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Abstract

The aim of this study is to investigate the effect of skill mismatch and educational mismatch on job satisfaction among master level graduates less than one year after graduation. We use data from a mailed survey among 2 cohorts of Dutch graduates. We find a negative effect of being overskilled in discipline-specific knowledge on job satisfaction, whereas perceived skill utilization has a strong positive effect. Although most of the existing research focuses on the effect of schooling on job satisfaction rather than on skills, we find that skill mismatches are much better predictors for job satisfaction than educational mismatches. We do not find that a mismatch has different effects for graduates with a study characterised by a broad occupational scope compared to a professional study with a narrow occupational scope.

1. Introduction

Technological and organizational changes have resulted in an increasing demand for higher level skills in the workforce during the past decades (Borghans, 2001; Dickerson and Green, 2004; Elias and McKnight, 2001; Floyd, 1998; Green et al., 2001; Heijke et al., 2003). The shift towards high value work-related attitudes and higher cognitive skills, like problem solving, communication and being able to work in teams seems to be a permanent one (Semeijn et al., 2005; Stasz, 2001). Simultaneously, we observe a growth in the educational level of the population in all Western countries (Groot and Maassen van den Brink, 2000). When the demand for higher level skills outpaces supply this could result in a mismatch. The same happens when the rise in educational attainment is higher than the growth of higher educated jobs. The first situation is often referred to as skill mismatch, while the latter is known as educational mismatch. Educational mismatch is defined as the mismatch between the field and level of (initial) education and what is required for the job. An undereducated worker is someone with an insufficient level of education needed for the job (Green, et al., 2002), while an overeducated worker has more education than is needed for the job. Skill mismatch refers to the mismatch between acquired and required skills (Allen and Van der Velden, 2001), while skill utilization is about the extent to which workers perceive opportunities for skill use and skill development in their job (Morrison et al., 1999; O'Brien, 1986).

The question arises to what extent are education and skill mismatch related? If so, one would assume that workers with a higher level of acquired education than necessary for the job are underutilising their knowledge and

skills. The effect of educational mismatch is then to a large extent explained by skill mismatches (Allen and Van der Velden, 2001). However, most of the existing research has focused only on the effect of educational mismatch rather than skill mismatch on labour market outcomes. One of the reasons is that educational requirements are more easily and objectively measured, provide a common factor in hiring personnel and are easily quantified (Hersch, 1991), whereas the (self) assessment of acquired skills is considered more ambiguous.

It is well known that there is a positive relation between educational level and life satisfaction (Hartog and Oosterbeek, 1998; Ross and Van Willigen, 1997). However, studies on job satisfaction have found that longer schooling has a direct negative effect on job satisfaction (Clark, 1996; Clark and Oswald, 1996; Mottaz, 1984). This effect may be explained by the higher aspirations of work values associated with increased education.

Educational mismatch is known to affect labour market outcomes, like turn over, wages, and job satisfaction, although conclusions, at least for job satisfaction, are sometimes contradictory. Several studies have found an inverse relationship between overeducation and job satisfaction on account of the effects of frustration (Battu et al., 1999; Belfield and Harris, 2002; Clark, 1996; Clark and Oswald, 1996; Groot and Maassen van den Brink, 2000; Hersch, 1991; Tsang, 1987; Tsang, and Levin, 1985). This inverse relationship concerns the comparison of overeducated workers and their correctly allocated colleagues. However, this does not answer the question whether overeducation per se lowers job satisfaction. Buchel (2002) claims

that overeducated workers are not less satisfied with low skilled jobs than low qualified workers within the same firm, and tend to be more productive.

Beside the educational level, the field of study may also influence job satisfaction. The closer the fit between a worker's field of study and the job, the more satisfied a worker may feel in the job. However, in a survey among UK graduates, Belfield and Harris (2002) report limited support for the argument that those with a better job match experience higher job satisfaction. Wolniak and Pacarella (2005) find that when the fit between a graduates' major and subsequent job field is closer, job satisfaction is higher. Others suggest that either, being overeducated for a job, overskilled, or to have a job in a different domain leads to a lower job satisfaction (Mora et al., 2005). However, the conclusions of this international comparative study are based on descriptive results.

Some recent studies specifically examined the effect of skill mismatch on job satisfaction. So far, an inverse association between skill mismatch and job satisfaction is found (Allen and Van der Velden, 2001; Johnson and Johnson, 2000; Vieira, 2005). However, Viera (2005) and Johnson and Johnson (2000) only look at the effect of perceived overqualification. Allen and Van der Velden (2001) analyze the relation between both types of mismatch and find that educational mismatch is neither a necessary nor a sufficient condition for skill mismatch. They also show that skills mismatches are better predictors for job satisfaction than educational mismatches. However, in their study skill mismatch is measured by an overall question whether the current job offered sufficient scope to use knowledge and skills, and no distinction is made between different types of skills.

This paper adds to the literature on education– and skill mismatch in four ways. First, we examine the importance of a number of specific skill mismatches on job satisfaction. We go one step further than the existing literature by examining the effect of mismatches of 23 separate skills in relation to job satisfaction rather than by measuring overall skill mismatch. Second, we allow for the possibility that the effect of possible mismatches might differ between types of academic studies. Third, we are interested in the influence of the extent to which workers perceive that their knowledge and skills are utilised in their job, on job satisfaction. Finally, we examine to what extent skill mismatch and educational mismatch are related to each other. This is particularly interesting because most of the existing research only used measures of educational mismatch, while assuming skill mismatch to be closely related. However, as indicated by Allen & Van der Velden (2001) educational mismatch does not imply skill mismatch. If schooling and skills are different, this may have implications for future research on the determinants of labour market outcomes.

This paper is structured as follows. In section 2, the relation between job satisfaction and skill mismatch is explained. Section 3 describes the pooled dataset of two cohorts of Dutch graduates in economics, health sciences and medicine in 2003 and 2004. We present the empirical model for analyzing skill mismatch and job satisfaction in the following section. In the fifth section, we present the empirical results, followed by the concluding section.

2. Educational–and skill mismatch & job satisfaction

Job satisfaction has been defined as “a pleasurable or positive emotional state resulting from the appraisal of one’s job or job experiences’ (Locke, p.1300). A considerable amount of research has shown a strong relationship between the opportunity for skill use and skill development and job satisfaction (as a proxy of well being) (O’Brien, 1980; Morrison, 1999). More specifically, an U-shaped relation has been suggested between job attributes implying mental challenge and job satisfaction (Locke, 1976). Workers seem to be most satisfied in jobs that provide them with sufficient opportunity to use abilities and to learn new ones. Too little or too much mental challenge, which implies a low sense of competence and accomplishment, may lead to dissatisfaction (Clark, 1996). Not being able to use existing skills leads to job dissatisfaction because workers experience frustration and a lack of challenge (Kalleberg and Sorenson, 1973; Burris 1983; O’Brien 1986). The need to feel competent when performing an activity is regarded as one of the fundamental psychological needs for optimal functioning (Guay et al., 2003). A low perceived level of competence can be related to an actual skill deficit or lack of knowledge. But it can also be the result of systemic factors in the organisation, like an excessive workload or a lack of administrative support, that make it impossible to use those skills {Cherniss, 1993). We therefore expect that those graduates perceiving underutilization or short falling of skills will be less satisfied in their job.

Although job satisfaction is likely to affect economic outcomes, it is relative little studies in economics (Clark, 1996). However, understanding how workers perceive their job is important because it may give us more insight in labour market outcomes, like voluntary turnover or productivity. In fact, job

satisfaction can be regarded as a summary measure to compare the current job to other labor market possibilities (Hamermesch, 2001).

The importance of the match between required and possessed skills is explicitly discussed in the *matching theory* (Jovanovic, 1979; Mortenson, 1988; Viscusi, 1979). According to this theory, the interaction between someone's ability and the requirements of the job are seen as determinants of workers productivity. Given individual abilities, some workers are more suitable for a job than others, which leads to different job opportunities. Thus, both the education and the occupational domain play a role (Heijke, Koeslag, 1999). Graduates of some types of education have a comparative advantage in certain types of jobs and are more suited to those jobs than others. Some types of study prepare students for a professional domain, while other studies lead to a broad range of jobs (De Grip and Heijke, 1989; Van Smoorenburg and Van der Velden, 2000). A professional academic study, like medicine, prepares students for a narrow occupational domain that cannot be carried out without specific knowledge and skills. It is often characterised by formalized and institutionalised rules of entry (Wolf de and Van der Velden, 2001). Other types of academic study have a broader occupational scope. We distinguish between generic and field-specific types of study. The first type of study trains students in a certain discipline. The acquired skills can be applied to a broad number of occupational fields. An example is the master in economics (de Grip et al., 1991). Finally, a field-specific study trains their students in applying knowledge and methods of multiple (academic) disciplines into one specific field. They can be considered as field-specialists. For these so called context- or field-specific jobs, familiarity with the sector or

field is an advantage as it implies lower training costs (de Wolf and Van der Velden, 2001). An example of a field specific study is the masters in health sciences/ public health.

According to the matching theory, we expect that a mismatch has different effects for graduates with a study characterised by a broad occupational scope compared to a professional study with a narrow occupational scope. Graduates from a professional study, like medicine, who cannot find a job within their field, are expected to have more difficulty to use their specific knowledge and skills, and will be less satisfied with their job. On the other hand, finding a job within their professional domain would imply the closest match of knowledge and skills leading to the highest job satisfaction. Graduates from an applied study, like health sciences are trained in applying multi-disciplinary knowledge to the public health field. These graduates are able to search jobs in a broader range of occupations within the field of public health. As their job possibilities are greater, we expect that finding a job outside their field of education has a less devastating effect on job satisfaction compared to when professionals find a job outside their domain. Finally, a generalist, like an economist, is trained in applying broad knowledge to various fields. We expect that these graduates would face the widest choice of job opportunities compared to the other two types of graduates. Economists would be able to transfer their (generic) knowledge and skills to various contexts, and would therefore be least unsatisfied when finding a job outside their field. In conclusion, we expect that working outside their occupational domain reduces job satisfaction for all graduates. However, the effect of a mismatch on job satisfaction is greater for a type of study with a narrow

occupational domain than for study with a broad occupational domain. Within broad types of studies we expect that the effect of a mismatch on job satisfaction is greater for a field-specific study than for a generic study.

3. Method

Data

The data were collected from annual surveys that the Research Centre for Education and the Labour Market (ROA) of Maastricht University (UM) carries out among the graduates of the UM. This so-called UM-scanner started in 1990 and is a longitudinal study, in which graduates are asked in a mailed questionnaire about their education and labour market situation one, five and ten years after graduation. Questions were asked about acquired education, labour market entry, current job characteristics, education job match and additional training.

For this analysis we use the data from two waves: the graduation cohorts 2001/2002 and 2002/2003 surveyed in 2003 and 2004 respectively. The response rates in these two waves were 32% and 46%[1]. The two waves are pooled into one dataset. In total, 1116 university master graduates completed the questionnaire, of which 820 respondents graduated in economics, health sciences or medicine. Approximately 11% of the sample (n=92) has missing information on job satisfaction (primarily because they had no job) and are dropped from the dataset. Furthermore, we exclude PhD

[1] The response rate in 2003 was lower than usual because an additional survey was held at the same time. There is no indication that the non-response was selective in terms of socio-economic outcomes.

students (n=72) as they are not considered to have a full working status and thus do not earn a normal salary. We end up with a database consisting of 656 graduates with a Master degree in economics (n=255), health sciences (n=287), or medicine (n=114) as representatives of different types of studies.

Measurement of skill mismatch, educational mismatch and job satisfaction

In this paper, we use a self-administered questionnaire among university master graduates to measure the acquired skills and qualifications brought to the job, as well as the requirements to perform the job. We distinguish two types of mismatches: skill mismatch and educational mismatch. Skill mismatch was measured in two ways: by a self-rating on 23 skills and by perceived skill utilization.

First, we ask respondents to rate 23 skills on the required level for the current job, as well as their own acquired level, both measured on a five-point scale, ranging from 1) moderate to 5) excellent. The 23 specific skills range from discipline-specific knowledge, generic skills, to work-related attitudes. In order to reduce the number of skills for the regression analysis, we perform a factor analysis by identifying the common underlying factors of the 23 required skills (see table 1). Based on the citerion of eigenvalues greater than one, six factors are extracted. The six factors combined explain 63% of the variance. Comrey and Lee (1992) suggest that only loadings above 0.32 can be interpreted, and that the greater the loading, the more the variable can be considered as a pure measure of the factor. We set the cut-off for factor loadings at 0.45 (20% overlapping variance). The following factors are

identified. Factor 1 load high on analytical academic skills; factor 2 on the application and development of discipline-specific knowledge; factor 3 on additional or job-supportive skills; factor 4 on leadership skills; factor 5 on assertiveness and initiative; and factor 6 on management skills. For each factor, we calculate a sum score for both required and possessed level. Then, we divide the sum score by the total number of items per factor and recode the scores into the five original categories, with 1 and 5 as the minimum and maximum value. We calculate category 1 if the score is between 1 and 1,5; category 2 if the score is between 1,6 and 2,5; category 3 if the score is between 2,6 and 3,5; category 4 if the score is between 3,6 and 4,5; and category 5 if the score is between 4,6 and 5. Then for each factor, we calculate a matching variable by comparing the required level with the possessed level resulting in the following categories: 1) underskilled; 2) adequate match; and 3) overskilled. Category 1 refers to when the required level of skills is higher than the respondent's own level of skills; category 2 refers to when required level is equal to the respondent's own level of skills; and category 3 refers to when the required level of skills is lower than the respondent's own level of skills.

Second, skill utilization is operationalised by the response to two questions. First, respondents are asked to indicate the degree to which their capacities were utilised in the current job, measured on a five point scale with only the extremes defined: 1)'not at all' to 5)'to a large extent'. The second question refers to the extent to which the respondent perceives that his/her capacities are falling short for the current job, again measured on a five-point scale: 1)'not at all' to 5)' to a large extent'.

Table 1

We distinguish three types of educational mismatches: level, field, and education-job match. Level is defined by the minimum level of education required for the current job position: 1) ‘university’; 2) ‘lower than university’. Level mismatch in this sample of university graduates refers to the last category. Field is defined by the field of education required for the current job position: 1) ‘my own field or a related field; 2) ‘a totally different or no specific field of education’. Field mismatch refers to the last category. Education-job match is defined by asking respondents to rate the quality of the match between education and their current job: 1) ‘poor’; 2) ‘moderate’; 3) ‘sufficient’; and 4) ‘good’.

The dependent variable in our analysis is a measure of job satisfaction in the current job. It was measured by one question: ‘how satisfied are you in your current job’? Respondents were offered a five-point scale with only the extremes defined: 1) ‘very unsatisfied’ to 5) ‘very satisfied’.

Confounders

The following covariates are included in the job satisfaction equations: career possibilities in current job (five-point scale ranging from 1 ’hardly any’ to ‘5 ‘good’); age (as a proxy for work experience); on the job search (1 ’yes’; 2 ’no’); cohort (1 ’2003’; 2 ’2004’); type of study (1 ’master in economics’; 2 ’master in health sciences’; 3 ’master in medicine’); log wage (‘the logarithm of gross wage per month in euros’); and tenure (1 ’permanent contract’; 2

'temporary contract without prospect of permanent contract'; 3 'temporary contract with prospect of permanent contract').

4. Model specification

To estimate the impact of skill mismatch and educational mismatch on job satisfaction an econometric model is developed. Due to the fact there are few responses in the extreme categories, the dependent variable job satisfaction was condensed into three categories: 1) 'unsatisfied'; 2) 'not satisfied/ not unsatisfied' 3) 'satisfied'. As job satisfaction is an ordered variable, an ordered logit regression model was applied. To estimate the individual effect of the two types of mismatches, we estimated separate models. To test to what extent educational mismatch implies skill mismatch we combined both concepts into one model. In all models, we test for proportional odds assumption by comparing the log likelihood from ordered logit with that obtained from pooling *J*-1 binary models fitted with logit making an adjustment for the correlation between the binary outcomes defined by $y \leq m$ (Scott Long and Freese, 2003). In all models, we use the covariates mentioned in the previous section.

We begin with model (1) containing indicators for the 6 skill mismatches, which were determined by the factor analysis, and the two general questions on skill utilization. For each separate skill mismatch, two dummy variables are constructed: 'UNDERSKILLED' when the required level of skills is higher than the respondent's own level of skills, and 'OVERSKILLED' when the required level of skills is lower than the respondent's own level of skills. The reference group is 'MATCH' indicating that the required level matches the respondent's own level of skills. Furthermore, we add the respondent's perception of skill

utilisation and skill deficit. We include both ‘SKILL UTILIZATION’ and ‘SKILL DEFICIT’ and regard them as interval variables as only the extremes of the scale are defined.

In the second model (2), we look at the effect of educational mismatch on job satisfaction, measured by required level, required field and a direct question how the respondent perceives the overall match between education and job. ‘LEVEL’ is a dummy indicating that a lower level than university was required for the current job (university level is the reference category). ‘FIELD’ is a dummy indicating that another or no specific field was required for the job (own or related field is the reference category). ‘EDUJOB’ consist of three dummies representing a bad match, moderate match, sufficient match and the reference category is a good education-job match. Furthermore, to verify our hypothesis whether the effect of working outside the respondent’s educational field on job satisfaction is different among three types of studies, we added an interaction term to the model. ‘STUDY*OUTSIDE FIELD consist of three dummies referring to the interaction between health sciences and working outside own field, the interaction between medicine and working outside own field, and the interaction between economy and working outside own field. The last interaction is chosen as the reference category.

The last model (3) includes both skill mismatch (model 1) as well as educational mismatch (model 2). In this way, we are able to examine to what extent skill mismatch and educational mismatch are related. If the effect of skill mismatch (model 1) will remain after controlling for educational mismatch (model 3) it indicates that both concepts are not identical and measure

different aspects of mismatch. Initially, we add the interaction terms previously mentioned in model 2.

5. The effect of skills mismatch and educational mismatch on job satisfaction

Descriptive results

Table 2

Table 2 shows the distribution of skill mismatch and educational mismatch for the pooled cohorts of master graduates in economics, health sciences, and medicine. The majority of all graduates report to have sufficient skills for what is required for their job, although over one third indicate to have more skills than is required for their job. About one quarter reports to be underskilled for additional skills, like ICT, foreign languages and knowledge of other fields. About two thirds of the respondents perceive that their skills are used to a large or very large extent in their job, while one third states that their skills are used only to some extent or less. Furthermore, most respondents (79%) do not perceive skill deficits in their current job.

With regard to educational mismatch, we find that the majority of the respondents have a job in their own or a related field. Over one third of the respondents report to have a job below the university level. The education-job match was generally considered as sufficient (35%) or good (45%), but approximately 20% of all graduates perceive a less than sufficient match. If we look at the three types of education separately, we observe similar results.

Worth noting is that all graduates in medicine are employed at university level, no undereducation was reported. Not surprisingly, the majority of medicine graduates (almost 95%) have a job for which only medicine is required, while three quarters of the health sciences and two thirds of the economics graduates have a job for which their own or a related field of study is required. We find that more than 30% of the economics graduates are in a job for which no specific field is required, fitting to our definition of a broad type of study. If we look at job satisfaction, we find that medicine graduates are most satisfied with their current job (85%), followed by the economists and health scientists (66% and 62% respectively).

Table 3

As we are interested in the relation between skill mismatch and educational mismatch, table 3 shows the cross tabulation between these mismatch variables. It shows that the majority of the respondents who perceive that their skills are utilised to a large extent and have sufficient skills for their job, also report a sufficient or good education job match, work in their own or related field of study, and have a job at university level. However, some of respondents report a sufficient or good education-job match indicating at the same time that only some of their skills are being utilised in their job (12%) and that they do not possess sufficient skills for the job (4%). On the other hand, some graduates work outside their own field of education or work in a job for which they formally overeducated, but still report strong skill utilization in their job (10% and 14% respectively) and say that they have sufficient skills for the job (19% and 28%).

Ordered logit estimates

Table 4

The full estimates, including control variables, for models 1, 2, and 3 are shown in table 4. All ordered logit models are successfully tested on the assumption of proportional odds assumption.

Model 1 presents the estimates of the 6 skill mismatches on job satisfaction. We find that 41% of the variance in job satisfaction can be explained by the variables in the model. For graduates who only recently made the transition to the labour market, being overskilled in discipline-specific knowledge has a negative and statistically significant effect on job satisfaction. Furthermore, job satisfaction is strongly negatively influenced by perceived skill underutilisation. It seems that the lower a respondent's perception about the extent to which skills are used in their job, the lower his/her job satisfaction. This is confirmed by several studies that show that skill underutilization has a strong negative effect on job satisfaction (Allen and Van der Velden, 2001; Humphreys and O'Brien, 1986; Meir et al., 1990). A skill deficit appears to have no statistically significant effect on job satisfaction. Thus, we can only partly confirm our hypothesis, namely that underutilisation of skills has a strong negative effect on job satisfaction, but that a skill deficit does not seem to have any impact. A possible explanation for the negative effect of more discipline-specific knowledge than needed and especially of underutilisation is that novices entering the labour market tend to apply initial knowledge rigidly and need to acquire practical experience in order to achieve a higher level of competence (Dreyfus and Dreyfus, 1986). Moreover, Clark

(1996) shows that workers are most satisfied in jobs that provide them with sufficient opportunity to use abilities and to learn new ones. Table 4 furthermore presents odds ratio estimates, which are measures of the average proportional change in the odds ratio of a change in job satisfaction after controlling for the other variables in the model. The odds ratio is the probability that an event occurs divided by the probability that an event does not occur. It is derived by calculating the exponential of the parameter estimates for skill mismatch. The odds of having a high job satisfaction are multiplied by 3.81 larger for each unit change in the scale of skill utilisation, holding all other variables constant.

In model 2, educational mismatch is included instead of skill mismatch to explain differences in job satisfaction. The fit of this model decreases significantly compared to model 1 (31% compared to 41%). However, educational mismatch appears to have a strong and statistically significant effect on job satisfaction. The better the fit between the respondent's university education and their current job, the higher job satisfaction is. Not surprisingly, the negative effect of overeducation on job satisfaction in this model is statistically significant. Working in one's own or a related educational field does not yield a higher job satisfaction than having a job for which another or no specific field is required. The odds of being more satisfied in the job are 32 times larger for those with a good education-job match than those with a bad match.

In model 3, we combine both skill mismatch (model 1) and educational mismatch (model 2) to analyse whether their effects are independent of each other. In this way, we can test whether the effect of skill mismatch is largely

explained by educational mismatch. If so, the effect of skill mismatch is expected to disappear in the combined model. This combined model fits the data equally well as the model with only skills mismatch indicators (41%). We find that the effects of educational mismatch become statistically insignificant in model 3. Interestingly, as most of the research so far is focusing on educational mismatch, our findings suggest that questions on skills and skill utilization are better indicators for job satisfaction. This does confirm the findings of Allen and Van der Velden (2001) that skill mismatches is a much better predictor of job satisfaction than are educational mismatches. Borghans et al. (2001) argue that education might be used by the labor market as a signal of ability rather than as a source of skill supply (Borghans, 2001). Graduates may have interpreted the question on education-job match strictly whether the acquired education fits the formal requirements of the job. Questions on skills would then refer to the person-job fit, to the extent they have acquired skills in, but also beyond, formal education. As a result workers with the same level of education may have different skill endowments, which supports the job-matching theory that it is the combination of personal abilities and job characteristics that matters.

Of interest is that in all three models the coefficients of the control variables show that having career possibilities in the current job is associated with higher job satisfaction. A one unit change in the career possibilities scale is associated with a multiplication of the odds ratio of 2. It has been suggested that people may choose a lower level job to gain relevant experience as a stepping stone to a better job in the future (Groot and Maassen van den Brink,

2000; Sicherman, 1991). However, we find that irrespective of overeducation or a level match, perceiving career possibilities enhances job satisfaction.

In the initial model, we include interaction terms for each type of study working outside their field. However, among the medicine graduates only six respondents were working outside their own field, and we could therefore not estimate a model including medicine graduates. The interaction terms for graduates in health sciences and in economics are not statistically significant, and are excluded in further analysis. Contrary to our expectation, we do not find the effect of a mismatch on job satisfaction is greater for a type of study with a narrow occupational domain than for study with a broad occupational domain. Also we do not find that within broad types of studies the effect of a mismatch on job satisfaction is greater for a field-specific study than for a generic study.

6. Conclusion

In this paper we examined the effect of skill mismatch and educational mismatch on job satisfaction. We also compared the effect of educational mismatch and skill mismatch by combining both in one model. Although the majority of the existing research focuses on the effect of educational mismatches rather than on skill mismatches, we find substantial differences in job satisfaction between the two types of mismatches. In this paper, we have tried to show that, although educational mismatch appears to have an effect on job satisfaction, skill mismatch should feature more prominently in labour market studies. Three conclusions can be drawn from the analysis in this paper.

The first is that it is important to make a distinction between different types of mismatches. We find a negative effect of being overskilled in discipline-specific knowledge on job satisfaction. Furthermore, we find that overall perceived skill utilization is a very strong predictor of job satisfaction, whereas perceived skill deficit does not have an effect. This is in contrary to our expectation that both underutilisation and skill deficit affect job satisfaction equally. This suggests that overall job satisfaction could be improved if employers give graduates entering the labour market opportunities to develop skills and to apply knowledge to the context of specific tasks within the job.

The second conclusion is that skill mismatches are much better predictors for job satisfaction than are educational mismatches. In the separate model with educational mismatch, it appears that the perceived education-job match and being undereducated for the job affects job satisfaction. However, these effects disappear if we include the indicators for skill mismatches in one model, whereas the effects of skill mismatches remain statistically significant.

Finally, and contrary to our expectation, we do not find that a mismatch has different effects for graduates with a study characterised by a broad occupational scope compared to a professional study with a narrow occupational scope. It seems that, irrespective of whether the acquired knowledge and skills are broadly applicable or not, graduates are equally satisfied when being able to utilize their acquired skills in their job.

Interestingly, when holding other variables constant, we find that those who perceive low career possibilities are less satisfied. It seems that those who perceive that their future job will improve, are more satisfied. This may

relate to the fact that this study focuses on graduates entering their first jobs after graduation. It is likely that mismatches in this group of workers are temporary mismatches. However, the impact of mismatches on job satisfaction over time might lead to much stronger effects. It will be interesting to examine and compare the effect of mismatches and job satisfaction in longitudinal panel data.

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Table

Table 1 Factoranalysis (pca) with orthogonal rotation and eigenwaarde greater than one

23 skills*	F 1	F 2	F 3	F 4	F 5	F6
Ability to link various issues	0,72					
Ability to prioritise	0,70					
Ability to identify problems and opportunities	0,67					
Ability to reason logically	0,67					
Ability to gather information	0,63					
Discipline-specific knowledge		0,84				
Ability to apply knowledge in practice		0,83				
Ability to learn new things		0,46				
Ability to communicate in foreign languages			0,79			
Ability to use ICT			0,72			
Knowledge of other fields (of study)			0,46			
Ability to perform well under stress				0,74		
Ability to make decisions				0,71		
Willingness to discuss ideas of yourself and others					0,82	
Willingness to defend your opinion					0,78	
Willingness to understand other opinions					0,71	
Ability to come up with new ideas and solutions					0,62	
Willingness to stick your neck out					0,62	
Ability to work according to budget, planning or guidelines						0,65
Ability to clarify yourself to others						0,55
Ability to use capacities of others						0,51
Ability to work productively with others						0,51

*Ability to work independently had a factorloading lower than 0,45 and was therefore dropped

Table 2 Distribution of skill and educational (mis)match (frequencies and percentages) in Master graduates in Economics (n=255), Health Sciences (n=287) and Medicine (n=114)

	All studies	Economics	Health Sciences	Medicine
Independent variables				
Analytical skills	No (%)	No (%)	No (%)	No (%)
Underskilled	12(1.8)	3(1.2)	8(2.8)	1(0.9)
Match	350(53.4)	121(47.5)	149(51.9)	80(70.2)
Overskilled	244(37.2)	114(44.7)	101(35.2)	29(25.4)
Discipline-specific knowledge				
Underskilled	34(5.2)	18(7.1)	14(4.9)	2(1.8)
Match	283(43.1)	94(36.9)	117(40.8)	72(63.2)
Overskilled	280(42.7)	120(47.1)	127(44.3)	33(29.0)
Additional skills				
Underskilled	172(26.2)	31(12.2)	103(35.9)	38(33.3)
Match	153(23.3)	91(35.7)	44(15.3)	18(15.8)
Overskilled	281(42.8)	117(45.9)	110(38.3)	54(47.4)
Leadership skills				
Underskilled	98(14.9)	36(14.1)	49(17.1)	13(11.4)
Match	235(35.8)	85(33.3)	92(32.1)	58(50.9)
Overskilled	274(41.8)	117(45.9)	119(41.5)	38(33.3)
Assertiveness and initiative				
Underskilled	32(4.9)	10(3.9)	13(4.5)	9(7.9)
Match	310(47.3)	108(42.4)	149(51.9)	53(46.5)
Overskilled	258(39.3)	116(45.5)	97(33.8)	45(39.5)
Management skills				
Underskilled	43(6.6)	17(6.7)	21(7.3)	5(4.4)
Match	192(29.3)	78(30.6)	78(27.2)	36(31.6)
Overskilled	364(55.5)	137(53.7)	160(55.8)	67(58.8)
Use of skills in job				
No or weak skillutilisation	91(13.9)	44(17.3)	47(16.4)	-
Some skillutilisation	114(17.4)	52(20.4)	57(19.9)	5(4.4)
Strong or very strong skillutilisation	449(68.5)	158(62.0)	183(63.8)	108(94.7)
Deficit of skills in job				
No or weak skilldeficit	520(79.3)	197(77.3)	229(79.8)	94(82.5)
Some skilldeficit	95(14.5)	43(16.9)	41(14.3)	11(9.7)
Large or very large skilldeficit	35(5.3)	11(4.3)	15(5.2)	9(7.9)
Education-job match				
Bad	42(6.4)	15(5.8)	27(9.4)	-
Moderate	91(13.9)	45(17.7)	44(15.3)	2(1.8)
Sufficient	226(34.5)	98(38.4)	106(36.9)	22(19.3)
Good	296(45.1)	96(37.7)	110(38.3)	90(79.0)
Required educational field				
My own field or related field	500(76.2)	174(68.2)	218(76.0)	108(94.7)
A totally different or no specific field	151(23.0)	79(31.0)	66(23.0)	6(5.3)
Required educational level				
University	427(65.1)	161(63.1)	152(53.0)	114(100)
Lower than university	224(34.2)	91(35.7)	133(46.3)	-
Dependent variable				
Job satisfaction				
Dissatisfied with job	80(12.2)	35(13.7)	41(14.3)	4(3.5)
Not satisfied/ not unsatisfied with job	133(20.3)	51(20.0)	68(23.7)	14(12.3)
Satisfied with job	443(67.5)	169(66.3)	178(62.0)	96(84.2)
N	656	255	287	114

* due to missing values totals do not add to 100%

Table 3 Combinations of skill utilisation/ skill deficit and education-job match

	Skill utilization in job			**Skill deficit in job**		
Education-job match	None	Some	Strong	None	Some	Strong
Bad/ moderate	11.2%	5.7%	3.5%	16.5%	2.6%	1.4%
Sufficient/ good	2.8%	11.8%	65.1%	63.5%	12.0%	4.0%
Required field of education						
Own or related	6.6%	11.6%	58.7%	61.0%	11.5%	4.2%
Other or none	7.1%	5.9%	10.2%	18.9%	3.3%	1.2%
Required level of education						
University	2.5%	7.7%	55.3%	52.3%	9.4%	3.6%
Lower than university	11.3%	9.6%	13.7%	27.6%	5.3%	1.9%

Table 4 Ordered logit regression for job satisfaction among Dutch graduates (N=656): logit- effects, robust standard errors between brackets, and odds ratios (exp(B))

Dependent variable: satisfied with current job	**Model 1**		**Model 2**		**Model 3**	
	B(SE)	Exp(B)	B(SE)	Exp(B)	B(SE)	Exp(B)
Analytical skills (match=ref.)						
Underskilled	0.87(0.47)	2.38			0.90(0.49)	2.46
Overskilled	0.29(0.29)	1.34			0.30(0.29)	1.35
Disciplinespecific knowledge (match=ref.)						
Underskilled	-0.63(0.39)	0.54			-0.54(0.38)	0.58
Overskilled	-0.60(0.29)	0.55			-0.56(0.29)*	0.57
Additional skills						
Underskilled	-0.11(0.39)	0.89			-0.15(0.38)	0.86
Overskilled	-0.06(0.39)	0.94			-0.00(0.38)	0.99
Leadership skills (match=ref.)						
Underskilled	0.37(0.35)	1.44			0.38(0.38)	1.46
Overskilled	-0.43(0.38)	0.65			-0.37(0.38)	0.69
Assertiveness and initiative (match=ref.)						
Underskilled	-0.15(0.40)	0.86			-0.22(0.41)	0.80
Overskilled	-0.06(0.31)	0.95			-0.07(0.32)	0.94
Management skills (match=ref.)						
Underskilled	-0.27(0.36)	0.77			-0.25(0.37)	0.78
Overskilled	-0.23(0.34)	0.80			-0.26(0.36)	0.78
Required level analytical skills	-0.06(0.23)	0.94			-0.06(0.23)	0.94
Required level knowledge	0.38(0.22)	1.47			0.33(0.22)	1.39
Required level additional skills	-0.03(0.20)	0.97			-0.05(0.21)	0.95
Required level leadership skills	-0.16(0.20)	0.85			-0.10(0.20)	0.90
Required level assertiveness	0.33(0.24)	1.39			0.27(0.25)	1.31
Required level management	0.29(0.21)	1.34			0.25(0.22)	1.29
Skillutilisation	1.30(0.19) **	3.69			1.14(0.20)**	3.13
Skilldeficit	-0.11(0.14)	0.90			-0.09(0.14)	0.91
Education-job match (poor= ref.)						
Moderate			1.18(0.47)*	3.27	0.18(0.61)	1.19
Sufficient			2.06(0.47)**	7.87	0.63(0.63)	1.87
Good			3.29(0.53)**	26.81	0.96(0.68)	2.61
Required educational level						
Lower level than WO			-0.54 (0.25)*	0.58	-0.28(0.33)	0.75
Required educational field (own=ref.)						
Other or no field			-0.23 (0.25)	0.79	0.01(0.32)	1.01
Female (*male= ref.cat.)*	-0.07(0.27)	0.93	-0.21(0.23)	0.81	-0.13(0.27)	0.88
Tenure (permanent contract=ref.)						
Temporary without prospects	0.23(0.33)	1.26	-0.22(0.30)	0.81	0.06(0.34)	1.06
Temporary with prospect	0.62(0.35)	1.86	0.11(0.29)	1.13	0.55(0.36)	1.74
Log salary gross per month	-0.53(0.39)	0.59	-0.18(0.31)	0.84	-0.61(0.42)	0.54
Career possibilities	0.82(0.12)**	2.27	0.97(0.10)**	2.64	0.78(0.13)**	2.19
Age	0.02(0.01)	1.02	0.01(0.01)	1.01	0.02(0.01)	1.02
Professional course (no=ref.)	-0.03(0.26)	0.97	-0.37(0.22)	0.69	-0.08(0.26)	0.93
Cohort 2004(2003=ref)	-0.11(0.26)	0.90	0.17(0.22)	1.18	-0.08(0.26)	0.92
Type of study (economics= ref.)						
Ms in health sciences	0.04(0.33)	1.04	0.42(0.26)	1.53	0.08(0.34)	1.09
Ms in medicine	0.21(0.47)	1.23	0.09(0.36)	1.09	0.00(0.47)	1.01
Pseudo R2	0.41		0.31		0.41	
N	520		595		517	
Model chi-square	255.15**		343.47**		252.38**	
d.f.	30		15		35	

* Significant at 5% level ** significant at 1% level; * test of proportional odds assumption; * B= logit coefficients; SE= Robust standard errors ; Exp(B)= the exponential of the parameter estimates representing the odds ratio for the probability that the event occurs divided by the probability that the event does not occur