

# Job Mismatches and their Labour-Market Effects among School-Leavers in Europe

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In this article, we investigate the determinants of job mismatches with regard to the field of education among school-leavers in Europe. We also examine the effects of job mismatches on the labour-market position of school-leavers. Special attention is paid to cross-national differences in this respect. The data used are from the EU LFS 2000 ad hoc module on school-to-work transitions. The empirical results show that a number of individual, structural and job characteristics affect the likelihood of having a job mismatch. Moreover, in countries in which the education system is vocationally oriented, the incidence of job mismatches among school-leavers is higher than in countries in which the education system is mainly general. With respect to the labour-market effects of job mismatches, it is found that school-leavers with a non-matching job achieve a lower occupational status, more frequently look for another job, and more often participate in continuing vocational training than those with a matching one. These labour-market effects of job mismatches are smaller in countries in which the vocational orientation of the education system is stronger.

## Introduction

In modern societies education is probably the most important characteristic in the allocation process on the labour market. Labour-market theories differ, however, about the mechanisms by which educated persons are allocated to jobs. According to the human-capital theory (Becker, 1964), the skills acquired in education represent human capital. Investments in human capital are useful, as long as they lead to higher productivity on the labour market. Employers value labour productivity by offering the highest wages to those individuals who have obtained most human capital. The job-competition theory (Thurow, 1975), on the other hand, suggests that wages are determined primarily by job characteristics and not by individual productivity. Employers seek to employ the best available candidates for their vacancies, at the lowest training costs. They use educational qualifications as indicators of trainability (Spence, 1974). Thus, job seekers are ranked in an imaginary labour queue according to

their expected training costs, and employers match this queue of applicants to a queue of vacant jobs that are classified on the basis of their level (Thurow, 1975; Sørensen and Kalleberg, 1981). The best positions go to the individuals with the lowest training costs (i.e. the highest qualifications), and education is regarded as a positional good (Hirsch, 1977; Ultee, 1980).

A combination of these two theories is the job-matching theory (Sattinger, 1993), which states that the quality of a job match, i.e. the degree of fit between required and acquired skills, determines the productivity level and earnings in a job. If an employee works in a non-matching job, his acquired skills are under-utilized. This imposes a limitation on his labour productivity, resulting in lower wages. The allocation of workers is optimal if every worker is matched to a job in which, in relative terms, he performs better than all other workers. The incidence of job mismatches, then, is explained

by differences in the shares of vacant jobs of a given level and available workers with adequate educational qualifications.

Most of the research addressing the topic of job mismatches refers to over-education (see among others Borghans and De Grip, 2000; Clogg and Shockey, 1984; Freeman, 1976; Groot and Maassen van den Brink, 2000; Halaby, 1994; Hartog and Oosterbeek, 1988; Smith, 1986; Wolbers, De Graaf and Ultee, 2001). Workers are over-educated if the level of education acquired exceeds the level of education required to perform their jobs adequately. Far less attention is paid to job mismatches referring to the field of education obtained (exceptions are Witte and Kalleberg, 1995; Solga and Konietzka, 1999; Van de Werfhorst, 2001). Moreover, the minor attention given to this kind of job mismatch is based on empirical studies that consider only a single country. This article tries to fill this gap by analysing job mismatches with regard to the field of education among school-leavers in thirteen European countries. We first study the determinants of job mismatches. Then we examine the effects of job mismatches on the labour-market position of school-leavers in terms of occupational status attainment, job search activities, and participation in continuing vocational training. The data that are used for the empirical analysis come from the EU LFS 2000 ad hoc module on school-to-work transitions.

## Theoretical Background

### Determinants of Job Mismatches

The transition from school to work is often regarded as a 'rite of passage' in which young people are introduced to the world of labour. This transition process takes place in stages and it is characterized as a turbulent and uncertain period (OECD, 1998; Kerckhoff, 2000). First of all, school-leavers have to compete for the available jobs with those who have already gained a position on the labour market. Their lack of work experience often forces them to face unemployment. Secondly, a relatively large number of school-leavers end up in jobs that do not match their educational qualifications very well. These job mismatches can be the result of incomplete information on the abilities of school-leavers and the characteristics of jobs offered by employers.

Logan (1996) refers to this as a two-sided matching game. By changing jobs or (re-)training, school-leavers and employers attempt to achieve a better job match. Job mismatches can thus be considered as a temporary position that allows a transition to a better one (Sicherman, 1991).

With regard to the determinants of job mismatches it is obvious that education plays a key role. Three aspects of educational qualifications are important here. First of all, the relative degree to which the curriculum of the vocational programme provides the required knowledge and skills matters. It is expected that the more a study specifically prepares students for a few occupations, the closer will be the fit between education and employment (hypothesis 1a). In vocational programmes that are mainly occupation-specific, school-leavers have specific skills which prepare them for particular jobs. Good examples are the fields of education and health/welfare, where a close link exists between the field of education completed and the occupation found. Both fields of education prepare for a small number of professions—such as teacher or medical doctor—occupations that are accessible only with the right certificates.

Secondly, the kind of vocational education (school-based versus workplace-based vocational education, or a combination of both in the form of apprenticeship training) may have an effect on the likelihood of having a job mismatch (hypothesis 1b). It is assumed that workplace-based and apprenticeship-type vocational education decreases selection and allocation costs for employers: it offers them an opportunity to teach students skills that match the firm's specific needs and to screen them during their training. From the point of view of school-leavers, both kinds of vocational education also offer advantages. They already have a (temporary) position in a firm and can thus more easily gain access to a position that fits their training than leavers from school-based vocational education.

Thirdly, the qualification level determines the likelihood of being employed in a non-matching job. In a situation of over-education, the over-supply of highly educated school-leavers may lead to 'bumping down' as these better-educated school-leavers start competing with less-educated ones (Borghans and De Grip, 2000). As a result, better-educated school-leavers find work in a related field,

but at a lower job level. For less-well-educated school-leavers, however, this strategy is less useful, since their opportunities to switch to an even lower level job are restricted, simply due to the smaller range of alternatives that exist for them. Therefore, we expect that the level of education attained by school-leavers is negatively correlated with the likelihood of being in a non-matching job (hypothesis 1c).

In addition to education, other individual characteristics affect the likelihood of having a job mismatch. Gender differences on the labour market are found along a large number of dimensions. In general, women have less favourable prospects on the labour market than men (Blossfeld and Hakim, 1997). It is likely that gender differences also play a role with regard to job mismatches. Since women's unemployment risk is larger, they may be more easily inclined to accept jobs outside their own occupational domain. Also, since their opportunities for career mobility are smaller, their probability of moving from a non-matching job to a better fitting job is smaller. We therefore suggest that female school-leavers are more often employed in a job that does not match their field of education than male school-leavers (hypothesis 2).

Furthermore, we hypothesize that older school-leavers are more likely to be in a job that does not match the field of education attended than younger school-leavers (hypothesis 3). Witte and Kalleberg (1995) mention two arguments for expecting an increasing likelihood of having a job mismatch with age. First of all, the skills obtained in initial education may become obsolete, mainly due to changing technology (Miles and Ducatel, 1994). Secondly, the relative value of vocational qualifications attended in initial education in the total amount of human capital acquired decreases during the career, since other forms of human capital (work experience, on-the-job-training) accumulate with age.

Concerning job tenure, we expect to find a negative relationship with the likelihood of having a job mismatch (hypothesis 4). The longer a school-leaver is employed in the same job, the higher the probability that deficiencies in initial education have in the meantime been compensated for by work experience and/or additional training. However, the causal order may also be the reverse: if a school-leaver has a non-matching job, then there is

a strong incentive to change to another job that fits better.

Besides job tenure, the nature of the employment contract has an effect on the likelihood of having a job mismatch. In general, labour-market opportunities for workers in a temporary and/or part-time job are worse than for those in a permanent and/or full-time position. An important reason for the less favourable labour-market position of employees with a temporary and/or part-time contract is that it is less profitable for employers to invest in such workers, because of the shorter pay-off period (Psacharopoulos, 1987). In the case of part-time employment, the returns to investment must be recovered in a smaller number of hours. In the case of temporary employment employers are more reluctant to invest, because of the greater risk of employees leaving, resulting in a shorter expected pay-off period. It is assumed that these investment arguments also hold with respect to job mismatches. In addition to this, temporary and/or part-time employment often leads to a loss of productive skills and a lack of relevant work experience. Hence, it is possible that job mismatches are used here as compensation (Groot and Maassen van den Brink, 1996). On the basis of these arguments, we presume that school-leavers with a temporary and/or part-time contract more often have a mismatched job than school-leavers with a permanent and/or full-time contract (hypothesis 5).

Apart from individual and job characteristics, various labour-market structures matter. First of all, fluctuations in the business cycle are expected to have an impact on the likelihood of being employed in a non-matching job. It is assumed that school-leavers who enter the labour market during an economic recession suffer disadvantages with respect to the chance of finding a job that matches the field of education attended (hypothesis 6). A high rate of unemployment makes school-leavers adjust their goals and, therefore, more easily switch to jobs outside their field of education, instead of continuing to search for a job that is better suited to the skills acquired in their field of education.

Another kind of labour-market structure refers to the organization in which a school-leaver works. With respect to the effect of firm size, we assume that the likelihood of having a job mismatch is smaller in larger firms (hypothesis 7). An argument

for this hypothesis is that larger firms can provide more opportunities for individuals to find a job that matches their field of education. Larger firms also invest considerably more in the training of their employees than smaller ones (OECD, 1991) so that initial skill deficiencies can easily be compensated for.

We also expect that the incidence of job mismatches differs between the private and the public sector. Our argument for this hypothesis is rather simple. Since it is assumed that school-leavers from a vocational programme in education and health/welfare less often have a job mismatch, and because the public sector comprises all educational and health care organizations, we expect that the likelihood of having a job mismatch regarding the field of education is lower in the public sector than in the private sector (hypothesis 8).

Last but not least, differences between countries are expected with respect to job mismatches among school-leavers. Cross-national variation with regard to education and training systems and labour-market regulation affect the integration process of young people into the labour market (Van der Velden and Wolbers, forthcoming). Countries differ in the extent to which there is an institutional link between the education and employment system (Allmendinger, 1989; Hannan, Raffe and Smyth 1997; Kerckhoff, 1995; Müller and Shavit, 1998). Basically, this refers to the extent to which education systems differentiate between general and vocational education. Some countries offer mainly general education. In such countries, education is weakly related to the workplace and vocational training is primarily obtained on-the-job. In other countries, occupation-specific skills are already taught in initial education. Here, the link between the education and employment system is much closer. In addition, the institutional structure of vocational education differs between countries. In some countries, teaching of vocational skills is shared between schools and the workplace, as is the case with the apprenticeship-type vocational education in Germany (the 'dual system'). In other countries, by contrast, the provision of vocational skills is mainly school-based. We suppose that in countries with a strong vocational orientation—referring to both the extent and kind of vocational education—the association between educational qualifications and labour-

market outcomes is closer, and subsequently, the incidence of job mismatches among school-leavers is lower (hypothesis 9).

### Labour-Market Effects of Job Mismatches

In the literature, job mismatches are reported to have serious effects on a number of labour-market outcomes. Most economic research has been conducted on the effect of over-education on wages (see Hartog, 2000). Empirical results suggest that individuals working in jobs for which a lower level of education is required than actually obtained (i.e. over-educated persons) earn less than individuals with fitting employment. In the case of job mismatches with regard to the field of education there are wage effects as well: individuals working in their own field of education have higher wages than those working outside it (Van de Werfhorst, 2001). Both findings are in line with the aforementioned job-matching theory (Sattinger, 1993). In most social stratification research, however, labour-market outcomes are assessed by measuring occupational rewards in terms of social status or prestige rather than earnings. The division of labour is the kernel of social inequality and occupation, therefore, is the main dimension of social stratification. In this article we adopt this sociological approach by looking at occupational status attainment.<sup>1</sup> We hypothesize that having a job mismatch coincides with lower occupational returns on the labour market (hypothesis 10).

Other labour-market effects of job mismatches deal with adjustment strategies. In fact, two adjustment strategies are possible for school-leavers with a job mismatch. A first strategy to improve fit is to look for another job. The job search theory states that school-leavers will continue to change jobs until an optimal match has been achieved (Jovanovic, 1979; Tuma, 1985). For that reason, we expect that school-leavers with a non-matching job more frequently look for another job than those with a matching one (hypothesis 11). The reasons for this job search are probably diverse, but it is assumed that job dissatisfaction is one of the main reasons for the job search behaviour of school-leavers who have a job mismatch (Allen and Van der Velden, 2001). Job mismatches are an important cause of job dissatisfaction (Tsang and Levin, 1985; Burris, 1985), which provides an

incentive for school-leavers to change jobs, hopefully leading to a position that better matches their knowledge and skills.

A second strategy to deal with job mismatches is to invest in additional training in order to compensate for skill deficiencies in initial education. It is assumed that if the field of education obtained by school-leavers corresponds to the field that is required at the workplace then there is less need for further training (Barron, Black and Loewenstein, 1989; Van Smoorenburg and Van der Velden, 2000). Hence, we formulate the hypothesis that school-leavers who work outside their field of education are more likely to participate in additional training than school-leavers who have a job in their own field (hypothesis 12).

Concerning cross-national variation in the labour-market effects of job mismatches, two contrasting hypotheses can be formulated. On the one hand, it can be expected that in countries characterized by a strong orientation towards vocational education—irrespective of how this is institutionalized in the education system—the consequences of having a job mismatch for the labour-market position of school-leavers are larger than in countries where education is hardly vocational-specific (hypothesis 13a). With respect to occupational returns, it is therefore expected that for school-leavers with a job mismatch in a country in which the education system is vocationally oriented, the loss in occupational status is larger than for corresponding school-leavers in a country that mainly provides general education. The reason why school-leavers with a job mismatch are ‘penalized’ less in countries in which vocational education is less developed stems from the fact that in these countries educational qualifications obtained in initial education are used primarily as a screening device to determine the trainability of school-leavers (Arrow, 1973; Spence, 1974). On-the-job-training provides occupation-specific skills that make promotion to a more suitable job possible. For the same reason, we expect that in countries in which the education system is more general than vocational, the effect of having a job mismatch on the likelihood of participating in continuing vocational training and the likelihood of looking for another job is smaller.

On the other hand, it may be the case that in countries with a strong vocational orientation, the

labour-market effects of job mismatches are smaller than in countries in which education is more generally oriented (hypothesis 13b). The rationale behind this hypothesis lies in the safety-net function of vocational education (Shavit and Müller, 2000*a*, 2000*b*). Vocational education appears to be more effective in countries in which it is well focused, specific rather than general, and relevant to the skills needed at the workplace, even for those who are not vocationally educated themselves. On the basis of this, we can assume that the loss in occupational status among school-leavers with a job mismatch is smaller here and adjustment strategies to improve fit are less common.

## Research Design

### Data

The data used are from the EU LFS 2000 ad hoc module on school-to-work transitions, provided by Eurostat. This data-set combines information from the original Labour Force Surveys (LFS) with special topical information on the transition from school to work. The analysis that follows covers thirteen European countries (Austria, Belgium, Denmark, Spain, Finland, France, Greece, Hungary, Italy, Luxembourg, the Netherlands, Sweden, and Slovenia) for which reliable data are available.<sup>2</sup> School-leavers are defined as those individuals aged 15–35 years old, who have left initial education within the past five (Finland, Luxembourg, the Netherlands, and Sweden) or ten (all other countries) years. Since this definition implies that people who are in initial education at the time of the survey, but who have already left education (at least once) in the past five or ten years (for more than one year), belong to the selection of school-leavers, a modified ILO definition (ILO, 1990) is applied to define the employed labour force. All people who are employed at the time of the survey, but who are in initial education at the same time, are excluded from the active labour force. Furthermore, the sample is restricted to persons who have attended a vocational programme before leaving initial education for the first time. Since lower secondary education is considered to be of a general nature, it does not make sense to study whether those who left school at this level

have a matching or non-matching job and, therefore, all school-leavers from this level of education are excluded from the analysis. For the same reason, school-leavers from upper secondary education and graduates from tertiary education with a general programme are not analysed either. At the level of upper secondary education this concerns 16 per cent of the school-leavers (in particular those from upper general secondary education which prepares for tertiary education); at the tertiary level it concerns only 1 per cent of the graduates. We also excluded self-employed persons and family workers (i.e. we have analysed only persons in paid employment). Lastly, members of the armed forces were not included in order to make sure that military personnel were not mixed up with school-leavers who did military service. Considering these selections and after list-wise deletion of respondents for whom information was missing on any of the variables used, an analytic sample of 36,268 school-leavers remained.

### Measurement of Variables

To determine the fit between the field of education attended by school-leavers in initial education and the job found on the labour market, an objective measure is used. A job mismatch is defined as a discrepancy between the current occupation a school-leaver is working in and the field of education attended. Individuals working outside their field of education are treated as school-leavers with a non-matching job. Table A1 of the Appendix presents an overview of the occupations that match a particular field of education. For example: in the category of education, all teaching professionals are present (codes 230–235); the category of sciences consists of, among other occupations, physicists, chemists, mathematicians, statisticians, and computing professionals (codes 211–213); the category of agriculture comprises all skilled agricultural and fishery workers (codes 600, 610–615), the category of health/welfare includes health professionals (code 222) and nursing and midwifery professionals (code 223), and so forth. The basic criterion used when assigning occupational codes to a field of education is the assumed congruence of skills acquired through the field of education and those needed on the job. All other combinations between

field of education and occupation are considered as job mismatches.

To investigate the consequences of job mismatches for the labour-market position of school-leavers, we have analysed three labour-market outcomes. First of all, the occupational status of the current job was used to estimate the effect of job mismatches. The occupational status of a job was determined on the basis of the International Socio-Economic Index (ISEI), which represents an internationally comparable measure of occupational status (Ganzeboom, De Graaf and Treiman 1992; Ganzeboom and Treiman, 1996). Status scores were assigned to occupational titles (on the basis of 3-digit information from the ISCO-88 classification) according to a scale that ranges from 16 for occupations with the lowest status to 90 for occupations with the highest status. Secondly, we studied the effect of job mismatches on job search activities. For this purpose, information was used on whether or not school-leavers had actively looked for another job during the last four weeks before the survey. Thirdly, the effect of job mismatches on training participation was analysed. Training participation of school-leavers was restricted here to participation in continuing vocational training to advance or change one's working career (i.e. participation in initial education was excluded) in the last four weeks before the survey.

As independent variables, the following characteristics were included in the analysis. To control for differences in educational attainment, we introduced the level and field of education. Level of education concerns the highest level of education successfully completed when leaving initial education. It is measured in terms of ISCED 1997 (see OECD (1999) for more details). We distinguish two levels: upper secondary and post-secondary, non-tertiary education (ISCED3–4) and tertiary education (ISCED5–6).<sup>3</sup> Field of education refers to the last educational programme attended before leaving initial education. This definition implies that the field of education does not necessarily relate to the highest educational level successfully completed.<sup>4</sup> Eight fields are distinguished: education; humanities and arts; social sciences, business, and law; sciences; engineering, manufacturing, and construction; agriculture; health and welfare; services. In addition to the measurement of the level and

field of education, a variable was included that determined whether or not a school-leaver had obtained a (non-tertiary) vocational qualification.<sup>5</sup> For those who had obtained a vocational qualification, a further distinction was made between a school-based, workplace-based, or apprenticeship-type vocational qualification. School-leavers for whom adequate information was not available to make such a distinction, were assigned to the category of 'type unknown'.<sup>6</sup>

Other individual characteristics that were taken into account, were gender (female versus male) and age. The latter variable was measured in age groups (15–19; 20–24; 25–29; 30–35).

To determine the impact of job characteristics, we used three variables. First of all, job tenure was taken into account (measured in years). Job tenure was based on the year in which a school-leaver started working in his current job. Furthermore, we included information on the nature of the work contract (permanency of the job and full-time versus part-time distinction). The permanency of a job was measured by making the contrast between permanent and temporary jobs. A temporary position reflects a job with a contract of limited duration. The part-time versus full-time distinction is built on the subjective evaluation of the individual and not on the actual number of hours worked per week.

Labour-market circumstances when leaving education were controlled for by using the aggregate unemployment level in the year of entry. The required unemployment figures were published in OECD (2001).<sup>7</sup>

Two organizational characteristics were included in the analysis. We first looked at the size of the firm in which school-leavers worked. We distinguish small (1–10 persons) and larger firms (11+ persons). Secondly, the economic sector was operationalized by adding a dummy variable that represents individuals working in the public (versus private) sector.

Finally, differences between countries were taken into account. First, we used a set of country dummies to determine cross-national variation. Then, we investigated to what extent the variation found between the countries could be explained by national differences in the vocational orientation of the education system. These differences were indicated by two measures referring to the main vocational education pathways in upper secondary

education in a country (see OECD, 2000: Table 2.2): the share of upper secondary education students in school-based vocational education and the share of upper secondary education students in apprenticeship-type vocational education.

## Determinants of Job Mismatches

Table 1 displays the results of a logistic regression analysis of having a job mismatch. Model 1 shows that, according to hypothesis 1c, young people who left school at the ISCED3–4 level more often have a job mismatch than those who graduated at the ISCED5–6 level. The implied odds ratio is 2.119 ( $e^{0.751}$ ). With respect to the field of education attended, we found that school-leavers from humanities and arts, agriculture, and sciences more frequently have a job mismatch than school-leavers from education (i.e. the reference category). Those from engineering/manufacturing/construction, health/welfare, social sciences/business/law, and services, in contrast, have a lower likelihood of being employed in a non-matching job. So, it seems that we can corroborate hypothesis 1a, in which we proposed that occupation-specific vocational programmes reduce the risk of having a job mismatch. The attainment of a (non-tertiary) vocational qualification has hardly any significant effect on the odds of having a job mismatch (see hypothesis 1b). Only school-leavers who have obtained a vocational qualification, but for whom information on the type of the vocational qualification is missing, are slightly more often employed in a non-matching job. Furthermore, the results of Model 1 indicate that men are more often employed in a job that does not fit the field of education attended than women, which leads us to refute hypothesis 2. In line with hypothesis 3 is the finding that older workers are more likely to be working in a non-matching job than younger workers.

In addition to these individual factors, job characteristics matter. First of all, job tenure has a negative effect on the likelihood of being employed in a non-matching job: school-leavers who have worked in their current job for a long time less often have a job mismatch than school-leavers who started their current job only recently, which supports hypothesis 4. Secondly, school-leavers

**Table 1.** Results of logistic regression analysis of having a job mismatch: logit effects ( $N = 36,268$ )

Model	1	2	3
Constant	-0.884**	-1.068**	-1.078**
ISCED3-4 (vs. ISCED5-6)	0.751**	0.713**	0.720**
Field of education (vs. education)			
Humanities/arts	0.992**	0.996**	1.001**
Social sciences/business/law	-0.748**	-0.713**	-0.723**
Sciences	0.383**	0.409**	0.396**
Engineering/manufacturing/construction	-1.075**	-1.036**	-1.059**
Agriculture	0.551**	0.604**	0.580**
Health/welfare	-0.885**	-0.813**	-0.857**
Services	-0.717**	-0.688**	-0.706**
Vocational (nontertiary) qualification (vs. no)			
Yes, school-based	0.001	0.076	0.048
Yes, workplace-based	-0.251	-0.148	-0.230
Yes, apprenticeship-type	0.075	0.223*	0.171*
Yes, type unknown	0.090**	-0.023	0.078*
Female (vs. male)	-0.059*	-0.064*	-0.060*
Age (vs. 15-19)			
20-24	0.195*	0.171*	0.189*
25-29	0.274**	0.229**	0.273**
30-35	0.301**	0.208*	0.299**
Job tenure (years)	-0.033**	-0.031**	-0.032**
Temporary job (vs. permanent job)	0.165**	0.195**	0.180**
Part-time job (vs. full-time job)	0.160**	0.197**	0.168**
Unemployment level in entry year (%)	0.014**	0.012	0.014**
Larger firm (vs. small firm)	-0.149**	-0.122**	-0.148**
Public sector (vs. private sector)	-0.246**	-0.249**	-0.249**
Country (vs. the Netherlands)			
Austria		0.027	
Belgium		0.180	
Denmark		0.495**	
Spain		0.178	
Finland		-0.001	
France		0.138	
Greece		0.336**	
Hungary		0.247*	
Italy		0.516**	
Luxembourg		-0.654**	
Sweden		0.245*	
Slovenia		0.064	
Share of school-based vocational education (%/10)			0.040**
Share of apprenticeship-type vocational education (%/10)			-0.015
Model Chi <sup>2</sup>	3,391**	3,561**	3,430**
Df	22	34	24
Pseudo R <sup>2</sup>	0.122	0.128	0.124

\*= $p < 0.05$ ; \*\*= $p < 0.01$ .

Source: EU LFS 2000 ad hoc module on school-to-work transitions.

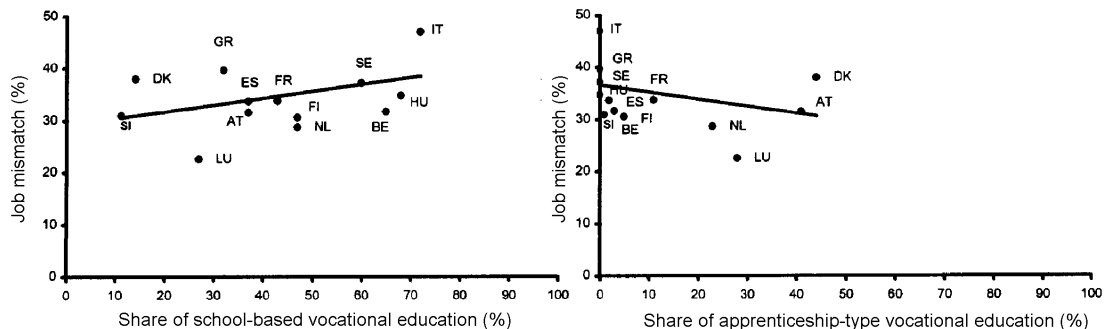


who have a temporary contract are more often in a job that does not match their field of education attended than those with a permanent contract. Thirdly, school-leavers with a part-time job more often have a job mismatch than those who work full time. These findings imply that we can corroborate hypothesis 5.

With respect to structural circumstances, Model 1 shows that the aggregate unemployment rate in the year of labour-market entry has a significant positive effect on the odds of having a job mismatch. This finding indicates that, in accordance with hypothesis 6, in times of high unemployment school-leavers more often have to accept a job that does not fit their field of education attended in initial education than in times of low unemployment. The structure of the organization in which a school-leaver is working also affects the likelihood of having a job mismatch. First of all, in larger firms the likelihood of having a non-matching job is lower than in small firms, which supports hypothesis 7. Moreover, school-leavers who work in the public sector are less likely to be employed in a non-matching job than those who work in the private sector. This corroborates hypothesis 8.

Model 2 presents cross-national differences in the incidence of job mismatches among school-leavers. The country dummies show that in Italy, Denmark, Greece, Hungary, and Sweden the likelihood of having a job mismatch is significantly higher than in the Netherlands (i.e. the reference category). In Luxembourg, on the other hand, the odds of having a job mismatch for school-leavers is significantly lower. All other countries show results that do not deviate significantly from the Netherlands.

In Model 3 we tested to what extent the variation found between the countries can be explained by national differences in the vocational orientation of the education system. These differences were measured by two indicators referring to the main vocational education pathways in upper secondary education in a country: the share of upper secondary education students in school-based or apprenticeship-type vocational education. By comparing the fit of Models 1, 2, and 3, we were able to calculate that almost one quarter of the total cross-national variation could be attributed to the two country characteristics  $((3,430 - 3,391) / (3,561 - 3,391)) = 0.229$ . Figure 1 gives a visual representation of these country characteristics. The regression lines show the estimated effects of Model 3, whereas the dots represent the observed percentages for each country separately. The left part of this figure shows that in countries in which the share of upper secondary education students in school-based vocational education is large, the incidence of job mismatches among school-leavers is higher than in countries in which the share of upper secondary education students in school-based vocational education is small. According to Model 3 of Table 1 this effect is significant, which means that we have to refute hypothesis 9. With respect to the percentage of upper secondary education students in apprenticeship-type vocational education, it seems that the higher this percentage is in a country, the lower the incidence of job mismatches among school-leavers in that country (see the right part of Figure 1). This effect, however, is not significant.



**Figure 1.** The relationship between the share of school-based, or apprenticeship-type vocational education in a country and the likelihood of having a job mismatch

Source: EU LFS 2000 ad hoc module on school-to-work transitions

## Labour-Market Effects of Job Mismatches

### Occupational Status Attainment

Table 2 represents the results of a linear regression analysis of achieved occupational status.<sup>8</sup> Model 1 shows that, as predicted by hypothesis 10, school-leavers with a job mismatch attain a significantly lower occupational status than school-leavers with a matching job. The difference is  $-5.021$  status points. When we take other characteristics into account as well, the lower achieved occupational status for those with a job mismatch remains significant (see Model 2). The difference in occupational status then becomes  $-4.207$  points.

Model 3 shows that the occupational status achieved by school-leavers differs significantly between countries. In Austria, school-leavers attain the highest occupational status with their jobs; in France they achieve the lowest. The absolute differ-

ence in occupational status between these countries amounts to over seven status points ( $1.516 + 5.803 = 7.319$ ).

In Model 4 the country dummies have been replaced by the two country characteristics measuring national differences in the vocational orientation of the education system. The model shows that in countries with a high share of school-based vocational education the occupational status achieved by school-leavers is higher than in countries with a low share of school-based vocational education. With respect to the share of apprenticeship-type vocational education the opposite effect is found: in countries in which the percentage of upper secondary education students in apprenticeship-type vocational education is high, the occupational status attained is lower than in countries in which this percentage is low.

In Model 5 statistical interaction terms between the country characteristics and the job mismatch

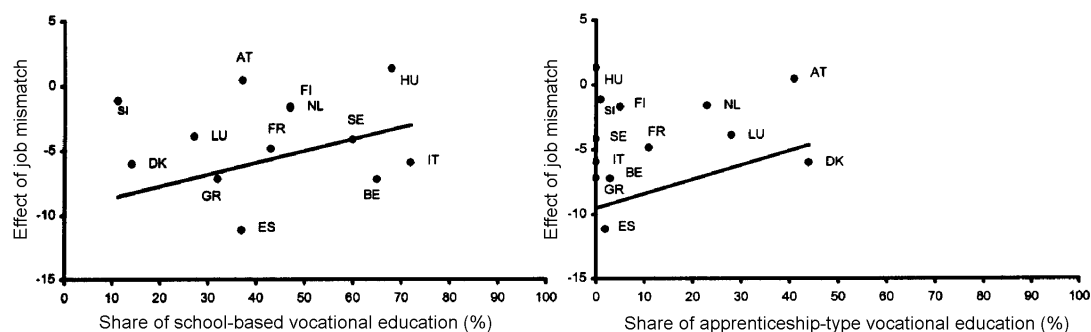
**Table 2.** Results of linear regression analysis of achieved occupational status (ISEI): unstandardized regression coefficients ( $N = 36,268$ )

Model	1	2 <sup>a</sup>	3 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>
Constant	48.193**	57.598**	58.013**	54.667**	56.532**
Job mismatch (vs. job match)	$-5.021^{**}$	$-4.207^{**}$	$-4.397^{**}$	$-4.286^{**}$	$-9.541^{**}$
Country (vs. the Netherlands)					
Austria			1.516*		
Belgium			$-3.351^{**}$		
Denmark			$-4.773^{**}$		
Spain			$-4.561^{**}$		
Finland			$-2.049^{**}$		
France			$-5.803^{**}$		
Greece			$-0.939$		
Hungary			$-0.496$		
Italy			0.322		
Luxembourg			$-2.499^*$		
Sweden			$-4.141^{**}$		
Slovenia			$-0.953$		
Share of school-based vocational education (%/10)				0.609**	0.294**
Share of apprenticeship-type vocational education (%/10)				$-0.219^{**}$	$-0.579^{**}$
Interactions with job mismatch (vs. job match)					
Share of school-based vocational education (%/10)					0.902**
Share of apprenticeship-type vocational education (%/10)					1.112**
F	950**	844**	606**	794**	742**
Df	1	23	35	25	27
Adjusted R <sup>2</sup>	0.025	0.348	0.369	0.353	0.356

<sup>a</sup>=controlling for level of education, field of education, vocational (non-tertiary) qualification, gender, age, job tenure, temporary employment, part-time employment, unemployment level in entry year, firm size, and sector.

\*= $p < 0.05$ ; \*\*= $p < 0.01$ .

Source: EU LFS 2000 ad hoc module on school-to-work transitions.



**Figure 2.** The relationship between the share of school-based, or apprenticeship-type vocational education in a country and the effect of having a job mismatch on achieved occupational status (ISEI)

Source: EU LFS 2000 ad hoc module on school-to-work transitions

**Table 3.** Results of logistic regression analysis of looking for another job: logit effects ( $N = 36,268$ )

Model	1	2 <sup>a</sup>	3 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>
Constant	-2.393**	-2.686**	-3.277**	-3.136**	-3.295**
Job mismatch (vs. job match)	0.455**	0.336**	0.346**	0.333**	0.675**
Country (vs. the Netherlands)					
Austria			0.104		
Belgium			0.385*		
Denmark			0.579**		
Spain			-0.714**		
Finland			0.660**		
France			0.375*		
Greece			0.028		
Hungary			-1.709**		
Italy			0.674**		
Luxembourg			0.640		
Sweden			0.918**		
Slovenia			-0.351		
Share of school-based vocational education (%/10)				0.072**	0.093**
Share of apprenticeship-type vocational education (%/10)				0.055*	0.109**
Interactions with job mismatch (vs. job match)					
Share of school-based vocational education (%/10)					-0.050
Share of apprenticeship-type vocational education (%/10)					-0.132**
Model $\chi^2$	162**	2,901**	3,440**	2,923**	2,933**
Df	1	23	35	25	27
Pseudo $R^2$	0.009	0.162	0.190	0.163	0.163

<sup>a</sup>=controlling for level of education, field of education, vocational (non-tertiary) qualification, gender, age, job tenure, temporary employment, part-time employment, unemployment level in entry year, firm size, and sector.

\*= $p < 0.05$ ; \*\*= $p < 0.01$ .

Source: EU LFS 2000 ad hoc module on school-to-work transitions.

variable were added in order to determine the impact of both educational characteristics on the relationship between having a job mismatch and the occupational status achieved. Figure 2 presents the results of Model 5. The regression lines display

the estimated loss in occupational status as a result of having a job mismatch for varying shares of school-based, or apprenticeship-type vocational education, whereas the dots indicate the observed loss in occupational status for each country separately. The

figure demonstrates that the negative effect of having a job mismatch on the occupational status achieved by school-leavers is smaller in countries in which the shares of upper secondary education students in school-based and apprenticeship-type vocational education are high than in countries in which these shares are low. This implies that the loss in occupational status among school-leavers with a job mismatch is smaller in countries in which the education system is more vocationally oriented. This clearly supports hypothesis 13b, but falsifies hypothesis 13a.

### Job Search Activities

Table 3 describes the results of a logistic regression analysis of looking for another job. In Model 1 we see that, according to hypothesis 11, for school-leavers with a job mismatch, the odds of looking for another job is 1.576 ( $e^{0.455}$ ) times larger than the corresponding odds for school-leavers with a matching job. This effect is reduced to some extent if other factors are taken into account. Nevertheless, Model 2 shows that, other things being equal, the estimated effect is still significant. The implied odds ratio is now 1.399 ( $e^{0.336}$ ).

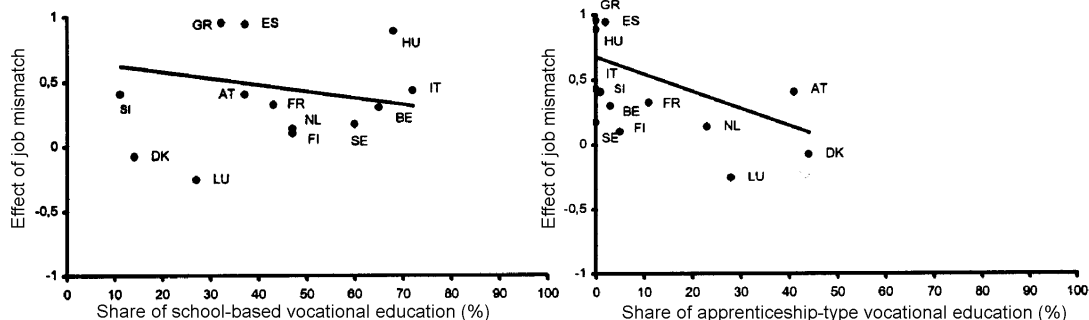
Model 3 shows that the incidence of job search activities differs cross-nationally. Swedish school-leavers are most often looking for another job, followed by school-leavers from Italy, Finland, Denmark, Belgium, and France. In Hungary and Spain, on the other hand, job search activities are least often found among school-leavers.

In Model 4 the country dummies have been replaced again by the two characteristics of the education system in a country. Both characteristics are significant and indicate that in countries with a high share of school-based, or apprenticeship-type vocational education job search activities among school-leavers are more intensive than in countries with a low share of both types of vocational education.

In Model 5 interaction terms between the two country characteristics and the job mismatch variable were added again. Figure 3 illustrates the results of this model. The regression lines display the logit effect of having a job mismatch on the likelihood of looking for another job for varying shares of school-based, or apprenticeship-type vocational education, whereas the dots represent the observed logit for each country separately. The figure shows that, as predicted by hypothesis 13b, the positive effect of having a job mismatch on job search activities among school-leavers is smaller in countries in which the shares of upper secondary education students in school-based and apprenticeship-type vocational education are high than in countries in which these shares are low. Only with regard to the share of apprenticeship-type vocational education is the interaction effect significant.

### Participation in Continuing Vocational Training

Table 4 presents the findings of a logistic regression analysis of participating in continuing vocational training. Model 1 shows that, on average, school-



**Figure 3.** The relationship between the share of school-based, or apprenticeship-type vocational education in a country and the effect of having a job mismatch on looking for another job

Source: EU LFS 2000 ad hoc module on school-to-work transitions

leavers with a job mismatch participate in continuing vocational training less often than school-leavers with a matching job. This means that we have to refute hypothesis 12. The implied odds ratio is 0.795 ( $e^{-0.229}$ ). After taking individual, job, and structural characteristics into account in Model 2, the estimated odds ratio takes the value of 0.872 ( $e^{-0.137}$ ).

When we control for differences in training participation between countries, the effect of job mismatches becomes non-significant (see Model 3). This means that the effect of job mismatches on the likelihood of participating in continuing vocational training that we found earlier, is the result of the country-specific composition of the data. With respect to cross-national variation in training participation, Model 3 demonstrates that the occurrence of continuing vocational training is highest in Denmark and Finland. In Spain, Italy, and Greece, on

the other hand, participation in continuing vocational training is lowest.

According to Model 4, the vocational orientation of the education system has a positive impact on training participation. In countries in which the shares of school-based and apprenticeship-type vocational education is high, school-leavers are more likely to participate in continuing vocational training than in countries in which these shares are low. So at the macro level, continuing vocational training builds on the occupation-specific skills already acquired in initial education.

Model 5 further qualifies the effect of job mismatches on training participation. By including interaction terms between the country characteristics that measure the vocational orientation of the education system and the job mismatch variable, it turns out that the effect of job mismatches is actually positive in countries with low shares of school-

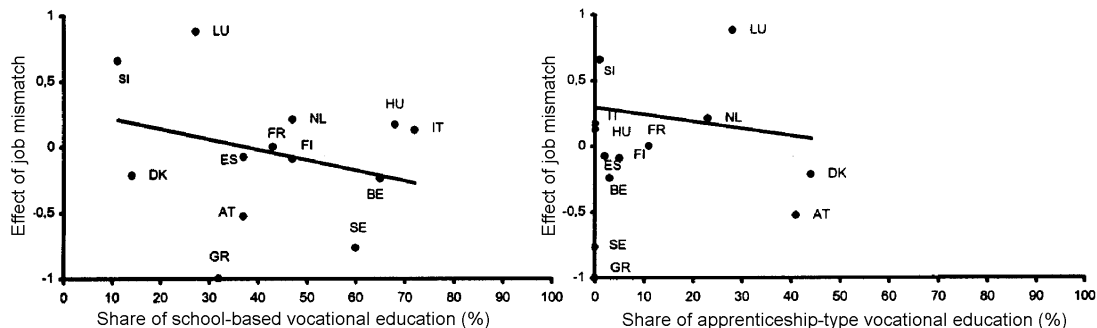
**Table 4.** Results of logistic regression analysis of participating in continuing vocational training: logit effects ( $N = 36,268$ )

Model	1	2 <sup>a</sup>	3 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>
Constant	-2.841**	-1.461**	-2.095**	-2.246**	-2.394**
Job mismatch (vs. job match)	-0.229**	-0.137*	-0.103	-0.137*	0.296
Country (vs. the Netherlands)					
Austria			0.097		
Belgium			-0.357*		
Denmark			0.424**		
Spain			-4.225**		
Finland			0.378*		
France			-1.242**		
Greece			-3.271**		
Hungary			-0.679**		
Italy			-3.364**		
Luxembourg			-1.177*		
Sweden			0.105		
Slovenia			-1.011**		
Share of school-based vocational education (%/10)				0.057**	0.083**
Share of apprenticeship-type vocational education (%/10)				0.243**	0.260**
Interactions with job mismatch (vs. job match)					
Share of school-based vocational education (%/10)					-0.079*
Share of apprenticeship-type vocational education (%/10)					-0.054
Model $\chi^2$	20**	925**	2,272**	1,028**	1,032**
Df	1	23	35	25	27
Pseudo $R^2$	0.002	0.076	0.183	0.084	0.084

<sup>a</sup>=controlling for level of education, field of education, vocational (non-tertiary) qualification, gender, age, job tenure, temporary employment, part-time employment, unemployment level in entry year, firm size, and sector.

\*= $p < 0.05$ ; \*\*= $p < 0.01$ .

Source: EU LFS 2000 ad hoc module on school-to-work transitions.



**Figure 4.** *The relationship between the share of school-based, or apprenticeship-type vocational education in a country and the effect of having a job mismatch on participating in continuing vocational training*

Source: EU LFS 2000 ad hoc module on school-to-work transitions

based and apprenticeship-type vocational training (see Figure 4). The higher these shares are, however, the smaller the impact of job mismatches on the likelihood of participating in continuing vocational training. This corroborates hypothesis 13b. In the case of school-based vocational education, where the interaction term is significant, the effect of job mismatches even becomes negative after a certain point.

## Conclusion

In this article, we have investigated the determinants of job mismatches with respect to the field of education among school-leavers in Europe. We also examined the effects of job mismatches on the labour-market position of school-leavers. Special attention was paid to cross-national variation in this respect. We used data from the EU LFS 2000 ad hoc module on school-to-work transitions in the empirical analysis.

The results of this analysis show that several factors affect the likelihood of having a job mismatch. First of all, individual characteristics matter. Better-educated and occupation-specifically qualified school-leavers are less often employed in a job that does not fit the field of education attended in initial education than lower educated and less occupation-specifically qualified school-leavers. Having obtained a (non-tertiary) vocational qualification, however, hardly affects the likelihood of being in a non-matching job. Furthermore, male school-leavers more often have a job mismatch than their

female counterparts. Older school-leavers are also more likely to be working in a non-matching job than younger ones.

Secondly, the likelihood of having a job mismatch is determined by different job characteristics. Job tenure has a negative effect on the likelihood of having a job mismatch. Moreover, school-leavers with a temporary and/or part-time contract are more frequently employed in a job that does not match their field of education than those with a permanent and/or full-time contract.

Thirdly, structural characteristics affect the probability of having a job mismatch. In times of high unemployment the likelihood of having a job mismatch is higher than in times of low unemployment. In addition, school-leavers who work in larger firms and/or in the public sector less often have a job mismatch than those who are employed in small firms and/or the private sector.

Fourthly, the incidence of job mismatches differs between European countries. Almost one-quarter of the variation between countries can be attributed to national differences in the vocational orientation of the education system. There is evidence that countries in which the share of upper secondary education students in school-based vocational education is high, have a higher incidence of job mismatches among school-leavers than countries in which this share is low.

With respect to the labour-market effects of job mismatches, the most important conclusion is that school-leavers with a non-matching job achieve a lower occupational status than those with a matching one. However, the effect of having a job

mismatch on achieved occupational status varies between European countries. The loss in occupational status among school-leavers with a job mismatch is smaller in countries in which the education system is more vocationally oriented, i.e. in which the shares of school-based and apprenticeship-type vocational education are higher.

Moreover, the analysis reveals that school-leavers with a job mismatch use adjustment strategies to improve fit. A first strategy refers to job search activities: school-leavers with a non-matching job more frequently look for another job than school-leavers with a matching job. Again, the impact of job mismatches differs within Europe: in countries in which the share of school-based vocational education is high, the effect of having a job mismatch on the likelihood of looking for another job is smaller than in countries in which this share is low. A second adjustment strategy concerns training participation. The results are less clear in this respect. On average, there is a negative effect of having a job mismatch on the probability of participating in continuing vocational training. Interacting the effect of having a job mismatch with characteristics of the education system, however, indicates that in countries in which the shares of school-based and apprenticeship-type vocational education are low, the impact of having a job mismatch on training participation is positive.

Finally, we have to make further comments on two issues. First of all, the question can be raised whether having a job mismatch with respect to the field of education is in itself a negative phenomenon. In contrast with job mismatches regarding the level of education (i.e. over-education), the interpretation of job mismatches with respect to the field of education is less clear. If a lack of fit between the field of education attended by school-leavers and the type of job they hold is the result of discrepancies between acquired and required occupation-specific skills, then these job mismatches can be considered as negative. This is in particular the case in (sector-)specific jobs. However, in more general jobs occupation-specific skills are less important and here a job mismatch with respect to the field of education may reflect the flexibility of that field of education to switch to alternative jobs. The empirical findings in this article suggest that the former interpretation dominates: job mismatches

clearly have negative consequences for the labour-market position of school-leavers.

Secondly, the analysis of cross-national differences with respect to job mismatches among school-leavers has been limited due to restricted data availability. The main hypothesis at the macro level was that the incidence of job mismatches and their labour-market effects depend on whether or not the education system in a country is vocationally oriented. At the one extreme is the United Kingdom and—to a lesser extent—Ireland, where general programmes dominate the education system. At the other extreme is Germany, characterized by its extensive dual system. However, both extremes of the same continuum were missing in the data analysis. It is likely that the absence of these countries has affected the cross-national results found in this article. Therefore, the overall conclusion at the macro level—i.e. that the incidence of job mismatches is higher in countries with a stronger orientation towards vocational education, but that the labour-market effects of job mismatches are smaller in those countries—is a preliminary one.

## Notes

1. Also from a more pragmatic point of view the emphasis here is on occupational status attainment. Information on income is (for most countries) not available in the data analysed in this article, and we have therefore used the occupational status as a proxy for wages to estimate the effect of job mismatches.
2. Data from Ireland, Lithuania, Latvia, Portugal, Romania, Slovakia, and the United Kingdom are excluded, due to small sample sizes and/or serious problems with measurement or comparability of one or more crucial variables. Data from Germany are not collected.
3. The differentiation of the various kinds of qualification levels and the identification of similar levels across countries constitutes a difficult task because of the different structures in the education systems. For the analysis, therefore, we used a broad, rather than a narrow definition of educational levels.
4. This is only the case in Denmark and Italy, where information on the field of education is related to the highest level of education completed.
5. Once again, this piece of information does not necessarily refer to the highest qualification obtained.
6. Unfortunately, information on the type of vocational qualification is missing for Denmark, France, Italy, the Netherlands, and Sweden. So, all school-leavers with a

(non-tertiary) vocational qualification in these countries are classified in the category of 'type unknown'.

7. The unemployment data from Slovenia are based on ILO (2001).
8. Full information on the estimation results of this multivariate analysis and the following ones are available from the author.

## Acknowledgements

This article draws on work carried out as part of the project 'Evaluation and analyses of the EU LFS 2000 ad hoc module on school-to-work transitions', co-funded by Eurostat. The article has benefited from the comments of the other partners in the project: Markus Gangl, Cristina Iannelli, Frank Kalter, Irena Kogan, Walter Müller, David Raffe, and Emer Smyth. An earlier version was presented at the tenth annual workshop of the European Research Network on Transitions in Youth, European University Institute, San Domenico di Fiesole, Italy, 5–7 September 2002, and the international conference on Overeducation in Europe: What Do We Know?, at the Max Planck Institute for Human Development, Berlin, Germany, 22–23 November 2002.

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## Appendix

**Table A1.** *Field of education and matching jobs*

Field of education	Matching jobs (ISCO-88 (COM) 3-digit codes)
Education	200, 230, 231–235, 300, 330, 331–334
Humanities/arts	200, 230, 231, 232, 243, 245, 246, 300, 347, 348, 500, 520, 521, 522
Social sciences/ business/law	100, 110, 111, 121–123, 130, 131, 200, 230–232, 241–245, 247, 300, 341–344, 346, 400, 401–422
Sciences	200, 211–213, 221, 230–232, 300, 310–313, 321
Engineering/ manufacturing/ construction	200, 213, 214, 300, 310–315, 700, 710–714, 721–724, 730–734, 740–744, 800, 810–817, 820–829, 831–834
Agriculture	200, 221, 222, 300, 321, 322, 600, 611–615, 800, 833, 900, 920, 921
Health/welfare	200, 221–223, 244, 300, 321–323, 330, 332, 346, 500, 510, 513, 900, 910, 913
Services	300, 345, 400, 410–419, 421, 422, 500, 510–514, 516, 520, 522, 800, 831–834, 900, 910, 913

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Manuscript received: August 2002.