3.8990	-6.91	-0.2666	-0.7507
LQUAL (low skilled worker)	-3.8443	-7.06	-0.1961	-0.7447
LEGH (Level of education greater than highest hurdle)	1.8394	5.52	0.0938	0.4299
LINT (Level of education between the two hurdles)	3.8998	11.37	0.3777	0.7508
MINW (Minimum offered wage)	-0.220e-3	-2.16	-8.467e-6	-5.50e-5
TENS (Tension on the labour market)	0.5357	1.43	0.0206	0.1339

An acceptance depends mainly on applicant's level of education. The variable LEGH has the strongest positive effect on the probability of an agreement (25 %). We observe a more important effect of the variable LINT (37%) on a deferred decision and a non negligible effect of the variable LEGH (9%) on the same event. We observe then a screening mechanism on the basis of applicants' level of education which validates our assumption about the threshold effect of the level of education : an employer fix two thresholds. If the applicant's level of education is below the lowest one, he is considered as unacceptable and is declined, if his level is between the two hurdles, he faces a deferred decision, and finally if his level is greater than the highest hurdle then he is (more likely) employed or faces (less likely) a postponed decision. The strength of the effect of the level

of education is certainly a consequence of the channel effect associated with the screening quality of the agency. Employers meet concurrently applicants presented by informal networks, of which screening is good, and candidates selected by the agency who have no external and reliable referee about their suitability. Therefore employers considers that applicants' educational credentials are the only reliable information. This result extends Riley's result (1979) where employers use these credentials when applicants' productivity is costly to evaluate. Firms use also this signal when the screening quality of the recruitment channel is doubtful.

Beyond the level of education, employers scrutinize the past history of applicants towards labour market.

The two variables which represent applicant's professional skills have a negative effect on the probabilities of an agreement or a deferred decision. These negative effects mean that workers with some professional skills are disadvantaged in comparison with workers without specific qualifications. A too high reservation wage of the skilled applicants could explain this result. More plausible is the interpretation with regard to the channel effect. We can assume that labour market is segmented in two groups of positions. A first group contains jobs intended for applicants with some professional skills. Firms prefer to hire on these jobs applicants coming from informal or internal recruitment channels because they have some confidence about the suitability of these applicants. The second group contains positions which do not need professional skills. These jobs could be viewed as an entry into the firm. For these positions, firms do not give precedence to a particular recruitment channel, thus applicants selected by the agency have a good opportunity of being employed.

The negative effect of the offered wage on an agreement and a deferred decision confirms this duality and the bad reputation stuck to the applicants selected by the agency. A high wage is the corollary of a high qualification requirement, and this latter result emphasizes that employers give precedence to the applicants coming from the other recruitment channels for the highest qualified positions.

The variable FRSJ which indicates that applicant is a newcomer in the labour market has no significant effect on an agreement and has a negative role on a deferred decision. This means that workers who are looking for a first job are disadvantaged in comparison with workers with professional experience. This result is reinforced by the negative effect of the variable UNSP which indicates that applicant's previous activity is unspecified. Its negative effect on the probability of an agreement underlines the advantage supplied with a recognized professional activity. Besides, the variable NBUUP shows us that the larger are the number of previous unemployment spells, the lower is the probability of being hired. An employer can interpret a large number of unemployment spells as a professional instability, or as a low productivity, or as an insufficient insertion into the labour market. Robinson (1988) pointed out that the "long term unemployed people performed very badly during their interview, appearing anxious and depressed"¹⁶. Therefore employers may prefer to recruit applicants making a better impression.

¹⁶ Quoted in Layard, Nickell and Jackman (1991).

Some individual characteristics, not directly connected to the working abilities, have also an impact on the result of the meeting.

Age has a linear positive effect on an agreement and on a deferred decision. This refutes the usual assumption about the unfavorable effects of this feature, which may be associated with a loss of abilities. We can explain this result observing age distribution in our sample : more than half of applicants are 25 years old or younger. Then age may be synonymous with experience. Therefore, the youngest applicants will be in a disadvantageous position to obtain a job . Nevertheless we observe that the mean and the maximum effects of this variable are minor.

Being a man has a low significant but positive effect on the probability of an agreement, and has a positive effect on the probability of a deferred decision. This result reflects either employers' discriminative behaviour against women or the fact that gender may proxy other unobservable characteristics. The former discriminative behaviour is already known in the literature. Cabral, Ferber and Green (1981), Lazear and Rozen (1990) as well as Renes and Ridder (1990) found that women are put at an unfair disadvantage with respect to men for obtaining a job. Apparently employers assume that women may exit from the labor market for other activities, and therefore they prefer to hire men assuming that they will constitute a more stable labour force. Such discrimination is a new aspect of an old phenomenon in which employers pay a lower wage to a woman than to a man who owns the same abilities (Cain 1986). Since French law forbids this type of discrimination, employers hire less likely a woman, and replace wage adjustment by labour force substitution.

Gender may also proxy applicants' unobserved features. We saw above that applicant's level of education plays a strong role in employers' decision. When we constructed the variable representing the effect of the level of education, we implicitly assumed that diplomas with the same label (baccalauréat, upper school,...) are homogeneous. In the first part, we mentioned that they are extremely heterogeneous, in particular women have on average less scientific or technical diplomas than men. As these latter educational credentials are the most appreciated on the labour market, employers will give precedence to men rather to women, in accordance with Spence's model (1974).

Furthermore this result may also be the consequence of a failure of the selection process made by the agency. If administrators, following political directives, selected unemployed women whereas the vacancy is not suitable for them (for example building sector employs exclusively men), the selected women will be surely declined.

Marital status has no effect on the probability of an agreement. On the other hand, being single or having a spouse who is working has a positive effect on refusal. We can suppose that a job seeker whose spouse is working may be less willing to accept a job : the presence of the spouse's wage may have a counter-incentive effect on labor force participation like an unemployment benefit (Kooreman 1988). On the other hand, the interpretation of the signal 'to be single' is less straightforward : it may be interpreted by the employer as a feature of instability, or of independence.

We observe a significant negative effect of a North-African name and

¹⁷ See Benarroch and Espinasse (1982).

surname on the probability of an agreement. Since the market appears to be a supply side market, this feature seems to result either from a discrimination among workers on the basis of their racial origin, or from a consequence on their bad insertion in the French society : a North-African extraction could be synonymous with unobservable characteristics such that their owner is considered as unacceptable by firms. Although we should temper this result with the way we used to construct the variable *NAPT*, this effect is without ambiguity : the mean effect of this feature is a change of 4 percent and 2.4 percent on respectively the probability of an agreement and the the probability of a deferred decision. This effect is equal to twice the mean effect of gender selection for an agreement.

However, the strength of the selection is alleviated when employers are subject to labour force constraints. The variable *TENS*, which measures a tension on the labour market where the firm is acting, has a positive effect on an agreement but no impact on a deferred decision. Employers seem to be more willing to hire one of the rare applicant met when they have trouble to find potential candidates.

Lastly, we observe that the estimated value of the association parameter ρ is equal to 2.37 and is outside the theoretical interval $[0,1]$ into which this parameter must belong. These theoretical constraints are often violated in empirical analysis .

Conclusion.

In conclusion, we observe a strong segmentation of this labour market in two regimes. The key to this phenomenon is the level of education obtained from the French system of education. A small part of applicants whose level of education is considered to be high enough by employers are hired after their first meeting. Applicant's educational credentials are used by employers as a screening device because the national agency for employment is not sufficiently reliable for screening acceptable candidates. The rest of applicants, i.e. young people without experience or job seekers without recognized professional past are immediately declined, or receive a postponed decision which ends with a refusal. These latter job seekers have trouble to exit from unemployment or to find a first job. For Merle and Vandepotte (1980) these applicants are rejected at best to precarious or temporary jobs, and at worst to long duration unemployment. This screening mechanism is rigorous accordingly with the level of wage. Nevertheless, the strength of this selection is alleviated when employers face a tension in the labour market, i.e. when the labour requested is scarce.

We observe also that women and people of North- African extraction are disadvantaged in comparison with other applicants. These facts may result

⁷ Amemiya and Shimono (1989) as well as Börsch-Supan (1987) faced the same problem. The main consequence of this value is that the probabilities of the events "agreement" and "deferred decision" are computed with an improper integral, and we cannot interpret the result of the nested logit model by a stochastic utility maximization hypothesis (See Börsch-Supan (1990)).

from a discriminative attitude of employers. Gender discrimination is well known in the literature. The difficulties of North-African people go beyond the labour market, and encompasses both political and sociological aspects. Nevertheless, this result may also be a consequence of a lack of technical training of these applicants.

We mentioned above that the weight of educational references was caused by the doubtful screening of the agency which induces a channel effect. If the main target of the agency is being an efficient matchmaker, it has certainly to revise its matching procedure and to adopt the ones implemented in other specific labour markets so as not to penalize the suitable applicants who will use the channel of the agency. Conversely, if the agency has to insert in the professional life people disadvantaged towards employment, it should implement some serious training formations so as to transform these unemployed people as applicants acceptable for the firms. For those who are unable to follow this training, some social distributive mechanisms should be implemented, but only as a last resort for avoiding disincentive effects.

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Appendix :

Table 1 : Characteristics of the vacancies	Filled vacancies	Offered vacancies
SIVP contacts (temporary positions)	87 (52.4%)	174 (39.5%)
Work contract (with social insurance, etc.)	75 (45.2%)	250 (56.8%)
Others contracts	4 (2.4%)	16 (3.6%)
Full time contract with undetermined duration	44 (26.5%)	167 (40%)
Partial time contract with undetermined duration	9 (5.5%)	23 (5.2%)
Contracts with fixed duration less than 3 months	84 (50.6%)	181 (41.1%)
Contracts with fixed duration greater than 3 months	29 (17.4%)	68 (15.4%)
Contracts requiring the level of "baccalauréat"	21 (12.6%)	73 (16.6%)
Contracts requiring the "certificat d'études"	12 (7.2%)	15 (3.4%)
Contracts requiring the middle school level	20 (12%)	57 (13%)
Contracts requiring the upper school level	113 (68%)	295 (67%)
Contracts requiring some particular knowledge	42 (25.3%)	110 (25%)
Contracts requiring a professional experience	71 (42.7%)	235 (53%)

Table 2 : Level of education required by SIVP and work contracts	SIVP	Work contract
Level of "baccalauréat"	18	52
Level of upper school	107	180
Level of middle school	39	17
Level of "certificat d'études"	10	2

Table 3	Mean	St-Dev	Minimum	Maximum
Working time (hours/week) :	37.08	6.63	4	39
Number of paid months :	12.006	0.077	12	13
Minimum offered wage :	3531	1536.4	464	7705
Maximum offered wage :	3814.6	1456.9	464	8000
Mean offered wage :	3225.3	1053	2500	8000
Number of requested applicants :	14.8	17.1	1	99
Number of encountered applicants:	13	15.1	0	99

Table 4 : Age of applicants	Men	Women	Total
25 years and younger :	603	775	1378
between 26 and 35 years :	374	330	704
between 36 and 55 years :	249	141	390
more than 55 years :	12	8	20
Total :	1238	1254	2492

Table 5 : Level of education	Men	Women	Total
Ph D, Graduate, Final Honours, Engineer :	3	4	7
First and second year at the University :	8	6	14
Baccalaureat :	82	137	219
Upper School :	340	433	773
Middle School :	261	255	516
Primary Living certificate :	200	194	394
30 years and older*:	344	225	569

* The national agency for Unemployment considers that the academic background is obsolete after 30 years.

Table 6 : Professional qualification	Men	Women	Total
Unprecise :	60	18	78
Unskilled worker (manœuvre) :	202	107	309
Semiskilled worker (ouvrier spécialisé) :	313	71	384
Skilled workman (ouvrier qualifié) :	172	19	191
Highly Skilled worker : (ouvrier hautement qualifié)	228	476	704
Unskilled Employee :	235	552	787
Skilled Employee :	17	9	26
Manager, Technician, Supervisor (technicien, agent de maîtrise, cadre)	12	1	13

Table 7 : Reasons for termination of the previous job contract.	Men	Women	Total
Layoff :	283	191	474
Resignation :	61	61	122
End of job contract :	440	502	942
End of interim job :	44	20	64
Looking for a first job :	249	346	595
Return to the labor market :	119	95	214
Others cases :	42	39	81

Table 8 : Previous branch of industry	Men	Women	Total
Unprecise Activity :	336	432	768
Industry :	308	172	480
Trade :	242	215	457
Services :	352	435	787



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