1. The Debate in Economics about Skill Utilization

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1 OVEREDUCATION OR UPGRADING?

In many OECD countries, one may observe the tendency for highly skilled people to be employed in jobs that used to be occupied by people with a lower level of education. This phenomenon is often directly interpreted as under-utilization of skills or overeducation, and concerns in many cases substantial fractions of people with a certain skill level, varying from 20 to 50%. One of the first studies that focused on this phenomenon, was Freeman’s (1976) *The Overeducated American*. Freeman suggested that students invest too much in education. On the basis of dated information about the labour market, students expected good labour market prospects after graduation. In reality, however, the increasing supply of higher educated people could not be absorbed by the market and many school-leavers were forced to accept a job that required fewer skills than they actually obtained. For these reasons, it is often suggested in policy debates that the employment of higher educated workers in jobs that were traditionally held by lower skilled people, implies a waste of skills and harms lower educated people. When people accept jobs below their educational level, it is claimed, they start competing with skilled labour at lower levels, and as a consequence these lower educated will also be forced to accept jobs below their level of skills, or even become unemployed, a process that is generally referred to as *bumping down* or *crowding out*. The policy conclusion from this interpretation is that at the social level, investments in education are too high. If students stay at school longer, their additional skills will not be utilized in the labour market, while the labour market position of less educated workers will worsen.

This overeducation argument challenges the policy of many developed countries to promote further investments in education in order to improve the competitiveness of their economies. In contrast to this negative picture of the
role of education in recent decades, there is a clear tendency in both the political
and the academic debate to stress more and more the importance of knowledge
in our society. Starting perhaps with Leontief (1953), who suggested that it was
not the physical capital endowment of the USA, but rather its endowments in
terms of skills, which explains the paradoxical trade patterns of the United
States. The European Commission (1996) claimed that education and training
should get priority with regard to European competitiveness. The Commission
therefore suggested that one should ‘treat material investment and investment
in training on an equal basis’. In line with this, the OECD (1996) stated that
‘OECD governments are strongly committed to improving the skills of their
citizens as one of the principal means for dealing with current economic
uncertainty’. In a similar way to technological progress, productivity growth
may be obtained by an input of more skills in the production process i.e. an
upgrading of the skill level of the labour force (Romer, 1990). Human capital
will become the decisive factor in international competitiveness (Porter, 1990).

The question whether the overeducation or upgrading argument holds, is
related to the literature on the development of the skilled-to-unskilled wage gap
(e.g. Davis and Reeve, 1997; Johnson, 1997; Topel, 1997). Upgrading of the
required skills is often mentioned as a major cause of the increase in the
earnings differential between high-skilled and low-skilled workers (e.g. Bound
and Johnson, 1992; Katz and Murphy, 1992). In a perfect market, this link
between the need for educated labour and wages of course holds but, in the case
of market failure, an overeducated workforce does not necessarily lead to a
narrowing of the earnings differential between high-skilled and low-skilled
workers, as low wages for high-skilled workers who are overeducated for their
jobs may go together with high wages for those who are occupied at their own
level of education. Furthermore, formal qualifications may not represent a
constant mix and level of skills over time. The screening theory (Lang, 1994 and
Borghans, 1998) suggests that increased enrolment may lower the average
abilities of school-leavers, while Grogger and Eide (1995) explain part of the
rise in the college premium by increased skills among graduates. Nicaise’s
analyses in Chapter 8, support these theoretical arguments for labour market
failures.

Both the explanation of overeducation and of upgrading are consistent with
the stylized fact that higher educated people tend to obtain jobs that used to be
held by lower skilled people. From the overeducation perspective, this illustrates
excess supply of high-skilled workers and suggests the underutilization of these
skills, while from the upgrading perspective, this illustrates that occupations
today require more skills. Moreover, although very different in their policy
implications, both views share a pessimistic perspective for low-skilled workers.
From the bumping-down point of view, low-skilled workers will be pushed into
the least favoured jobs, or will even be crowded out from the working population, irrespective of their real abilities or potential productivity, whereas the upgrading view predicts that the role of low-skilled workers will become more and more marginalized, because their skill level no longer meets the minimum requirements in the labour market. For a policy that aims at improving the position of people at the lower end of the labour market and tries to combat unemployment of low-skilled workers, understanding of the relevant economic mechanisms underlying the observed shifts in allocation is therefore essential.

Knowledge of the allocation of workers over occupations will therefore not immediately provide an answer to the questions on the role of skills in the labour market. Grasping the significance of education and training for both economic development and the position of the weakest groups – the low-skilled workers – in the labour market, requires a better understanding of the skills people have and the way they utilize these skills in their work. Unfortunately, much less is known about how workers’ productivity is related to the way in which people use their skills, than about the allocation of the workers in the labour market. Due to the difficulty of measuring skills, the available evidence remains limited to detailed case studies on the one hand, and rough and limited indicators about skills which are representative for the labour market as a whole. Since the limited direct evidence we have about skills utilization is largely based on case studies, it is difficult to relate these findings to information about market forces. In Chapter 4, of this book, however, Green and his colleagues provide a promising attempt to collect data about skills by direct measurement for the entire British labour force.

To get a better understanding of the consequences of a policy that stimulates education among the low-skilled and low paid, insight is required into the reasons why employment in various occupational groups moves towards the higher skilled.

In everyday language, it is common to state that a certain occupation requires a certain level of education. In such a simple picture of the relationship between education and work, it is implicitly assumed that jobs of a certain level cannot be performed by a worker with lower qualifications: the productivity of the latter is zero. On the other hand, people with higher qualifications than required for the jobs they have, are considered to waste their excess qualifications completely: their productivity in a job below their educational level equals the productivity of workers with an adequate educational background for this kind of job.

Many empirical studies, however, have questioned this rigid interpretation and suggest a more gradual relationship between productivity and educational background. Hartog and Jonker (1998) provide an overview of a large number of empirical studies which show a gradual, but non-linear relationship between
the education of workers and their productivity. All empirical results that demonstrate this gradual non-linear relationship between education and productivity, are based on the assumption that wages reflect productivity. The neo-classical law that productivity equals wages, however, assumes an optimal allocation of workers across jobs. Since these analyses try to catch the consequences for productivity when allocation is changed, and therefore compare people with the same qualifications in jobs at different levels, this assumption is violated. Although very illustrative for the idea that productivity depends on allocation, the estimates are in fact based on an inconsistency. Neo-classical theory would state that either workers with the same educational background are indifferent between jobs at different levels, e.g. because the wages are equal in each job, or that there must be differences in skills between these people with a formally equal qualification. More insight is therefore needed into the way in which skills differences influence allocation and productivity.

2 OCCUPATIONAL PRODUCTIVITY PROFILES AND THE EDUCATION–WAGE PROFILE

In the so-called assignment or matching theory introduced by Roy (1950, 1951) and Tinbergen (1956, 1975), both productivity and wages are assumed to depend on the level of skills. Therefore, the relationship between productivity and skill level – the occupational productivity profile – will vary between different jobs. By contrast, in a perfect labour market the relationship between wage and skill level – the education-wage profile – is equal for the whole labour market, and may vary with labour market developments.

Figure 1.1 illustrates these relationships for a specific occupation. Such occupational productivity profiles were introduced by Knight (1979). In this example, wages increase gradually with the level of education, while productivity rises sharply around 15–18 years of schooling. For lower qualification levels, productivity remains low and does not catch up with the wage increase, while for higher qualifications, the additional productivity of one extra year of schooling will not compensate for the increase in wage costs. The ratio between productivity and wage costs shows that for employers, workers with 19 years of schooling provide the optimal combination of productivity and wages. This implies that even the 19th year of schooling, which increases productivity only to a limited extent, still contributes more to productivity than it costs.

Figure 1.1 also shows that, although the productivity–wage–ratio reaches its maximum at 19 years of schooling, the ratio has only modestly lower values in
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the 18–20 years of schooling interval. This may imply that employers are approximately indifferent between people with educational backgrounds within this interval. This is illustrated by the *Occupational Outlook Handbook* of the US Bureau of Labor Statistics (1984), in which educational requirements for a particular occupation are frequently expressed in terms of ‘at least this level, but some/many employers prefer’.

Figure 1.1 An occupational productivity profile and a wage curve, together determining the optimal skill level for a specific occupation

The allocation theory provides an explanation for what is meant by the statement that for a certain occupation a specific educational level is required. This refers to the match which is optimal given production possibilities and given the supply of labour. There are however, many reasons why in practice the match between the educational backgrounds of the workers and the jobs in which they are employed might differ from this optimum. However, within this theoretical framework, the required level is not fixed, but might change. Such changes can result also from shifts in the wage curve. These shifts can be the results of changes in the demand for certain occupations (in units of production) or the supply of labour at certain educational levels. On the other hand changes in the optimal level of education in a occupation can result from changes in the occupational production profile due to technological or organizational develop-
ments.

**Figure 1.2** A shift in the optimal skill level of an occupation due to a shift in the education–wage profile, caused by changes in demand or supply

The changes in the optimal skill level in a certain occupation due to, for example, a change in the supply of educated labour, which results in lower wages for higher educated workers is illustrated in Figure 1.2. Compared to Figure 1.1 the optimal level of education increases from 19 towards 20 years of education. Figure 1.3 shows the effect of a change in the occupational productivity profile on the optimal skill level. Compared to Figure 1.1 the optimal level of education in this occupation again increases from 19 towards 20 years of education.

Both in Figures 1.2 and 1.3 the people who are employed in this occupation have an educational background which is higher than it used to be. Such a shift might easily be associated with overeducation or underutilization. However, only in Figure 1.2 – by flattening the education–wage profile – does an excess supply of higher skilled people increase the optimal level of education in the occupation concerned. The figure therefore illustrates the *overeducation* view. Yet, although high-skilled workers are underutilized in this occupation their productivity is higher than the productivity of the workers in this occupation.
with less years of education. Furthermore – given labour market conditions – it is for these high-skilled workers not possible to reach a higher level of productivity. Figure 1.3 A shift in the optimal skill level of an occupation due to a change in the occupational productivity profile, caused by the introduction of new technology

Figure 1.3, however, illustrates the upgrading view. Here the change in the production process due to such factors as technological or organizational developments, increases the demand for higher educated workers. This means that higher educated people will be employed in this occupation, which used to be the domain of people with lower levels of qualifications. The productivity of these higher educated individuals will, however, not be lower than the productivity they have – and used to have – in their traditional occupational domain. New technologies have in fact opened up possibilities of utilizing the skills these people have productively in these new jobs too. Therefore there is no underutilization of their level of qualification.

Thus, the allocation theory is able to explain the tendency for higher educated people to occupy jobs that used to be held by lower educated
individuals both from a supply and a demand side perspective. Within this neo-
classical framework, skills are always utilized optimally, given the actual labour 
market conditions. Three grades of underutilization of skills can be 
distinguished:

- First, someone may be employed in a job in which people with the same 
educational background used to have lower productivity than in their 
original domain, but in which productivity is now at least equal to the 
productivity in the original domain. This is the case in an upgrading process, 
where actually one can only speak of alleged underutilization of skills.
- Second, someone may be employed in a job in which he/she has lower 
productivity than people with the same educational background used to 
have, but which equals the productivity that such people have today. This is 
the case in a situation of excess supply on a perfect labour market and may 
be called intertemporal underutilization of skills.

However, overeducation is generally associated with underutilization of skills 
in a labour market which is far from perfect and where part of the workforce 
with a certain skill level is occupied in jobs where they are less productive than 
others; therefore:

- Third, workers may be employed in a job in which they have lower 
productivity than some other people with the same educational background 
currently have. This may be called genuine underutilization of skills. This 
genuine underutilization is not explained by the allocation theory. In Chapter 
4, Green et al. introduce the distinction between ‘credentialism’ and ‘qualifi-
cations used’ that comes close to our distinction between genuine 
underutilization and other forms of underutilization. Credentialism means 
that some qualifications are required in the recruitment process but are 
never actually used.

3 JOB COMPETITION VERSUS WAGE COMPETITION

The analysis in previous section, based on education–wage profiles, typically 
represent so-called wage competition models. The basic assumption of these 
models is that the wage always represents productivity and therefore markets 
will always clear. In the literature about underutilization of skills and bumping 
down, wage competition is often opposed to job competition models. Job 
competition models are based on the assumption that wages for a certain
occupation do not react to shifts in supply and demand. For that reason an increased supply of high-skilled workers does not lead to an adjustment of the wages. High-skilled workers will have to compete for a limited number of well-paid jobs and some of them will lose. They will be forced to accept a job with lower skill requirements and lower pay.

In Borghans and De Grip (2000), we developed a typology of economic theories on the possible causes and consequences of the observed changes in the allocation of skilled labour and the related policy implications with respect to the (macro) efficiency of training policies for low-skilled people. It is argued that for the policy question of whether or not the shifts in the employment in various occupational groups towards the higher skilled make additional investments in schooling worthwhile, the opposite positions of the wage competition model and the job competition model are not crucial. The crucial point is whether increased employment of higher educated individuals in jobs at lower levels, suggests the occurrence of a bumping-down process initiated by excess supply of the higher educated or that it points to a process of upgrading. Bumping down – which can be the outcome both in the job competition model and the neo-classical matching model – suggests that additional investments in education are not very effective. Underutilization versus upgrading, on the other hand, seeks increased educational investments. Upgrading therefore seems to be the most fundamental opposition with respect to the macroefficiency of training policies for low-skilled and low paid workers. For this reason, underutilization or upgrading? is the leading question for Part One of this book.

Two differences between the job competition and the wage competition model remain important, however. First, from the point of view of the wage competition model, bumping down is only an extreme case. The model does not exclude the possibility that additional demand absorbs part of the extra supply at a certain level of education, which results from training policies. The effects of training, therefore, need not to be totally cancelled out by a bumping down process, but may also lead to new employment opportunities at higher wages, depending on the elasticity of demand at the higher job levels. In the job competition model, however, elasticity of demand equals zero, since wages will not react to changes in supply and demand.

Muysken and Ter Weel (in Chapter 5) and Zwick (in Chapter 6), however, provide different arguments that may explain underutilization of skills based on search externalities and monopsonistic power. Battu and Sloane (in Chapter 7) add to this the possibility of heterogeneity within a group of a certain skill level as an explanation for differences in pay and employment.

Second, although both in a world of job competition and in a world of wage competition, upgrading may occur in the sense that jobs become more complex, the labour market will provide no signals for this in the job competition case. In
the case of wage competition, it may be very difficult to distinguish upgrading from bumping down, since both processes will lead to a shift in the employment structure of higher educated people to jobs that used to be occupied by the lower educated. Upgrading does, however, manifest itself in a changing employment structure. In the case of job competition neither the allocation of workers, nor their wages, will change as a result of upgrading. The increased productivity of the higher educated, which might make greater educational investments fruitful, will therefore remain unnoticed.

Lastly, it is interesting to note that not every form of training will be a useful instrument to cope with upgrading. It has been shown that upgrading in a specific group of occupations at a certain level of education may induce bumping down at lower levels of education. Training is therefore only fruitful if it increases the supply at a level of education for which the upgrading process has created a new demand. Training that increases peoples’ educational level below the level where these upgrading tendencies occur, only further stimulates the process of bumping down. Gautier (Chapter 10) and Groot and Hoek (Chapter 11), however, strongly disagree on the levels of education where these spillover effects occur.

4 THE MEASUREMENT OF UNDERUTILIZATION

The problem of distinguishing between upgrading and underutilization is enlarged by the fact that – despite the large number of empirical studies on this field – the measurement of underutilization of skills is far from straightforward. The problem is not helped by the fact that various terms are used to describe essentially similar situations (Shockey 1989). Thus, skill underutilization, overeducation, overqualification, underemployment, overtraining, and occupational mismatch, are often used interchangeably.

Underutilization is most simply defined as a level of educational attainment greater than the educational requirement of an occupation. However, direct measurement of the way in which people organize their work and thereby utilize their skills is rare. An interesting example of such research is provided by Stasz (1998). On the basis of very extensive observations of people at work, she draws conclusions about the role of such competences as problem solving, communications, and team work at the workplace. Lam (1996) and Mason et al. (1996) also provide interesting detailed studies about the utilization of skills. Studies such as these require large resources, however, and therefore can never provide a complete picture of the developments in skill utilization on the labour market. To obtain such a more general view on the developments in skill utilization, indirect methods are needed.
There are three main alternatives in the measurement of underutilization. First there is the so-called *objective measure*, which depends on systematic evaluation by professional job analysts who attempt to specify the required level and type of education in particular occupations. In this book, this method is represented by Wolff (Chapter 2). The best-known data set used in a number of overeducation studies is the *Dictionary of Occupational Titles* (DOT), compiled by the US Employment Service. In this approach, the same job is first analysed in two different establishments in one State and then in two different establishments in another State. Six components of worker traits are assessed – training time, aptitudes, interests, temperaments, physical demands, and working conditions (see Rumberger, 1981). The Department of Labor’s *Handbook for Analysing Jobs*, 1972, shows that the training time requirements are derived from two questions. The first asks what level of general educational development is necessary for a worker to obtain the required background knowledge to perform the work in question. The second asks how long – in terms of specific vocational preparation – it takes for a worker with a specified level of educational development to become a fully qualified worker on the job, compared to a trainee. European equivalents to DOT are few and far between. One exception is the ARBI code, which contains a classification into seven levels of job complexity, developed by the Dutch Department of Social Affairs (see Hartog and Oosterbeek, 1988). The classification takes into account both the job content and the employee’s ability and knowledge in attaining the required level of proficiency. The scale ranges from very simple work with a training time of a few days (level one) to scientific work at level seven.

The second approach is based on worker self-assessment and can therefore be referred to as a *subjective assessment*. In the present book, this method is represented by Green et al. (Chapter 4). Examples include the Michigan Panel Study of Income Dynamics question, which asks ‘how much formal education is required to get a job like yours?’, or the British Social Change and Economic Life Initiative data set question, which asks ‘if they were applying today, what qualifications, if any, would someone need to get the type of job you have now?’ Related to these two different questions, Green et al. distinguish between credentialism and underutilization of skills. Credentialism means that an employer requires a certain skills level although these skills are not utilized. Workers with appropriate qualifications are just not recruited. A slightly different variant is the Spanish Living and Working Conditions Survey of 1985 (ECVT), which has been analysed by Alba-Ramirez (1993). This includes two separate questions. The first asks ‘considering the job you do, how long would it take someone with the required education who begins the job, to do it correctly?’ Such periods of time may be interpreted as on-the-job, training requirements, but may be influenced not only by the complexity of the job, but
also by the ability of the individual. The second question in the ECVT survey asks ‘what kind of education does a person need in order to perform the job?’ This recognizes the possibility that there may be a distinction between the actual requirements of the job and the customary hiring requirements. This is consistent with the screening hypothesis, which suggests that the labour market is characterized by imperfect information and education is used as a signal to identify to employers the more able, ambitious, or productive workers. Lastly, some data sets may allow for the fact that there is no unique educational requirement. Thus, the 1980 UK National Survey of Graduates and Diplomates asks ‘what was the minimum formal qualification required for (entering) this job?’. As Hartog (1997) notes, the above definitions are clearly different from one another, but they may not necessarily be perceived as such by the respondents.

The third approach focuses on the distribution of educational qualifications in a given occupation. Most commonly, underutilization is defined as a level of education more than one standard deviation above the mean, and under-education as a level of education more than one standard deviation below the mean (see, for instance, Verdugo and Verdugo 1989). In the present book, this approach is represented by Asplund and Lilja (Chapter 3) and by Battu and Sloane (Chapter 7). This so-called empirical method clearly differs from the above-mentioned measures in defining underutilization as being substantially underutilized. It also implies symmetry and will clearly give biased estimates where the tendency to underutilization or overutilization is skewed. The latter is generally the case, as in almost all studies of the US and British labour markets the percentage of workers whose skill level is underutilized exceeds the percentage of workers who are overutilized. However, the reverse seems to hold in the Netherlands and Spain. Therefore it seems more appropriate to consider the underutilization of skills in relation to the mode rather than the mean, as Kiker et al. (1997) do for Portugal and Alpin et al. (1997) do for Britain. De Grip et al. (1998) formulate criteria that make it possible to identify a range of skill levels as appropriate on an empirical basis.

It is clear that the above approaches to the measurement of underutilization of skills can lead to divergent estimates. All three approaches have been criticized on various grounds. As Hartog (1997) notes, conceptually the job analysis approach has the advantage of being objective, having clear definitions and a detailed measurement methodology. Yet, there are a number of sources of potential bias. First, estimates of mean years of required schooling in an occupation are constructed by aggregating various jobs within that occupation, ignoring the fact that there is likely to be a distribution of required education across those jobs. Some workers may, therefore, be misclassified as over-educated as a result of within-occupation variation in job-specific schooling
requirements (Halaby, 1994). Second, required schooling levels may vary for each occupation according to the abilities of job incumbents. As Rumberger (1987) and others have pointed out, workers with higher levels of ability may require fewer educational qualifications to perform tasks effectively and vice versa. Education and ability are substitutes. Third, converting job scores into years of schooling, as in the DOT approach in the USA, is far from uncontentious, although in European studies that use educational dummies this sort of problem may be avoided. Fourth, levels of education ignore the type of education received and some workers who are mismatched may be misclassified. As Halaby (1994) puts it, ‘if plumbing requires a high school diploma then plumbers who work in any occupation requiring a high school diploma would be classified as matched even if plumbing skills are not used in the work’.

Most important however is that, fifth, such studies assume that the educational requirements of occupations do not increase over time, while in practice both tasks and the required level of knowledge do alter over time (Smith, 1986). Since the objective method is very expensive and time-consuming, occupational classifications become available long after they have been measured, while furthermore, these classifications are typically used for a very long time period, assuming no changes in the required level. However, as has been explained in Section 2, the optimal level of skills for a certain occupation depends on market forces. Moreover, technological and organizational developments may change the requirements. Measurement of developments of underutilization based on the objective method, therefore includes both shifts in the optimal level, both due to changes in the relative scarcity and technological and organizational developments. It is therefore not surprising that the objective method tends to provide high levels of underutilization of skills and also strong increases in these levels.

Worker self-assessment has been criticized because it is subjective and it is claimed that workers may not always have a clear insight into the actual level of education required. For example, workers may be inclined to overstate the requirements of their job in order to enhance the perceived status of their position. Stasz (1998), however, found that employees report the actual skill requirements much more accurately than employers. In contrast with the job analysis method, workers will be able to identify their own job rather than the occupation in general. Furthermore, workers may report changes in job requirements as soon as they show up. The method may therefore have clear advantages for measuring pure developments in underutilization, without incorporating influences from changes in the optimal levels of skills within an occupation. Employees may, however, simply state current hiring standards. Therefore tendencies of credentialism may be underestimated by the subjective
The empirical method has the advantage that it takes the theoretical foundation of the allocation theory as the point of departure. When the labour market functions well to some extent, it may be expected that the majority of workers within a certain occupation has an appropriate educational background. Moreover, this approach will be very sensitive to labour market conditions and technological development, picking up changes in skill requirements very quickly. Measurement based on the labour force as a whole may be hampered by the stickiness of existing working contracts to be adjusted. Based on information about school-leavers or other new matches on the labour market, the information may be very responsive, however. Another advantage of this method is that it incorporates the possibility that a range of educational levels is appropriate for a given occupation. The empirical method will therefore do a good job in identifying the appropriate level and changes in this level. The demarcation line between adequate levels and levels for which underutilization occurs, however, will be arbitrary to a large extent, since the method is based on criteria of frequency. If underutilization occurs more than only incidentally, the method may therefore fail, while it will not provide very precise measures of underutilization.

It can be concluded that, although it seems to be clear that occupations that used to be occupied by the lower-skilled tend to be occupied by people with higher levels of education, there is no indisputable way to determine to what degree this really indicates underutilization of the acquired skill level.

5 MAIN QUESTIONS OF THE BOOK

To improve the insight in the role of education in society, it is important to investigate carefully the arguments sketched above and to put the question: to what extent are these arguments of overeducation and upgrading valid? The main questions in this respect are:

1. Are people who work in jobs that used to be occupied by less-skilled people really underutilized, or have there been changes in the character of the job that justify this shift?
2. How can economic theory explain the underutilization of workers?
3a. What happens to the people who are employed in jobs below their skill level? Is their labour market position worse compared to others who have found an appropriate job, and is their abundance of skills really wasted?
3b. What happens to lower educated people who are confronted with higher educated workers in their labour market segments? Does their labour
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market position worsen, and does this have consequences for their wages and the unemployment rate among this group?

The aim of this book is to bring together contributions to the investigation of the above questions from different perspectives in order to obtain a complete picture of the debate in economics about underutilization of skills and bumping down. The book starts with three contributions to the first question about underutilization or upgrading? Each chapter represents one of the three methodological approaches to the measuring of underutilization: the objective method, the subjective method and the empirical method. Edward Wolff analyses the factors responsible for the change in skills in the USA in the post-war period. These include intersectoral shifts in employment, technological change, institutional and organizational dimensions of production, and the degree of trade openness.

Using skill indices derived from the Dictionary of Occupational Titles, linked to employment matrices for census years 1950 to 1990, Wolff finds in Chapter 2, that both cognitive and interactive skills showed positive growth over this period in the USA, while manual skills experienced an absolute decline. Growth in all three workplace skill indices peaked in the 1960s. The growth of cognitive skills fell between the 1960s and 1970s, and again between the 1970s and 1980s. Investigation into the factors that affect the demand for skills indicates that growth in total factor productivity is generally deskilling. Other dimensions of technological activity - particularly, capital-labour growth, R&D intensity, and computerization – have a positive relation to the change in substantive complexity and interactive skills.

In Chapter 3, Rita Asplund and Reija Lilja investigate the effects on labour market allocation of the increased supply of higher educated labour. The aim of their paper is to explore whether the Finnish labour market can be argued to have been characterized by a bumping-down tendency over the period 1975 to 1995. Asplund and Lilja investigate the extent of shifts over time in the educational structure within different occupations. In addition, they ask the following questions: is there a clear tendency of more skilled workers bumping down less-skilled workers? If so, is this bumping-down phenomenon concentrated in certain occupations and time periods? Are also the earnings, age and gender structures of these occupations affected, and do these changes possibly differ from the general trends observable in the labour market in these years? The panel character of the data set allows Asplund and Lilja to investigate what has happened to the low-skilled workers that have been ‘bumped down’ by their more skilled colleagues. Especially in times of high unemployment, it can be expected that they are likely to be crowded out into unemployment or (early) retirement. There is, however, also the possibility that they have started studying in order to upgrade their skills or change to another
occupation. A crucial question then is whether they later return into employment and, if so, in what type of occupation and pay level.

In Chapter 4, Francis Green, David Ashton, Brendan Burchell, Bryn Davies and Alan Felstead describe the shifts in skills demand in Britain. They present the preliminary results of their ‘Skills Survey’ in which developments in required skills are measured directly. Deploying several measures of skills, Green et al. find at both ends of the occupational spectrum, a rising demand for skills in Britain. Moreover, in the eyes of the job holders, there is no substantial rise in the extent to which employers are demanding qualifications just to ration jobs. Green et al. also indicate the types of skill change. They find an increased usage of problem-solving skills, of communication and social skills, and of computing skills, and a reduction in the manual skills used.

To understand the mechanisms that cause underutilization and bumping down, Part Two investigates some theoretical explanations of underutilization. In Chapter 5, Joan Muysken and Bas ter Weel investigate on the basis of a matching model, why people choose to invest in education that will not be utilized in the labour market. In this model, the search-theoretical analysis of Pissarides is applied to the demand for skilled labour and is extended to allow for job competition. It is combined with the human capital theory to explain the level of education. They argue that it is not an increased supply of higher educated workers that caused an increase in underutilization of skills, but rather a shift in some structural characteristics of the labour market. Increased bargaining power for employees, higher search costs, and structural imbalances can explain the changes on the Dutch labour market.

In Chapter 6, Thomas Zwick inverts this question and searches for the answer to the question of why some students decide not to acquire skills and consequently restrict themselves to the low-wage unskilled labour market. Zwick provides two answers to this question. First, high education costs may prevent workers from investing in additional schooling. Second, the risk of being overeducated after completing schooling reduces the attractiveness of human capital investments. This risk arises as a result of the sunk nature of human capital investments, i.e. it is not clear at the moment of schooling if an adequate job will be found afterwards. Using a simple model, Zwick shows the effects of the increased wage gap between skilled and unskilled workers and of the increased unemployment incidence of unskilled workers on skilled labour supply, and analyses the impact on social welfare. This model assumes monopolistic competition on the skilled labour market with a large number of different skills and unskilled workers needed in the production process. The more than compensating monopolistic skilled wage mark-up induces therefore Pareto-inefficiency, unemployment and overeducation. Two policy measures to combat overqualification in the presence of more than compensating wage
mark-ups are proposed. Lastly, a policy measure is proposed that leads to the efficient labour market outcome with full employment and zero overqualification, but has an impact on rent distribution.

In Chapter 7, Harminder Battu and Peter Sloane investigate underutilization in Britain and focus on the role of heterogeneity as an explanation. The aim of this chapter is to establish whether the degree of overeducation in Britain has altered over time and whether the increase in the proportion of graduates and workers with other qualifications over the decade has led to a significant downward movement in the types of jobs undertaken by these workers. An important conclusion is, however, that according to Battu and Sloane, personal characteristics such as gender, age and job tenure seem to be more important determinants than labour market characteristics. This puts forward heterogeneity of workers with the same qualifications as an explanation for alleged underutilization. A change in the quality of school leavers may, in time, also explain changes in their labour market position.

In Chapter 8, Ides Nicaise tests two different hypotheses: do low-skilled workers leave the labour market because their wages do not exceed their reservation wage or are these people excluded from the labour market because high-skilled workers occupy their jobs? These empirical investigations support the view that labour market imperfections are a main cause of bumping down. People with lower skills, tend to be crowded out. Wage adjustments therefore seem not to clear the market completely. Nicaise finds no support for the opposite explanation that men with a low productivity leave the labour market because their wages do not provide enough incentives to work. For women, evidence for both explanations is found.

Part Three focuses on the consequences of underutilization and bumping down. In Chapter 9, Lex Borghans, Allard Bruinshoofd and Andries de Grip investigate the consequences for the wages of groups that are confronted with underutilization. On the basis of simulations in a model of the Dutch labour market, it is possible to assign the actual occurrence of low wages to three skill-related causes. First, people may have a low wage because their educational background does not meet the standard educational background introduced above. Second, even if the educational background is sufficient, underutilization of these skills may lead to a low paid job. Third, even if people find a job at their own (sufficient) educational level, excess supply may worsen the labour market conditions and therefore cause low wages. The results of the analyses of Borghans et al. indicate that having an inadequate skill level and labour market imbalances are the main causes for low wages among Dutch school-leavers. Achieving an educational career with at least a diploma at the level of Intermediate Vocational Education would have a considerable impact on the incidence of low wages, although labour market imbalances are also an
important cause of low wages. The latter means that underutilization seems to affect not only the wages of people who are actually working below their educational level, but also – due to increased competition – of those who still find a job at their own educational level.

In Chapter 10, Pieter Gautier investigates in a job matching framework, the consequences of increased supply for the competition between different skill groups. He shows the consequences for the employment rates of both low-skilled and high-skilled people when unemployed high-skilled workers search for both simple and complex jobs and continue searching for complex jobs when they happen to come across a simple vacancy first. He also investigates whether more high-skilled workers occupy simple jobs during bad times, as the crowding out theories predict. The results of Gautier’s analysis suggest that there is only weak evidence for crowding out of intermediate skilled workers by high-skilled workers in the beginning of the 1990s, but no evidence for the crowding out of low-skilled workers. Some evidence is given that supports the hypothesis that the high unemployment rates among low-skilled workers are caused by the fact that firing costs for simple jobs (where relatively many low-skilled workers are employed) are lower than for complex jobs.

In Chapter 11, Loek Groot and Albert Hoek investigate the same problem from a different theoretic perspective. First, they illustrate the working of a fictitious labour market under the assumption of the human capital theory and the job competition theory, respectively. This exercise enables them to demonstrate the differences in assumptions and predictions between the two theories. Groot and Hoek show that a sudden exogenous increase in the average level of education gives rise to different outcomes. According to the human capital theory, the average wages of the lower educated will increase, while those of the higher educated will decrease, but income inequality among educational categories increases. Second, Groot and Hoek test three hypotheses in line with the job competition theory: (i) an increase in the average level of education of the labour force causes a rise in income inequality between the higher and lower educated, (ii) schooling programmes for the lower educated cannot reduce unemployment among lower educated, and (iii) job competition will increase if unemployment among the higher educated increases. The last hypothesis is tested using the same data as Van Ours and Ridder (1995). Contrary to the findings of the latter authors, Groot and Hoek find that job competition mainly occurs at the intermediate level for medical, chemical, and social and cultural occupations.

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