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# Mismatch of vocational graduates: What penalty on French labour market?

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This study explores individual effects of educational mismatch on wages, job satisfaction and on-the-job-search on French labour market. We distinguish between horizontal matches (job matches with field of studies) and vertical matches (job matches the level of qualification) on the one hand and skills matches (worker's assessment) on the other hand. We use data from the French survey “Generation 98,” conducted among a sample of 22780 young vocational graduates asked about their employment situation 3 years after leaving school. We show that whatever the criterion chosen, there is a minority of matched situations. We find that situations of vertical mismatch and skill mismatch have strong negative effects on wages, while situations of horizontal mismatch have not. However, horizontal mismatch increases both job dissatisfaction and the desire to find another job, even if their job is qualified, permanent and reasonably well paid. Implications for the evaluation of vocational training programs are discussed

**Keywords:** Mismatch ; Vocational training ; School-to-work ; transition  
Performance criterion

## 1. Introduction

In France, vocational training courses provided at the secondary education level lead to diplomas called CAP (or Certificate of Professional Competence), BEP (or Vocational Studies Certificate) (ISCED 3C), Vocational Baccalaureate (ISCED 3B). When provided at the first stage of tertiary education (Baccalaureate + 2 years) they lead to BTS (or Advanced Technician's Certificate) or DUT (or University Technology Diploma) (ISCED 5B). The contents of these training programmes are developed by Consultative Vocational Committees in partnership with professionals and experts. In France, no diploma of technological and vocational education can be created or modified without the consent of these committees. The latter review the contents of the

diplomas on a regular basis so as to better adapt them to the technological and organizational changes occurring in the workplace.

In these committees, diplomas are designed in reference to activities/functions/professions or to specific vocational knowledge which constitute what is called the *référentiels d'activité professionnelle* (or professional activity standards). They make it possible to identify the type of activities a diploma must lead to. They are set in such a way as to endow young people with precise operational knowledge and with the learning capacities that enable them to adapt to the technical evolutions that occur in their field of work.

These committees carefully monitor the integration of graduates into employment and verify that the target set for each diploma is actually reached by the graduates. Young people expect that the training courses they choose will actually lead them to the jobs defined by the standards. The employers who, in these committees, are involved in the design of diplomas, pay particular attention to the field of study of the young people they recruit as it must correspond to the knowledge and skills they are looking for. The convergence of these interests leads one to believe that having quick access to (if possible) long term jobs as defined in the standards, is the best thing that can happen to young vocational training graduates. Situations in which one's job perfectly matches one's training is therefore seen as an optimal situation for individuals and a goal for all vocational training programmes to achieve.

Yet, in France, as in many countries, surveys on the labour market show that this situation is far from being systematically achieved, even though certain training fields and some countries do “better” than others. It is commonly found that there is a strong mismatch between initial vocational training and jobs. When there is a mismatch between the educational level and the job level, the term over-education or vertical mismatch (Hartog, 2000) is used; A situation in which there is a mismatch between an individual's field of study and the vocational field in which one is actually employed is usually called “horizontal mismatch” (Witte & Kalleberg, 1995; Van de Werfhorst, 2002).

Previous researches have shown that the situation of young people whose jobs are horizontally matched is on several criteria (unemployment, stability, and even the salaries for the more highly qualified)—and everything being equal (whatever the level and field of training)—better than that of people whose jobs do not match their field of training (Wolbers, 2003; Robst, 2007). Thus, horizontal mismatches are thought to have a negative effect on the professional careers of young people, an effect comparable to that over- education. A hasty conclusion would be that for a young person, not finding a job in his field of study is a

handicap one must overcome.

These results may be used by the public authorities in their evaluation of training programmes. In this perspective, in France, situations of horizontal mismatch are often considered as a dysfunction of the education and vocational guidance systems that fail to produce the appropriate quantity of well-trained people in the appropriate vocational fields and at the right time. And, one thing leading to another, the horizontal match rate has become a performance criterion for vocational training programmes, just like the rates of over-education or unemployment (see for example, Dubois, Le Paux, & Vourch, 2004).

At an international level, the consideration of horizontal mismatch in assessments of vocational training has been incorporated into a more general debate on the efficiency of vocational training programmes in relation to non-vocational programmes (Ziderman, 1997). Until the 1990s, the majority of studies conducted in a range of different countries (both developed and developing) focused primarily on differences of wage levels between vocational and non-vocational training graduates. With the support of the World Bank, assessments often reached negative or insignificant conclusions concerning vocational training programmes, and included findings that challenged the utility of vocational training programmes, particularly in developing countries (see for example Psacharopoulos, 1987). From the 1990s, the models developed by researchers began to incorporate indicators showing the correlation between training and employment, particularly horizontal mismatch. The training-employment indicator was shown to be a requirement for measuring the success of vocational training programmes in the labour market (Bishop, 1989; Neuman & Ziderman, 1991; Chung, 1990). In Europe, the earliest studies of horizontal mismatch (Witte & Kalleberg, 1995, Solga & Konietzka, 1999) were conducted in Germany, where research focused directly on the efficiency of the two-tier system. As noted by Witte and Kalleberg (1995, p.293): "The success of German workers in achieving a fit between their vocational education and their subsequent employment thus becomes a question of the greatest policy importance in evaluating the efficiency of the German vocational education system."

Given that mismatch represents an instrument for assessing training programmes, it seems reasonable to operate on the assumption that young people who find a job in an area related to their studies tend to secure a better professional situation than those who find a job in an area unrelated to their training. However, this type of hypothesis should not go unchallenged. First of all, there is the issue of the individual strategies deployed on the labour market, where supply and demand are left to adjust freely. The reasons prompting young people to find jobs outside their field of training and the reasons leading

employers to hire them are not necessarily irrational. Another issue is the measure of the link between training and employment and the definition of mismatch, which is more difficult than a measurement of wage levels and unemployment rates among recently qualified workers. This article focuses on how previous studies in the field have addressed these two questions (section 2). It then looks at the effects of horizontal mismatch on the early careers of French vocational training graduates (sections 3, 4 and 5).

## 2. Horizontal vs. vertical mismatch: evidences from previous researches

What are the reasons for situations of horizontal mismatch between the field of work and the field of study? What are the effects of this mismatch on the future careers of individuals? In order to answer these questions, we present, in this section, a few elements of theoretical interpretation and a review of the empirical literature on the subject. Finally, we shall try and see to what extent the literature is relevant to the situation on the labour market of young adults in France.

### 2.1. What are the reasons for horizontal mismatches?

The human capital theory postulates that training in the education system, whether it be general or vocational, increases individuals' level of competences and therefore their productivity for all jobs. According to Becker (1962), the question of whether the field of one's initial education matches that of his/her job is irrelevant since the skills acquired while at school do not depend on the type of job occupied. Following Becker's works, studies on the heterogeneity of the human capital have enriched Becker's framework of analysis. Stevens (1994) for example, has introduced the notion of transferable human capital: some training programmes are only relevant to a limited number of employers and therefore, their value on the labour market varies according to the job occupied. This applies to post initial training for a particular job, but also to initial training courses relevant to a limited number of occupations or sectors of activities.

In comparison with the human capital theory which does not address the question of the match between the supply and the demand, the allocation models proposed by Sattinger (1993) present the advantage of explicitly introducing the constraints related to the labour demand in the analysis. The process of allocation of individuals who are highly heterogeneous because of their different characteristics, and therefore of their human capital, as well as their tastes, will affect their productivity, and consequently their remuneration. For Sattinger (1993, p.873), the existence of comparative

advantages is central to explaining this process of allocation of individuals to jobs: «Comparative advantage is significant in describing relationships among opportunities in different sectors. Self-selection describes how decisions may be made. But the underlying feature is the variability of worker output among sectors or jobs. This variability arises from the different sensitivity of jobs to worker abilities (i.e., the difficulty of jobs), the large dispersion in tasks performed in different jobs throughout the economy, and the diversity and lack of correlation among individuals' performances of those tasks.»

Some individuals, depending in particular on their competences, have comparative advantages for certain types of jobs that endow them with a higher productivity. Possessing a diploma and being trained in the field corresponding to a job can be a comparative advantage, but except in the case of regulated professions, it does not provide an absolute advantage. Indeed, individuals have skills other than those gained through training (Vincens, 2005).

The existence of barriers to some segments of the labour market can impose other selection criteria that are partly unrelated to the diploma or the initial education. It is the case, for example, in internal labour markets in which one can only gain access to certain positions through internal promotion. The skills gained while working for a company/organisation can then be crucial when applying—internally—for more qualified jobs, even though the education received, remains—in France—an important signal to gain access to internal markets (Dupray, 2001). It is possible, on the contrary, that in other segments, the training received provides an absolute advantage in finding employment. It is the case particularly in professional markets, (Marsden, 1989) in which the human capital is jointly constructed by the employers and the employees in a strictly delimited field and is only valued in that specific field. For Marsden, the institutionalisation of the professional market and the involvement of the employers in this process (Strict certification standards often associated with selection for access to the market, distribution of training costs, coordination at branch or professional corporation level) will help to ensure that these access barriers remain in place. In France, these markets remain important in the case of medical and legal professions. In the case of secondary education, these markets only concern a few skilled occupations learned through apprenticeship training, occupations for which there is a shortage of labour.

One must also raise the question of the employment search process in a context of imperfect information about job offers and mobility related costs. In the job search theory, young people will accept jobs with wages above their reservation wage, or generally offers that are above their reservation utility. The latter integrate criteria that are considered necessary to accept a job (its status, its level of strenuousness, its level of qualification, whether or

not it corresponds to one's training), criteria which differ between individuals and which change according to how difficult access to the jobs sought is. Thus, one cannot claim that the horizontal relation between training and employment is a crucial criterion. However, Matkovicz (2009) shows, using Croatian data, that young people with a higher education level find more quickly than others their first jobs matching their training; However, according to this author, it is difficult to claim that mismatch situations always constitute alternatives to unemployment.

It is also possible that some fields of training—with equal qualification levels—do not, in Spence's words, send the same signals to the labour market (1973): the disciplines that are considered more difficult signal young people with higher abilities regardless of the job they occupy. Inversely, the training fields in which the qualification level is considered low, can be a negative signal for the potential employers, including those who offer jobs in the job seeker's field of training. The level of mismatch can be high for opposite reasons: young people with qualifications in certain fields of education considered demanding and selective, are sometimes offered jobs in fields that do not match their training; whereas people with qualifications in less demanding fields see their potential employers turning away from them (Bruyère & Lemistre, 2010). The field of training and the diploma can also appear to be imperfect signals of the individual productivity: within one training area and one educational level, there can be a high level of heterogeneity among individual abilities. In this case, it is reasonable to believe that the matching process will lead only part of these graduates (those with the highest abilities) into jobs that are related to their field of education, particularly if this education/job match is accompanied by higher wages, whereas the others will not find jobs in their field of education.

## 2.2. Consequences of horizontal mismatches on the job situation of young people: some lessons drawn from empirical studies

Some empirical studies, although they are fewer than studies on over-education, have examined the individual determinants of horizontal mismatch situations and their consequences on the labour market. For example, Wolbers (2003), using the ad hoc module “school to work transition” of the Labour Force Survey conducted in 13 European countries, shows that horizontal mismatches, measured in an objective and normative manner, depends both on the individual's characteristics, on those of the labour market (the type of employer, the rate of unemployment) and on the more structural characteristics of the system. A high education level or professionalized training reduce the probability of horizontal mismatch. Furthermore, his

results show that young people in situations of horizontal mismatch are those who tend to look for other jobs the most, who reach lower job statuses and who have less access to continuing vocational education.

Using data about how young American graduates perceive the relation between their field of study and their field of occupation, Robst (2007) also observes a negative effect of horizontal mismatches on individuals' wages, even though it varies strongly depending on the field of education. As in the case of Wolbers' study, Robst's work shows that mismatches affect primarily young people with a more general training. We show here, however, that the negative effect of mismatches on wages is stronger in the case of people with more specialized training. Nordin, Persson, and Rooth (2009), using Swedish data, have observed a stronger negative effect of horizontal mismatches on the wages of higher education graduates than that observed by Robst (op.cit.), even in cases when information about the cognitive abilities of the graduates are introduced. This result tends to show that the phenomenon of horizontal mismatches cannot be reduced to a simple matching and selection problem in which, in a given field of study, the individuals with the lowest abilities are those who do not find jobs that match their field of training. Finally the authors show that this negative effect on wages decreases with experience, which confirms the hypothesis that following a specific training course while in employment can compensate for the lack of ad hoc initial education. The authors also find, as most studies on the subject have, that once the young workers have found a job in a field other than that for which they trained, they do not subsequently return to jobs that match their initial training.

These results highlight the importance of the methodological manner in which education-job mismatches are measured. To the normative and objective measures based on the match between education and job (called the educational match)—both measured in terms of level and field of activity—we can add or oppose the subjective measures based on the individuals' opinions about whether their job matches their training, or whether the skills they learnt at school match those that are required to perform their job (skills match). For example, Allen and Van der Velden (2001) show, based on data about young Dutch graduates, that there is little relation between the different measures of horizontal mismatches: a large number of young Dutch graduates whose jobs matched neither their education level nor their field of study claim that the knowledge and skills they acquired at school are useful in their jobs. It seems therefore that the skills acquired within the education system by young people can be transferred from one field of work to another more easily than the normative approach tends to imply. However, the authors indicate that the negative effects of skill mismatches on the workers' wages and satisfaction are much stronger than those associated with formal education- job mismatches.



They even find that horizontal mismatches have no negative effect whereas vertical mismatches have a negative effect on wages. Their results suggest therefore that beyond the education level and the subject of study, it is the match between the skills young people have acquired at school and those required to perform their job that has a determinant effect on their professional situation and their behaviour on the labour market.

Allen and De Weert (2007) find slightly different results using data collected in four European countries and Japan: they find that the relations between educational mismatches and skill mismatches are much tighter. In each country, people who find jobs that do not match their field of education or their qualification level are for a large part in situations in which their skills are under-utilized. The authors show however that the utilization of the skills acquired within the education system is lower in the two countries in which the horizontal and vertical matches between education and employment are the strongest (Germany and the Netherlands versus Spain, UK or Japan). This counter-intuitive result brings to the fore the importance of taking into account the heterogeneous dimension (national and individual) in our answers to these subjective questions. A mismatch between the level of education and the job level always has negative effects on the worker's wages and satisfaction, whereas a mismatch between the field of study and field of work has no significant effect, whatever the country.

This review of the literature shows that the consequences of a vertical mismatch (i.e. mismatch between the level of education or skills and the job level) are generally negative, whereas the effects of horizontal mismatches are not as significant. Above all, this review highlights the importance of distinguishing between the different measures of mismatches on the labour market, both at national level and in international comparisons.

### 3. Research questions

In this study, we shall take into account education-job mismatches, both vertical and horizontal, and skill job mismatches on the French labour market.

Considering the care taken in France in designing the content of vocational training programmes according to precisely defined targets, one could expect a high job-training match rate on the labour market. Some characteristics of the secondary education system force us to qualify this hypothesis (Duru-Bellat, 1996). First of all, in France, choosing vocational training at secondary education level is often seen as a choice made by young people who do not do well in general education. Secondly, the rise in the educational level of these vocational training programmes—particularly with the creation of the Vocational Baccalaureate diploma, which is open to CAP or BEP graduates—is believed to

result from a drop in the level of selectiveness in admitting students into these courses (Magnac & Thesmar, 2002). Finally, vocational training at secondary education level is mostly school-based and the number of students following on-the-job apprenticeship training, which takes place at the first level of vocational education, has been dropping in recent years. These different reasons related to the internal functioning of the secondary vocational education system reduce the relative value and relevance in terms of specificity of these vocational diplomas on the labour market.

In France, there appears to be a gap between the objectives targeted by training programmes and the reality of selecting specific vocational training programmes. We submit four hypotheses:

Hypothesis 1: A gap between the theoretical target of a diploma and the jobs secured by graduates 3 years after completing their training might be expected. The degree of divergence needs to be measured in terms of level (vertical educational/job mismatches for individuals who are over-qualified for their current professional situation) and training area (horizontal educational/job mismatches defined for those in current positions outside their field of study).

Hypothesis 2: The views expressed by young people concerning the use of their skills in employment are likely to be shaped by their personal environment and by their perception of their job. Some divergence between the two types of mismatches outlined above (normative) and the mismatches based on individuals' perceptions (subjective) might therefore be expected.

Hypothesis 3: The three types of mismatch generate different effects in terms of wage level, job satisfaction and on-the-job search. It is assumed that young people who found jobs that match their level of qualification outside their field of study earn wages that reflect only their level of employment. Skill mismatch is predicted to have a greater impact on the selected indicators.

Hypothesis 4: Mismatches are not penalizing if work conditions are good (stability, salary). It is assumed that the priority of young people is not to find adequate employment but rather to secure a job that offers satisfactory prospects in terms of stability and professional development.

## 4. Methods

### 4.1. Data

We use the French data “Generation 98 survey” (CEREQ, 2001). It is a nationally representative sample of 54000 young graduates of all educational levels and fields of study, surveyed in 2001, 3 years after leaving the educational system. The survey contains precise data about their professional situation 3 years after they started working, as profession, qualification, sector of activity, employment contract, working time, wage, job tenure, type and size of company, and about each individual's transition from school to work, time taken to find the first job, successive jobs, duration of unemployment... We focus here on the graduates of the secondary vocational education system (CAP, BEP and Vocational Baccalaureate diploma holders) and of the first level (Baccalaureate + 2 years) of higher education (BTS and DUT). We also kept the young Vocational Baccalaureate graduates who failed the DUT or BTS exams after 1 or 2 years of training.

Qualifications at different levels are offered in a wide range of industrial and service sectors. A young person can obtain a BEP, a Vocational Baccalaureate and a BTS or DUT, most commonly in closely related fields. Students begin by acquiring basic professional knowledge (CAP/BEP) before moving onto more advanced technical skills (Vocational Baccalaureate) and finally developing particular conceptual skills in specific fields (BTS/DUT). The general standard of training provided by these qualifications increases significantly between different levels of training. Students enrolling in BTS and (above all) DUT programmes tend more commonly to hold a Baccalaureate rather than a Vocational Baccalaureate. Apprenticeships are carried out primarily in CAP/BEP programmes (37% of apprentices and 52% in industrial sectors) and to a lesser extent in Vocational Baccalaureates (20%, including 32% in industrial sectors). Apprenticeships tend to be less common in BTS and DUT programmes (less than 10%). No job placement support is offered to these graduates. Competition between different diplomas for access to specific areas of employment is relatively fierce. A young person holding a BEP, a Vocational Baccalaureate or a BTS may submit an application for a position as a qualified electrician. A BTS graduate will be over educated for this job, but is in a position to acquire a job as a technician more rapidly.

We get a sample of 21780 young people who, 3 years after leaving the education system, are employed.

#### 4.2. Mismatches measures

Identifying the true relation between the professional activity standards and the jobs the graduates actually occupy 3 years after they have completed their training, would require that we examine 5000 to 6000 different vocational diplomas. To facilitate our analysis, we use the fact that each diploma can be identified by a level (out of 6 positions) and a specialty (150 positions). Similarly, the jobs are identified by their level (socio-professional categories) and their specialty (professional field). The relations between the jobs occupied by young people 3 years after leaving school and their diplomas are established by experts, using normative correspondence tables, one concerning the education level (Affichard, 1981) and the other concerning the specialty (Fourcade, Ourliac, & Ourtau, 1992). However, these tables are commonly used in France to determine the relations between education/diplomas and jobs and are valid for all the vocational diplomas. We have grouped the individuals according to whether the level of the job they are in is—or is not—higher or equal to the level of their qualifications, and according to whether it is related—or is not—to their field of training.

The conversion table related to the level (vertical mismatches) comes from Affichard's works (81) conducted in the 1970s to help define the planning of the French educational system. Although it is three decades old, this table is still used to determine the relations between the job and the education levels; However, some adjustments have been made in order to take into account the fact that the rise of education has been greater than the evolution of qualifications. Thus, it is commonly accepted today that Baccalaureate level diplomas no longer lead to jobs at “technician level,” as Affichard's table stipulated, but to jobs at “qualified employee or worker” level. We use the following correspondences: Are considered to have the right qualification levels for their jobs, the Bac + 2 (DUT and BTS) graduates who have at least an Intermediary occupation, the BAC, CAP or BEP graduates who have at least a job as Skilled Labourers or Employees. When an individual's job belongs to an occupational level category below that targeted by the diploma, then there is a vertical mismatch.

In order to define the correspondence of the special ties, we use the nomenclature proposed by Fourcade et al. (1992) in order to establish the map of vocational training programmes in the regions. The different areas of vocational knowledge are divided into 25 distinct groups to which can belong both the types of training and the occupations. When the vocational area of employment differs from the field of study, then there is “inadequacy” or “horizontal mismatch.”

We also use an indicator of skill mismatch, which is related to an individual's perception of how much his/her skills are utilized in his/her job. The survey asks the respondents whether, in their work, their skills are fully, over- or under-utilized. It is therefore a subjective (based on the individuals' perception) indicator, and no longer a normative one as was the case above (based on tables of correspondences developed by experts). This question has the advantage of helping us to better define what could be due to a real underutilization of skills, which would correspond to a “simple” over-qualification. We use normative and subjective measures separately, rather than the composite measure constructed from these variables, as Chevalier(2003) or Green and Zhu (2010) proposed to do, by distinguishing several levels of real or formal over-qualification. Our aim in this paper is to examine horizontal mismatches in the light of vertical mismatches, and of what the individual believes.

#### 4.3. Data analyses

To test H1, the normative criteria defined above are cross-tabulated to measure horizontal and vertical mismatch. Four types of adjustment between an individual's diploma and job are obtained. The four situations are given for each diploma (Table 1). To test H2, the assessments of educational mismatch are compared with the indicator of skills mismatch (see Table 2).

To test H3 and H4, the effects of mismatches are evaluated on the basis of three criteria commonly used in research: net monthly income to calculate potential wage losses related to mismatch; job satisfaction to evaluate the level of resentment felt by an individual at securing a job unrelated to the occupation targeted by their training; and the propensity of the individual to look for an alternative job to evaluate their desire to leave a position that is perceived to be non-optimal (see Tables 2–4).

The last two variables are binary and are based on the following questions:

- Are you currently searching for a job? (Yes/No)
- Would you say that your current professional situation suits you/does not suit you?

This type of analysis does not enable one to control for the effects of the individual characteristics, all things being equal. Mismatches depend on the characteristics of the training programme, on the diploma obtained and the type of schooling but also the disciplines studied. Furthermore, the hypothesis can be made that these three indicators (salary, job search and satisfaction) also vary according to the individuals' work and—in relation to job satisfaction and

the search for an alternative job—to the salary obtained. Finally, because the two measures of mismatch (Educational and skill mismatch) are relatively independent, we assume that both will influence our three indicators.

We measured the effects of these different individual characteristics introduced together in “all-things-being-equal” models

(Table 3). We used a linear regression where the dependent variable is the logarithm of the monthly salary, and two probit models in which the dependent variables are the job satisfaction and the search for another job respectively.

There are five types of independent variables:

- The human capital variables (diploma and field of study), augmented by the gender;
- The situation of the individual in terms of education/job match (normative measure)
- The variables describing the job situation (time taken to find first job, number of years in current job, type of work contract, working hours, size of company)
- A relative salary indicator: it is the differential between the salary actually earned by the worker in his/her current job and the salary s/he could expect considering her/his individual characteristics. This type of method is based on the hypothesis that individuals readily compare their salaries to those of a reference group. The reference salary is that earned by young people with the same individual characteristics (gender, diploma, conditions of employment, situation in terms of normative education/job match). It is measured by the wage function (Table 3, col 1). The relative salary introduced in the models of job satisfaction and search for alternative work is the difference between the actual salary and the expected salary.
- The individual's report about whether s/he is in a “skill mismatch” situation or not.

The relative impact of these types of variables on mismatch is then measured. The variables influencing the three criteria of evaluation of the professional situation were then progressively introduced into the three models (Table 4).

Table 1

Matched status of graduates by level of education, 3 years after leaving the education system. Data source: Survey Génération 98, Céreq.

Job held diploma when leaving school	Vertically and horizontally matched (1)	Vertically mismatched but horizontally matched (2)	Vertically matched but horizontally mismatched (3)	Vertically and horizontally mismatched (4)	Total
DUT	21	16	43	20	100% 21424
BTS	23	24	30	23	100% 65479
Voc. Bac + 1or2 years of voc. Studies (Failure at DUT/BTS)	12	23	23	42	100% 32299
Voc. BAC, school- based	34	9	32	25	100% 64160
Voc. BAC, apprenticeship	48	7	28	16	100% 17552
CAP/BEP school based	20	12	30	37	100% 67052
CAP/BEP apprenticeship	36	13	22	29	100% 44944
TOTAL	26 83359	15 46852	30 92866	29 89833	100% 312910

Notes: N = 21,780 individuals (weighted 312910)—CAP, BEP, Voc. BAC, BTS or DUT holders, or Bachelors who failed the DUT or BTS but trained for 1 or 2 years—who left the education system in 1998 and were employed in 2001.

Table 2

Mismatches status and evaluation criteria. Data source: Survey Génération 98, Céreq.

	Vertically and horizontally matched (1)	Vertically mismatched but horizontally matched (2)	Vertically matched but horizontally mismatched (3)	horizontally mismatched (4)
Combination of educational mismatches and skill mismatches: % of individuals reporting to				
Have a job that matches their skill level	73%	65%	70%	58%
To be employed below their skill level	19%	30%	24%	37%
To be employed above their skill level	8%	5%	7%	5%
Educational mismatches and evaluation criteria				
Average monthly wage	1141€	1043€	1161€	1026€
Graduate employees who are satisfied with their professional situation	78%	72%	74%	67%
Graduate employees who are looking for an alternative job	20%	26%	25%	31%

Notes: N = 21,780 Individuals—CAP, BEP, Voc. BAC, BTS or DUT holders, or Bachelors who failed the DUT or BTS but trained for 1 or 2 years—who left the education system in 1998 and were employed in 2001. Spearman correlation between educational and skill mismatch is .12.



## 5. Findings

### 5.1. Educational mismatch on French labour market (H1).

Table 1 shows: The young people in group (1) have jobs that match their education level and their field of study, i.e. a job that lies “within the target” of their training. Those in group (2) have jobs that match their field of training but not their education level. The individuals in both these groups belong to the category of the horizontally matched. The other two groups therefore comprise the young people whose jobs do not match their field of training, but some of them have jobs that match their education level (3), whereas the others are both horizontally and vertically mismatched (4).

Results confirm those obtained by other studies, i.e. that young people who, within a few years after leaving the educational system, find jobs that match both their field of study and their qualification level, are a small minority. The rates of vertical and above all horizontal mismatch are very high. Only 41% of young people have a job that is related to their field of training and 56% have a job that matches their education level, which might seem low for people who have followed a vocational training course. However, it must be noted that the group comprising the individuals whose jobs do not match their field of study but match their qualification level (group 3), is the largest group. This seems to indicate that the human capital acquired during vocational training is highly transferable. It is interesting to note that this situation primarily concerns the individuals with the highest education level and the most selective degree (the DUT). Thus a high level of qualification, including in the case of vocational degrees, endows young people with skills that are sufficiently transferable to be valuable in performing qualified occupations (of the same level) in other vocational fields.

The young people who found a type of job which their training targeted (1) only represent a quarter of the sample (26%). Graduates with a vocational Bac or a CAP or BEP whose training was apprenticeship-based have the highest horizontal and vertical match rate. In other words, apprenticeship training “does better” than school-based training. This can be explained by the specific human capital co-produced by the supervising teacher and the apprentice, and which only really has value in their professional sector. Nevertheless this double match is no more related to the level of education than is the double mismatch. The young individuals whose jobs match neither their level nor field of education represent 30% of the sample.

## 5.2. Educational vs. skill mismatches (H2)

The two measures of mismatch, educational/skills, are, indeed, very weakly correlated (spearman = .12, Table 2), which validates the hypothesis that both measures only partially overlap. We find a slight relation between vertical and skill mismatches, which can be explained by the use of the phrase “skill level” in the question. Nevertheless, the majority of the young people in the “vertical mismatch” group consider that their work matches their skill level (65 and 58%), and reciprocally, among the individuals who have a job that matches their education, one out five complains that his/her job does not match his/her education.

A number of different factors may account for the weak correlation between skill mismatch and educational mismatch. The first explanation relates to the subjective nature of the question concerning skill mismatch—i.e. respondents may be reluctant to admit that they have jobs for which they are either over or under qualified. Either situation could be interpreted as reflecting poorly on the individual. A job that is too easy may be perceived to be a reflection of the individual's inability to secure a “good” job. For those who feel that they have secured jobs for which they are under-qualified, this could be perceived to be an acknowledgement that the individual does not have the skills required to be successful. The second explanation is that the objective measure of educational mismatch may be relatively distinct from young people's perceptions when they directly observe the labour market which they have recently entered. Giret and Lemistre (2005) show that young people have a tendency to compare themselves with their peers to gauge their drop in status: given an identical objective drop in status, young people will tend to feel less lowered in status if a high proportion of individuals with the same diploma have suffered an objective drop in status. Finally, as noted by Hartog (2000), while they may entail a degree of individual subjectivity, measures of skill mismatch take account of the direct environment of employees (modes of organization, autonomy at work, hierarchical relations...), which normative measurements do not allow for inasmuch as they refer to highly diverse employment sectors.

Table 3

Effects of mismatched situations on Wages, job satisfaction and on-the-job search. Data source: Survey Génération 98, Céreq.

	Regression analysis dependant variable: ln(monthly wages)	Logistic analysis dependant variable: job satisfaction	Logistic analysis dependant variable: searching for other work
Gender (ref: female)	+.11***	.00	.00
Diploma when leaving school (ref: CAP ou BEP, apprenticeship)			
DUT	+.21***	-.15**	+.13**
BTS	+.19***	-.08**	+.07*
Voc. BAC, DUT or BTS	+.14***	.00	.00
failed			
Voc. Bac, apprenticeship	+.05***	.00	.00
Voc. Bac school based	+.04***	-.07*	.00
CAP BEP, school based	+.01**	-.07*	.00
Field of studies (ref:management)			
Technology	+.03***	+.12*	.00
Agricultural	-.04***	.00	-.11*
Process industry	.00	.00	.00
Construction	-.02**	+.13**	-.17***
Manufacturing	-.08**	.00	.00
Mechanic. Electron.	.00	.00	.00
engineering			
Health	.05***	.00	-.15**
Personal services	.00	.00	.00
Utilities	.00	.00	.00
Labor market experience	+.005***	.00	.00
Months in current job	+.004***	.00	+.003*
(tenure)			
Residual wage	+.51***	-.40***	
Time (ref: full time)			
Less than part times	-.61***	-.49***	+.68***
Part time	-.44***	-.27***	+.50***
3 days a week	-.44***	-.24**	+.42***
4 days a week	-.27***	-.18**	+.21***
No answer (freelance)	+.26***	+.51***	-.63***
Type of contract (ref: long term contract)			
Temporary contract	-.07***	-.34***	+.38***
Interim	.00	-.61***	+.82***
Youth contract	-.25***	-.40***	+.33***
Type of organization (re: small or medium sized private company)			
Public organization	+.04***	+.22***	-.27***
Large private company	+.11***	+.14***	-.16***
Education-job match (ref: level and field of education appropriate)			
Level appropriate but	.00	-.06*	+.10***
different field of education			
Lower level but field of	-.07***	.00	.00
education appropriate			
Lower level and different	-.08***	-.09*	+.08**
field of education			
Skill match (ref:skill utilization)			
underutilization	-.05***	-.79***	+.68***
overutilization	.00	-.22***	+.21***
Constant	6.79***	+.11***	-1.14***
N	21780	21780	21780
R2 / pseudo likelihood	.48	-11488	-11125

Notes: \*\*\*pb.01; \*\*pb.05 ; \*pb.10.

### 5.3. Effects of mismatches on wages, job satisfaction and on-the-job search (H3).

Thus, matched situations are relatively rare among young employees. But are situations of mismatch necessarily negative professional situations? The descriptive statistics (Table 2) show that the jobs that match the individuals' level and field of study are, on average, those that provide the highest average salaries, the highest level of satisfaction for the individuals and the ones which the workers are the least likely to want to quit. To find a job that lies within what one's training targeted is definitely, in terms of these three criteria, an optimal situation. But, judging from the value of our three criteria for the other three situations, this so-called optimal situation is only relatively so: The salary of the workers whose jobs does not match their education level is admittedly lower than that of others (minimum wage threshold effect in France...), but the rates of satisfaction and of job search of the individuals in the three groups are very close to each other, except perhaps for those who are both horizontally and vertically mismatched. On the other hand, the differences are more significant in the case of skill mismatches.

The results of the "all-things-being-equal" models (Table 3) show that the three indicators do indeed depend on all these variables. They are all significant and all have the expected influence.

The salary increases with the level of qualification and varies according to the field of study, which confirms the effects that are specific to the special ties studied. It also increases with the number of years of employment in the current company and in the labour market. In the probit models, we observe that the diplomas obtained through apprenticeship-based training provide more satisfaction and that the individuals who trained through apprenticeship tend to look for alternative jobs less than the workers who received school-based training.

Having a job with good conditions (permanent, full time job, in a public organization Guaranteeing lifelong employment or in a large company which offers important professional advantages and, often, access to an internal market), provides a higher salary, more professional satisfaction; furthermore, the individuals who have found this type of job are less likely than others to look for alternative jobs. However, the individuals are more likely to want to look for a new job as soon as—all things being equal—they have been working in the same company for a relatively long time. Finally, when the relative salary is too low, the level of dissatisfaction is likely to increase and to cause the worker to look for alternative work.

All things being equal, particularly the employment conditions, we find that situations of vertical mismatch have a negative effect on salaries, while

situations of horizontal mismatch have no effect on remuneration. This result, which is surprising in a country where educational policies heavily rely the professionalization of training/education to improve the job situation of young people, is in keeping with existing analyses. Overall, situations of horizontal match do not increase the relative wages of workers. However, dissatisfaction arises when a worker has not been able to find a job in her/his field of study, all things being equal and regardless of his/her job level, since both situations of horizontal mismatch present statistically significant coefficients, negative with job satisfaction and positive with the desire to find a new job. It does not depend either on the individual's own evaluation of the utilization of her/his skills. However, the impact of this effect of horizontal mismatch on the individual's satisfaction and on the wish to change jobs is low compared to that generated by poor working conditions, low relative wages or, even more significantly, by a situation of skill mismatch.

On the basis of the three key indicators, young people who have secured a job in the area targeted by their diploma (horizontal and vertical match) are never in a clearly optimal situation. Skill mismatch is invariably penalizing.

#### 5.4. Relative impact of mismatch (H4)

The objective is then to evaluate the relative influence of these variables on the coefficients of the normative mismatch variable. The variables influencing the three criteria of evaluation of the professional situation have been progressively introduced into the three models (Table 4).

With regard to the salary, when the individual variables alone are introduced, both vertical and horizontal mismatches have a negative effect on the remuneration of young people. The negative impact of a horizontal mismatch disappears when the variables related to the job's characteristics are introduced. We then obtain the same results as that mentioned previously, i.e. only the individuals in situations of vertical mismatch experience a salary disadvantage—identical whether the mismatch is total or partial. This disadvantage corresponds, on average, to 2 years of validated education. A situation of horizontal mismatch does not modify these results and its negative effects are as strong as those of vertical mismatches. The effects of both types of mismatches can therefore accumulate: the salary disadvantage can be due to an insufficient job level as well as an underutilization of the worker's skills. However, the fact that a horizontal mismatch has no effect can be explained by the fact that the human capital acquired in one field is transferable to another, without having negative effects on the salary.

The effects of mismatches on job satisfaction and on the desire to find a alternative job are different. Situations of horizontal mismatch seem to have a much stronger effect on these two variables, especially when the horizontal mismatch is accompanied by over-education. However, the progressive introduction of variables related to the characteristics of the job and of the employer reduces the coefficients associated with vertical mismatch. The satisfaction of overqualified workers, whether or not they are in a situation of horizontal mismatch, increases significantly—and their desire to find another job is not as strong—when we introduce variables that indicate that the individuals might be employed in organizations with large internal labour markets (large enterprise or public organization, permanent position). In other words, young workers seem willing to not consider the relation between the job they actually occupy and the job their training targeted as an important criteria in their reservation utility, on the condition that other criteria, which they deem more important, are satisfied. On a highly segmented labour market for young people, as is the case in France where the first jobs young people find are often “bridge” jobs created institutionally through public employment policies, the priority, for young people, is to find more stable jobs. Thus, the dissatisfaction related to vertical mismatch situations is relatively weak compared to other employment characteristics. Young people seem to acknowledge the fact that their diploma does not necessarily enable them to obtain the level of employment which the standard promised.

Nevertheless, the disappointment of young people is stronger when they feel that their skills are underutilized (20% more). When the two measures are introduced together, the effect related to horizontal mismatches on both job satisfaction and the desire to find another job, is the only one that remains significant. This result suggests that these young people—even when they have “good,” permanent and reasonably well-paid jobs—wish to find the types of jobs which their training targeted. Even though horizontal mismatch does not have a direct effect on salaries, the young workers who were lead into choosing vocational courses that trained for specific occupations, are disappointed that they did not find a job that matched their education, and this is true regardless of the level of qualification of the job obtained.

## 6. Discussion

Why are the rates of education-job mismatches so high among young people who received vocational education, even when the contents of the training programmes are so carefully designed to respond to the demands of the professions? The answer we give to this question is based on the following

fundamental idea: the initial education received by young individuals and the qualifications obtained at the end of schooling cannot alone explain the process of integration into the labour market and the access to satisfactory jobs. Other factors play an important role and explain why a job which has no explicit relation with one's training is not always a “bad” job that an individual accepts because s/he cannot find any better job and want to avoid unemployment. First of all young people can find skilled jobs in fields other than their field of training and secondly they can be caused to choose job stability over the realization of his/her career goals in precarious conditions. This is possible thanks to the transferability of skills from one vocational field to another, a transferability that is much higher than the normative measures of education-job match imply. Considering the diversity of the modes of skill acquisition, the functioning of the labour market and the individual strategies developed by young people to find a job that suits them, horizontal matching cannot be the only criterion used to analyse the relationship between training and employment. Horizontal matching is not always the optimal situation with regard to the preferences of individuals and employers, even though a degree of disappointment—low in comparison to other characteristics of employment—is experienced by young people when they only find jobs that have no relation to what they studied.

Situations of horizontal mismatches are inherent to a labour market in which the actors make free choices, in which individuals with identical training background remain heterogeneous in their preferences and abilities, and in which jobs are also heterogeneous sets of complex tasks. These degrees of freedom in the allocation of individuals to jobs, this flexibility in the adaptation of skills to qualifications, this diversity of the relationships between education and employment, are even necessary and desirable in order for all young people to find a job, whatever their qualifications.

The measurement of the relationships between vocational education and work serves to provide initial information to students and employers concerning the possible occupations and professions the various education programmes lead to and therefore concerning the skills the graduates are recognized to have. It also enables those who design education programmes to monitor the value of qualifications on the labour market. But it cannot serve to evaluate the quality of an education/training programme, as indeed, an analysis in terms of “education-job matching” is not sufficient to evaluate how well integrated young people are on the labour market. Other indicators are necessary in order to thoroughly analyse the school-to-work transition. The legitimate question—posed by the members of the Consultative Vocational Committees—of whether a vocational training course does or does not lead to the jobs it is supposed to prepare for cannot be reduced to a question of

evaluation and performance of training programmes. The best designed vocational training course will never lead to a 100% education/job matching rate, and inversely a low education/job matching rate does not mean that the training programme is dysfunctional. In this respect, the question of the education/job relationship is different from that of unemployment: if a given training programme leads all its participants to unemployment, it would legitimately be suspected of being dysfunctional.

#### 6.1. Limitations

This study has several limitations that will need to be addressed in future research. Firstly, the relevance of analyses of mismatch 3 years after leaving the educational system might be questioned. The 3 years following the completion of studies enable young people to acquire new skills and to access different jobs from those targeted by their training. A study that examined situations of mismatch in the first 7 years of employment in France (Couppié, Giret, & Lopez, 2009) showed that it was the very reverse that tended to happen: horizontal mismatch declines in the 3 years after graduation before subsequently increasing, while vertical mismatch decreases steadily throughout the 7 years. The jobs secured in the months following the completion of studies tend primarily to be “temporary jobs.” The authors observed cases of ascending vertical mobility after 3 years, including among young people in employment outside their field of study. For these individuals, the professional experience acquired at work gradually replaces the specific skills developed in training.

The results provide a framework that is meant to apply to all the subjects of vocational programmes from the CAP to the DUT. They cannot replace more precise and even qualitative analyses that would provide a more qualified approach to the question and more details; it is essential to note for example that some occupations have more or less specific technical skill requirements, which forces employers to recruit young workers with specific qualifications, sometimes within vocational markets. Hair dressing, health care, and more generally, the regulated occupations are typical examples. Incidentally, these are the only cases where young graduates with the right specialization are much better paid than the others (Couppié & Lopez, 2003). These constraints related to the more or less technical level of the different occupations, or inversely, the fact that some skills are easily transferable from one occupation to another, are an essential dimension of the analysis of education/job mismatches.

Finally, the measures of educational mismatch and skill mismatch used in this research take no account of the diversity of skills developed in education



and required by specific professions. Therefore, in surveys of large samples covering several educational levels and areas of training, specific questions about particular skills are difficult to address. However, as shown by De Grip et al. (2009) in the pharmaceutical area, the promotion and development of purely technical skills or general skills such as “communicative skills” may affect levels of graduate satisfaction.

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