

Employment outlooks: why forecast the labour market and for whom?

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Abstract:

This essay argues that experience from more than three decades of labour market forecasting shows that forecasting helps greasing the wheels of labour markets. Applied correctly – not in the sense of old fashioned manpower planning models - sufficiently disaggregated employment outlooks support individuals in making better informed decisions on human capital investments, guide policy makers, and alert firms of upcoming skill shortages. That forecasts are necessary at all follows mainly from nowadays widely acknowledged market failure arguments.

Zusammenfassung:

In einigen Ländern der OECD werden seit mehr als drei Jahrzehnten Arbeitsmarktprognosen erstellt. Die Erfahrungen zeigen, dass Prognosen, wenn sie nicht im Stil sogenannter ‚Manpower Planning‘ Modelle interpretiert werden, durchaus die Funktionsfähigkeit von Arbeitsmärkten verbessern können. Hinreichend detaillierte Voraussagen zum Bedarf nach Berufsgruppen und Qualifikationen helfen bei individuellen Bildungsentscheidungen, unterstützen Politik, und informieren Firmen über möglichen Fachkräftemangel. Dass Prognosen überhaupt notwendig sind, folgt aus den heutzutage doch weitgehend anerkannten Arbeiten zum Marktversagen.

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1. The world is changing: Adaptability of training and education systems

Nowadays there is widespread consensus among scholars and policymakers that investments in human capital confer benefits to individuals, firms and societies. Better educated people have higher employment probabilities, are subject to a lower risk of unemployment and receive on average higher income (OECD, 1998). Positive effects from education also accrue in the forms of economic growth, social cohesion and lower crime. However, the benefits of a better trained workforce should not lead governments to support human capital investments irrespective of quality concerns. Even though education, training and lifelong learning policies seem to be a promising form of investment, resources need to be allocated in an efficient way.

No doubt, this is a difficult task. Some scholars advocate the hypothesis that technological progress, societal changes, and internationalization of product, capital and labour markets continue to evolve largely parallel to each other, and some even argue that these processes have been speeding up. This view challenges training and employment systems and the links between the two systems. Adaptability of the latter system, involving individual employees and firms as well as their representatives, such as trade unions and employers' organizations, is decisive for achieving and maintaining prosperous economies. A successful policy has to take into account that education, training and lifelong learning policies must respond to shifts in the demand for skills and qualifications flexibly, and in due time.

The challenges are not restricted to policymakers. In addition to the need to reshape institutions, individuals and firms must face new challenges, too. Structural shifts in the demand for labour will require permanent updates of the know-how and employability of employees and of the knowledge management of firms. The insight that lifelong learning ensures employability is a key element of any strategic response. An adequately trained and educated workforce will contribute to individual wealth, will make firms more competitive and is to the advantage of societies at large because of large spillover effects.

Even though there seems to be a wide consensus on the importance of a highly qualified labour force, future skill and qualification needs are uncertain. Policymakers and social partners generally agree that vocational training, higher education and

¹ We would like to thank Hans Heijke, Günther Schmid and Jerry Sexton for their comments on an earlier version. Christian Brzinsky, Josef Forster and Janine Leschke provided efficient research assistance. Thanks are due to all contributors to the book 'Forecasting Labour Markets in OECD Countries, Measuring and Tackling Mismatches' as well as to the participants of a preparatory workshop in November 1999 at the Wissenschaftszentrum Berlin für Sozialforschung (WZB).

further training are important. But none of them can justify promoting one type of training over the other. And if they do so, one sometimes wonders how they know. What about scientists? Do they know? Well, there are some rather pessimistic colleagues who claim 'that there are two types of forecasters . . . those who don't know and those who don't know that they don't know' (James Galbraith). Of course, this makes us smile. However, we do not agree.

One of the key lessons to be learned from (Neugart and Schömann 2002) is that forecasts very likely will not eliminate cycles in the demand and supply of skills. However, instead of the frequent fire-fighting role performed by policymakers, forecasts enable a more strategic approach to identifying and subsequently solving problems. In this way forecasts may help to reduce adjustment costs arising from imbalances on the labour and product markets.

The contributions of Sexton (2002) and Barnow (2002) show that these forecasts have indeed delivered valid and useful information on labour market trends. Now that labour market forecasts have been made in some countries for several decades, it is probably fair to claim that many developments have occurred as predicted, even though some forecasts have failed to predict employment trends in specific areas. Thus, we do not wish to omit the fact that forecasts may also react sensitively to the underlying assumptions on the growth path, which are usually derived from macroeconomic forecasts.

However, if forecasts are restricted to sufficiently large classes of occupational groups, and if forecasts are not misused as point predictors, then they may reasonably be employed for broad policy-guiding purposes, particularly in fields with extended educational tracks, such as those for university-trained engineers, teachers, medical doctors or other highly skilled professionals. Likewise, information is needed on labour market trends for middle-level skills, because labour shortages or excess supply in specific sectors, educational classes and occupational groups frequently can be observed. Therefore, forecasts tend to be restricted to sufficiently large classes of occupational groups or so-called *familles professionnelles*, which can be translated as groupings of occupational groups with large overlaps in required skills. Perhaps this shared wisdom of many forecasters builds on the experience of another eminent scholar, Sir Maynard Keynes, who is quoted as having said: 'I'd rather be vaguely right than precisely wrong'.

Forecasts not only provide some occupational guidance for new labour market entrants but also address the need or potential for occupational mobility for those already in a job or those seeking to re-enter the labour market. Retraining to enhance occupational mobility, in particular, is a costly affair for both firms and employees. In the event of market failure due to insufficient information or incorrect expectations, public policies might step in. This is current practice in many OECD countries, particularly in the case of countries with high levels of unemployment which also have to be financed through higher contributions or taxes.

Having addressed the question of whether we could know, there may still be the question of 'Do we really have to know?' After all, markets clear. Relative wages, labour supply and demand will adjust so that no excess supply or demand will persist. What, then, is the value added of forecasting labour market trends?

2. Why not rely on market mechanisms alone?

We answer with a rhetorical question: Do markets really clear? And if so, in due time? Nowadays, it is widely recognized among labour economists that market mechanisms themselves can contribute to imbalances on the labour market. A prominent example is efficiency wage theories (surveyed by Yellen, 1984, and Schmid, 1989). The shirking approach (see, for example, Shapiro and Stiglitz, 1984) is one attempt in this strand of literature to explain under which conditions the wage may not clear the labour market. These models postulate that wages may have to fulfil other tasks rather than serve as a market clearing device alone. This other role stems from asymmetric information between employers and employees. Firms may not have perfect control over workers. In overcoming the incentive problem of not being in a position to know whether workers perform their jobs properly, firms will look for appropriate incentives. The wage or access to further training may be such a tool. Firms use it as a device to raise the productivity of workers. Employers view wages not only as a cost factor. Rather, they face a trade-off between low wage costs and low worker productivity on the one hand, and paying higher wages to employees to make them work harder on the other. From the perspective of the firms it is optimal to pay a wage that is higher than the market clearing wage. It gives the optimal mix of wage costs and induced effort to arrive at higher productivity. However, higher wages create unemployment. There are people around who are willing to work under the prevailing conditions but who are not offered a job, because it simply is not to the advantage of the firms. In addition to arguments for shirking, efficiency wages may also be reasoned on the grounds of turnover costs (Salop, 1979; Schlicht, 1978) or a fair wage hypothesis (Akerlof and Yellen, 1990). In any case, the wage as a market clearing device is blocked.

Other examples of theories in which wages may not adjust to clear the labour market are implicit wage contracts (Azariadis, 1975; Baily, 1974; Gordon, 1974) and seniority wage profiles (Lazear, 1981). Wage profiles in which workers with little firm experience are paid less than their marginal product but receive wages in excess of their individual productivity when firm tenure increases are also based on asymmetric information between the employer and the employees. Firms seek an incentive device that ensures optimal effort by workers. Because it would not be advantageous for the young to shirk, as they would then relinquish the premiums in the future, seniority wage profiles may solve incentive problems from asymmetric information. However, this comes at the cost of lower wage flexibility.

With implicit wages employees insure themselves against the business cycle. Workers are assumed to be more risk averse than firms because their human capital is embodied, that is, it cannot be separated from the worker and sold. Therefore, they accept a markdown on the wage relative to productivity in exchange for employment and wage stability—in other words: a steady income stream. In all three examples, efficiency wages, seniority wage profiles and implicit contracts, the wage mechanism as a market clearing device will not work properly, if at all. Imbalances in the supply and demand for labour which potentially are irrespective of skill level will vanish only slowly, or even persist.

In addition to labour market slack that originates from the functioning of markets themselves, we must take into account institutions that govern labour markets and their dynamic features. We do not wish to get into the discussion of whether labour market regulations are well suited or necessary at all. In our opinion this would require a comprehensive cost-benefit analysis. That is clearly beyond the scope of our essay. Rather, let us take those labour market regulations at face value and ask only what impact they have on the speed of adjustment when imbalances occur. This will necessarily be a one-sided view, neglecting the other column of the balance sheet that—taking collective wage bargaining agreements as an example—would contain benefits such as a reduction in the transaction costs. Collective wage bargaining systems exist in many industrialized countries. Even though unionization may be low, union coverage can be sizeable, with many firms joining the collective agreements subsequently (Nickell, 1997). Because wages generally are bargained for every year or once every two years, wages may not adjust quickly enough to avoid labour market imbalances. Insider–outsider theories even claim that the incumbent workforce may be so powerful (through various channels; see Blanchard and Summers, 1986; Lindbeck and Snower, 1988; Solow, 1985) that wages are set by them.

The market clearing mechanism may also suffer from rather centralized national wage bargaining systems if these systems are unable to take into account sectorial changes. If wages in declining sectors are restricted from below, relative wage changes between rising and declining sectors may be too small to induce labour mobility between sectors. Alternatively, the same mechanism might spur more job growth in the case of reduced wage growth in prospering sectors which have wage growth below productivity increases due to national compromises or so-called pacts for employment.

But low mobility between industrial sectors may not only be due to collective wage agreements that slow down wage adjustments. Workers who are not well informed may also contribute to sluggish labour mobility, fostering labour market imbalances (Lilien and Hall, 1986). Just assume that for whatever reason workers do not know whether reduced demand is a temporary phenomenon or related to sectorial shifts. If they believe in the former while the latter is true, they will not move to another sector but rather wait for recovery. Especially if mobility costs are non-

negligible, waiting can be the preferred option, slowing down the speed of labour market adjustment.

An alternative explanation for low job mobility between sectors of the economy is given by Hall (1975). Consider an economy that has two sectors: a declining high-wage sector, for example manufacturing, and a rising low-wage sector, say, services. Even if wages adjust to clear the low-wage sector instantaneously, excess supply in the manufacturing sector may persist. Workers may decide to stay unemployed and go on searching rather than accept a job in the low-wage sector right away.

Job-search effects leading to persistent imbalances on the labour market have also been linked to welfare state arrangements (Ljungqvist and Sargent, 1998). As long as economic times are not turbulent, unemployment compensation for those who have lost their job may have no detrimental effects on the functioning of the labour market. A sufficient number of new jobs coming to the market compensates for the negative effects on the job-search activity of programmes for the unemployed. However, if shocks are large, generous support may lengthen the transition period, generating long unemployment spells. Then unemployment compensation may destroy the incentives to quickly pick up a new job for which new skills could be accumulated.

Sectorial mobility may also suffer from occupations being too narrowly defined and from overly strong identification with a specific occupation, which might hinder job mobility to other occupational groups or similar occupations in other industrial sectors. No matter what our reasoning or beliefs are about where the driving forces of sectorial mobility come from, empirically we do not observe considerable elasticities for sectorial and occupational mobility (Freeman, 1986).

Table 1 sheds some light on the dynamics of European labour markets by simply looking at occupational and sectorial distributions of employment. This cross-tabulation of sector of economic activity by major occupational group for 15 member states of the European Union summarises changes from 1995 to 2000 based on calculations for each member state of the European Union. Within the European Union countries with a high job growth rate, such as the Scandinavian countries, Austria, the Netherlands and Portugal, reach the highest rates of change between occupations and economic sectors when comparing simple percentage distributions.

Most of the general trends in the European Union are well known and do not come as a surprise. Skilled agricultural jobs as well as jobs in the military services have shrunk in number over the five-year period (see columns in Table 1). The largest increases are found among technicians and professionals. Comparing across occupations within a sector of economic activities (see rows in Table 1), we find the trade and finance category with the strongest gains. This sector comprises wholesale/retail trade and hotels/restaurants as well as banking, insurance and real estate intermediation. Remarkable as well is the absolute sum of job shifts behind the

structural change between 1995 and 2000. A positive balance of 8.5 million new jobs has been created. Individual job mobility is of course much higher because this average figure on the structural change masks processes at the individual level such as year-to-year mobility, labour market entries, and temporary and permanent exits from the labour force.

Let us now turn to a final example of slow adjustment processes. Time-series evidence on the demand for education reveals quite large fluctuations in enrolment rates to higher education. This holds true for many fields of study and across many countries. The demand for education was analysed with time-series data on the basis of rationally forecasting agents (Siow, 1984; Zarkin, 1983, 1985) as well as with dynamic regression models in which agents have backward-looking expectations (Borghans, de Grip and Heijke, 1996; Freeman, 1975, 1976; Quinn and Price, 1998). There seems to be no agreement so far about how these cycles in the demand for education can be explained best. No matter what kind of expectations are employed, rather large and perpetual shocks are needed to generate ongoing cycles as they can be found in the data. However, if one believes in the explanation that relies on backward-looking expectations of agents, then cycles in the demand for education may at least partly be driven by internal market structures. Then cobweb-type ups and downs, which indicate persistent fluctuations in the demand for education, would be generated by backward-looking beliefs of first-year students, and exogenous productivity shocks may play some additional role.

The time-series analyses that employ backward-looking expectations lack an explanation of why agents predict returns on education using current and past labour market information. Very likely, they would be better off taking into account all available information, including knowledge about the future. A possible answer to this question is that access to information is costly for individuals, which leads to their preference for 'cheap' prediction rules. Their forecasting behaviour may only change if experiences of previous cohorts signal that the past is not a good predictor for returns on education to come. With the switch of prediction rules, fluctuations in the demand for education can be explained endogenously (Neugart and Tuinstra, 2001). Costly access to labour market information destabilizes the system. Or, reversing the argument, reducing individuals' costs for collecting and processing information about future trends in the labour market may eliminate cycles (*ceteris paribus*, which does not consider variations driven by exogenous shocks).

ISCO by NACE	Managers	Professionals	Technicians	Clerks/sales	Skilled agricultural workers	Operators	Security	Total	Activity rate
Agric./fishing	-60,798	-31,227	-47,455	-132,547	-641,359	-250,998	-1,559	-1,165,944	-1.07%
Construct/min	190,848	-2,937	27,341	-113,365	2,240	442,269	-1,726	544,670	-0.17%
Manufacturing	95,476	139,790	361,974	-166,439	-0,046	404,883	-4,693	830,945	-0.62%
Trade/finance	-460,144	749,690	844,064	2,845,778	11,646	958,600	-10,993	4,938,641	1.69%
Administration	188,019	61,051	362,464	-47,318	9,553	-195,277	2,289	380,780	-0.20%
Education	15,693	345,862	278,909	168,715	-2,501	-14,329	2,855	795,205	0.15%
Health/social	32,397	218,443	871,556	538,157	2,841	66,675	-2,383	1,727,684	0.63%
Associations	265,516	67,677	-12,518	-445,819	10,866	501,317	-2,392	384,647	-0.40%
Total	267,009	1,548,348	2,686,335	2,647,162	-606,761	1,913,140	-18,603	8,436,630	
Occupation rate	-0.29%	0.53%	0.79%	0.26%	-0.63%	-0.61%	-0.05%		

Source: Eurostat, European Labour Force Survey, 1995 and 2000, own calculations

Expectation formation appears to be a field that has not been explored very well in economics (see also Manski, 1993, for this argument). This is even more astonishing considering that the way agents form expectations is decisive for their human capital investment decisions. The survey evidence that we are aware of on wage expectations of young university students reports substantial overestimation of future earnings. Students believe that their starting salaries will be higher than what they actually will earn. The individual guesses are more than 10 per cent higher than actual wages (Betts, 1996; Brunello, Lucifera and Winter-Ebmer, 2001). Other evidence on wage expectations shows that alumni report lower levels when working in large firms than senior students expect to earn (Carvajal et al., 2000). Given that wages are an important decision variable, those students whose expectations about wages turn out to be wrong would rather have chosen some other subject for study or invested less in their human capital. As access to information is obviously not perfect, agents receive biased signals on the worthiness of investments into education. The market mechanism fails to allocate resources efficiently.

Even though we are not aware of evidence on expectation failures for different educational groups, one may reasonably surmise that relative costs of expectation failures as estimated for college students are actually even higher for groups with lower levels of education. The reason is that those groups in the labour market may have more limited access to information through relevant social networks and modern communication technologies such as the Internet.

3 The consequences of labour market imbalances

A range of issues worthy of our attention follows from (persistent) imbalances on labour markets. We report here on consequences with respect to nominal wages, productivity levels and growth, effects arising from educational and skill mismatches, low wage–low skill equilibria and product quality, all of which may be caused by labour supply or demand shortages in specific labour market segments.

Standard labour market theory tells us that labour supply shortages cause upward pressure on wages. Firms searching for certain types of labour may have to offer higher wages to attract workers. Skill shortages may also induce the incumbent workforce to bargain for higher wages. Although excess demand in a certain sector very likely raises the wage, the overall effect with respect to the economy-wide wage level is unclear. Excess demand in one sector may be accompanied by excess supply in another sector. For example, if there is a sectorial shift towards high-skilled labour, then the low-skilled labour supply will exceed demand. Wages in this sector may fall. The composite effect can be either positive or negative. The question must be answered empirically. Econometric evidence (see Haskel and Martin, 1996)

suggests that skill shortages may have a positive effect on nominal wage growth. When factors like productivity, unions, unemployment or firm market power were controlled for, it was found that nominal wage growth would have been one percentage point lower each year between 1983 and 1989 had there been no skill shortages in the United Kingdom.

Skill or educational mismatches have also been found to affect wage levels. Individuals with a certain education generally have lower wages in a job that does not match their educational background than another person with the same education who has a job that does match his or her educational background. Moreover, an overeducated person will earn more than another person in the same job who has an educational background matching the job requirements (see, for example, Hartog, 2000; Sicherman, 1991). In the case of undereducation, workers earn more than if their educational background and the job requirements were to match, but less than when the job is occupied by somebody who is educated for that job. Usually the wage effects of overeducation are stronger than those of undereducation; however, both concepts are difficult to measure empirically with high precision.

The results from education–job mismatch studies are partly robust against skill mismatch specifications. Wage effects persist, even though they do become smaller. Positive effects for on-the-job search also are reported. What is contrary to education mismatch studies is that skill mismatches seem to have a strong negative effect on job satisfaction (Allen and van der Velden, 2001). This strand of literature demonstrates that labour market imbalances may cause bad job matches.

Although many would consider labour market imbalances temporary, the literature on multiple equilibria emphasises that economies may get stuck at various states depending on their histories. Some of these perhaps rather stable equilibria can be more desirable for a society than others. Finegold and Soskice (1988) described a mechanism that may lead to a low skill–low wage equilibrium.² Assume that for some reason a skill shortage arises. Then firms may have problems hiring workers for high-skill jobs. If there is some complementarity between production factors they will eventually invest in technologies that supplement the low-skilled workforce. The labour market will be characterized by low wages. Furthermore, firms will not post vacancies for high-skilled workers. As there are no well-paid jobs on the market, workers will stop investing in their human capital. The vicious circle will drive the economy into a low wage–low skill equilibrium. There are other, more advantageous equilibria. But for the individual there is no incentive to invest in education, as the payoffs will not materialize. Considerable efforts are required, efforts that only a powerful actor in the market can accomplish. That is where the government could come into play, perhaps by subsidizing education or by avoiding labour supply shortages right from the beginning through forecasts and appropriate policies tackling upcoming skill shortages.

² For a more formal treatment of the argument, see Snower (1996).

If there are skill shortages firms may switch to filling high-skill vacancies with low-skill workers, lowering productivity. It may also happen that a shift in the bargaining strength towards workers leads to employment conditions that are less efficient for firms and that lower the productivity of the incumbent workforce. The former argument addresses productivity levels, but productivity growth also may suffer from skill shortages if firms reduce investments in research and development. The findings by Haskel and Martin (1996) suggest that skill shortages reduced productivity growth by 0.4 per cent per year in the United Kingdom between 1983 and 1989. Cross-country evidence from panel data sets reveals that the average number of years of school attainment at secondary and higher levels has a positive effect on economic growth. The relationship is even more important quantitatively if variables are used that measure schooling quality (Barro, 2001). Interpreting the results, the author conjectured that the absorption of new technologies might be easier with people who have obtained relatively more education at the secondary and higher levels. The international migration of highly skilled people and green card initiatives find their justification in this kind of reasoning.

We conclude our list of examples on potentially undesirable consequences from labour market imbalances by arguing that the lack of skilled workers may lead to malfunctions in production processes. Quality control may suffer and, consequently, product quality may decrease (Finegold and Soskice, 1988). Haskel and Holt (1999) discussed evidence on whether skill shortages affect product quality. From a sample of case studies they concluded that product quality may indeed suffer, but perhaps only in some sectors.

Doubting the market mechanisms, should we trust policymakers? Can they develop and implement appropriate training and education policies, once they know about labour market trends? As we have demonstrated, the list of market failures is long. But policy failures have also been occurring. So, which horse should we bet on? One possibility is to make information on labour market trends accessible to potential users so that people can make better informed decisions. Policymakers certainly should be concerned about this aspect. The contributions in Neugart and Schömann (2002) report on the important topic of how information is disseminated. In many countries, public employment offices provide job counselling services and allocate unemployed workers to training schemes. Do they have proper forecasts on what people should be trained in? Do responsible teachers in schools know? Is there an up-to-date Web site that tells us what jobs we should aim for? In which segments of the labour market should firms be aware of likely shortages in the near future?

4. Why labour market forecasts are a public good

Forecasts on labour markets are a public good (see also Smith, 2002). The reason is simple. Very likely, individuals and firms cannot be excluded from the use of information that labour market forecasts produce. Not all users can be forced to pay a price and contribute to the development costs of forecasting models and the production of forecasts. Indeed, the costs incurred when developing a forecasting model are not negligible. Comprehensive microlevel and macrolevel data sets are needed; the estimation of the models is not trivial, nor are the development costs. Hence, if the use of the information cannot be restricted to those groups that actually pay for it, there will be no incentive to pay for the information. Consequently, no profit-oriented organization will provide such information. For example, no consulting firm that may have thought about setting up a forecasting model and selling forecasts to individuals, employment offices, training companies or firms enters the market. However, even though it is optimal from a private perspective not to produce information on labour market trends, the situation is not optimal from the perspective of society as a whole. The society at large can gain from adequate and timely labour market information. Here the role for public agencies or governments comes in. If a government agency is capable of providing the service, the functioning of the labour market may improve in the sense of better matches or faster adjustments to structural changes.

5. Who uses the information

In 1998 OECD countries spent almost 0.9 per cent of their gross domestic product on active labour market policies. Of that amount 25 per cent went into training policies (OECD, 2001). Clearly, this is a considerable amount of money. Knowing about future shortages in the supply of certain occupations and skills as well as demand shortages would surely help to allocate those funds more efficiently. This especially holds true if one takes into account that evaluation studies have shown only limited success of public training programmes so far with respect to the reemployment probabilities of participants (Martin, 2000; OECD, 1993; Rabe, 2000). In many of the countries where labour market forecasts are made on a regular basis, information is disseminated to public employment offices. We do not know of any evaluation study that has investigated whether employment offices supplied with information on labour market developments allocate people to training measures more efficiently. This constitutes a fruitful area for future research on matching processes on the labour market.

Recent evidence suggests that there is a lack of sound information about in which sectors and occupations participants of training measures are most likely to

find well-paid jobs (Schömann and O'Connell 2002). This observation finds support in recommendations for labour market policymakers. There it is generally acknowledged that having an eye on the demand side of the market while training people improves the effectiveness of programmes (Schmid 2001, O'Connell and McGinnity 2002).

A broad range of other potential users exists. This is documented by Neugart and Schömann (2002) and emphasised by Heijke (1996). The list of potential and current users of information on the labour market can be extended far beyond employment offices. In fact, forecasting in a systematic fashion began in the United States when a large number of soldiers came back from World War II and the government was concerned about where these people could find jobs (see Barnow, 2002). Since then it has also played a major role in immigration policies in the United States and Canada, a role which many European countries have omitted until very recently. In the case of the United States the information on which occupations and skills to look for among potential immigrants also comes from the Bureau of Labor Statistics forecasts on future skill shortages. In the European Union, where the debate on an economically motivated immigration policy only recently began, it became clear rather quickly that a solid understanding of future skill needs is frequently still lacking. In most European Union countries only vague ideas exist about how quotas on types of occupations and qualifications could be derived.

In most countries schools, vocational training systems, universities and other types of higher education are run as public institutions. Even in countries that host greater shares of privately run schools, governments play a major role in the education system. Total public and private spending on education among OECD countries averaged 6.3 per cent of gross domestic product in 1994 (OECD, 1998, 2001), of which about four-fifths was public money. It is probably not farfetched to say that while funding these organizations, the government wants to see a return on education. At some point voters will judge governments' policies. Parents of young children will be embarrassed if they find schools in a bad condition or underequipped, or if their children are taught in crowded classes because there are not enough trained teachers. Such a situation will not only eventually upset parents against the ruling parties; it is also acknowledged that capacity constraints at schools which lead to a high number of pupils per individual teacher are likely to generate lower returns to schooling. The same rationale holds for young students entering universities who find themselves in crowded seminars. This is likely to lead to longer average study times. Students will therefore enter the labour market later. Individual returns on education will materialize with delay, as will social returns. Holding excess capacity to avoid capacity constraints is a costly option. From this point of view it would be more desirable to stabilize flows into education, which also reduces adjustment costs for teaching capacity.

Although most sociological studies argue that transitions to higher education are still mainly driven by effects of parental backgrounds (Albert, Davia, Hernanz and

Toharia, 2002), there is also evidence that income considerations matter. Lifetime income is at the heart of human capital models (Becker, 1975). Survey data show that career motives and income considerations play a significant role in individuals' decisions on human capital investments (Heublein and Sommer, 2000). Hence, individuals will have an interest in studies on labour market developments. Excess supply in their fields of study will dampen their individual employment probabilities at the time of graduation. The probability of finding a job and expected income seem to be major determinants in the demand for education. If they are sufficiently accurate, forecasts on labour market developments may contribute to a reduction in uncertainties about the returns to education.

In human capital models in which agents have perfect foresight, the effect of uncertainty on the demand for education is ambiguous (Levhari and Weiss, 1974). However, under certain assumptions on agents' preferences, demand for education will decline with more uncertainty about the returns on educational investments (Snow and Warren, 1990). Econometric studies cannot always establish the theoretically predicted signs in the demand for education when returns are risky (Kodde, 1986). However, should it actually be the case that uncertain returns lower investments into higher education, professional and reliable forecasts may spur human capital investments.

Finally, where those forecasts are available, firms have been using them. Shortages in the supply of labour usually cause costly bottlenecks for companies. We already stressed that they may face higher costs from upward wage pressure, declining product quality, less skilled or too few workers and, in a longer perspective, lower market share growth and the inability to enter new markets. Clearly, knowing about future shortages will help firms as they take measures to ensure that they have an appropriate workforce. Although for big firms the benefits from having a forecasting model may outweigh the costs of development and production, small- and medium-sized enterprises will very likely suffer from the investment-cost trap. In these cases, and taking into consideration the arguments on forecasts as a public good, government provision of labour market information may be desirable from the perspective of society as a whole.

6. Previous approaches and some alternatives

There is a long history of forecasting labour market developments in OECD countries. One of the first 'Manpower Planning Projects' was the Mediterranean Regional Project initiated by the OECD in the early 1960s (Parnes, 1962). Within this project the 'manpower requirement approach' was developed. In those days the idea was to use forecasts for planning purposes. Given economic targets, such as the growth path of the economy, labour requirements in terms of various occupations and qualifications were derived. Compared with rather simplistic projections of the

supply side of the economy, this approach was to assist policymakers in the determination of education and training policies necessary to achieve the targets for economic growth.

These approaches have been widely criticized (see, for example, Ahamad and Blaug, 1973), in part because of aspects of the methodology employed, but also because of the economic targets used. Many see economic growth as detrimental to the environment, exploiting natural resources to the cost of future generations. With respect to the methodological issues, it has been argued that the lack of good data and the poorly elaborated models would render forecasts with longer horizons impossible. The models were seen as purely mechanistic because they did not take into account substitution processes on the labour market between sectors and occupations. The fixed coefficients employed to relate sectorial growth to labour demand were said to be too inflexible a tool to sketch a reliable picture of future labour demand. It was also brought forward that these early models did not consider interactions between supply and demand. The criticism led to the conclusion that these models are unable to produce useful forecasts. Furthermore, a mere forecast on the need for certain occupations would not say much about the contents of the training and education policies needed.

The critique induced a discussion about flexibility and 'key skills', and it also instigated a revision of the aims of what should be achieved through the manpower planning approach, especially with respect to the potential use of the results. However, despite these early disappointments, and the criticisms, governments retained an interest in manpower forecasting issues. Model-builders have responded to the criticisms by reducing the forecasting period from the long term to the medium term and by switching the focus of the forecasts from detailed educational planning to the provision of more general strategic guidelines. With regard to the latter, forecasters now emphasise that their main objectives are to highlight the implications of existing occupational trends; to provide information for governments and policymakers on the sort of changes which are likely to occur in the occupational profile of the labour force, as well as on the *broad* implications of these changes for educational, training and employment policies; and to provide information which facilitates career choices to society in general.

Besides model-based forecasts, many other tools have been tested and applied to predict labour market developments. One such tool is interviews with employers, human resource managers and their representative bodies. Certainly, all these other approaches have their shortcomings, too. In surveys employers may strategically overstate their need for qualified labour in order to signal urgent demand to policymakers. This probably happened in Germany just recently, when the debate on working permits for information technology specialists started, and the government was unsure about how many permits should be issued. There may also be a problem of conflicting underlying assumptions in the answers of firms. Certainly, all firms have some projection of market share growth in mind when deriving their demand for labour. Let us assume that all plan to increase their market share. Naturally, this is

something that will not happen. But because the assumptions underlie the firms' projections, labour demand forecasts from surveys will be biased upward.

Given the high degree of uncertainty that also accompanies labour market forecasts based on macroeconomic models, it would be rather ignorant to exclude results from other forecasts for the assessment of future labour market trends. Methodologically different approaches may serve as checks and balances..³

7. Overview of forecasting models, methodologies and related policy debates

Neugart and Schömann (2002) present individual country forecasts for a number of OECD countries with the aim of identifying best-practice examples in terms of modelling approaches, specific methodologies applied, and features of use and implementation structures in these countries. In most categories of comparisons the models have common features. For example, most countries use a time horizon of between five and ten years in the forecasts (see Table 2). This practice should safeguard to some extent against the possibility of strong influences of recent short-term effects or vintage and seasonal effects. The aim of these forecasts is therefore directed towards medium-term structural changes largely independent of short-term business cycle effects. Additionally, it should be kept in mind that the availability of annual data, the basis of most forecasts, also means that a time lag of at least one year to produce the forecast—data for 2001 will only be available in the summer of 2002—is inherent in the statistical model.

In order to overcome the time-lag problem and to be able to assess the impact of short-term developments, many countries have opted for a yearly or biannual update of the forecasts. About a third of the countries that Neugart and Schömann (2002) consider still produce irregular updates according to the specific needs of policymakers or every five years until new forecasts are produced, taking the risk of using outdated information and forecasts in public policy debates on economic, structural and occupational change (see Table 2).

³ See Tessaring (1998) and Wilson (2001) for an introduction to a wide range of approaches to forecasting needs for qualifications and occupations. The broad range of approaches used in France and Germany has recently been demonstrated in an edited volume by Schömann (2001) as part of the research network www.frequenz.net, which so far is available only in French and German.

Table 2. Overview of projections

	Austria	Canada	France	Germany	Great Britain
Time horizon	2000–2005	2000–2004	2000–2010	1999–2010	2001–2006/2010
Interval for updates	Irregular in past	5 years	Irregular	5 years	1 year
Major data sources	Census and census sample, socio-economic database, national accounts, companies' databases, micro-data from unemployment insurance and social security systems	Census, monthly labour force survey	Labour force survey, national accounts	Labour force survey, national accounts, social security records	Census, labour force survey combined with industrial data for employment status and gender, derived from establishment-based surveys
Who pays for the forecast?		Labour Ministry (HRDC)	Ministry of Employment in internal research service department	Federal and regional governments	The research institute originally funded by the Department for Education and Employment
Who does the forecast?	Independent research institutes (WIFO, IHS)	Independent research institutes; federal forecasts are supplemented by regional and sectorial forecasts	Statistical and Economic Research Department of the French Ministry of Employment (DARES)	Independent research institutes and federal research institutes	Independent research institute (IER)
Who uses the forecast?	There doesn't seem to be a high demand for formal forecasting results.	Federal government for training programmes; sector councils to assess training needs, develop curricula and occupational standards and evaluate effectiveness of training efforts; career counsellors and individuals	State and regional government, social partners and specialized committees	Mostly for governmental use	Policymakers; sub-models exist which allow policy simulations on the regional level
Implementation	Only weak implementation of results; quality assessment through informal knowledge and knowledge of practitioners	Federal Labour Ministry, Provincial Ministries of Education or Labour Ministries	National Ministry of Education and regional governments in charge of further training policies	Differences in the implementation between regions; no close links for the use of regional and national forecasts	Department for Education and Employment delegates responsibility to profit-making local partners that receive public funding; non-corporatist approach
Other features (access to the forecasts, particularities of the forecasts)	Special short-term quantitative prognosis for the apprenticeship market	Widespread use of forecasts; hardcover and Internet version; CD-ROMs are distributed to schools	Links between education and labour ministries in implementation fostered	Limited transparency and accessibility	Additional special survey on skill shortages

	Ireland	Japan	Netherlands	Spain	USA
Time horizon	2000–2005	1998–2010	2001–2006	2000–2010	2000–2010
Interval for updates	2 years	5 years	2 years	Irregular	2 years
Major data sources	Annual labour force survey, quarterly national household survey	Census, basic survey of employment structure	Labour force survey	Labour force survey and national accounts	Census, labour force data, employment statistics
Who pays for the forecast?	National Employment and Training Authority (FÁS)	Ministry of Labour	Ministries of Research, Labour and Agriculture; Central Employment Board; LDC Expertise Centre for Career Issues	Foundation, and a regional government in case of regional forecasts	Ministry of Labour
Who does the forecast?	Independent research institute (ESRI)	Research Committee for Employment Policy	Independent research centre (ROA)	Research institute	Statistical Institute of the Ministry of Labor (BLS)
Who uses the forecast?	Government and state agencies for planning employment and education policies; guidance for science, technology and innovation policies; firms and trade unions; career counsellors; individuals	One of the major resources for the discussion of employment measures	Ministries of Research, Labour and Agriculture; individuals for educational choices; firms to forecast supply shortages; employment offices	Little established discussion beyond expert groups so far	Government agencies for training, education and immigration policies; career counsellors; firms; individuals
Implementation	Department of Enterprise, Trade and Employment; Department of Education and Science; social partners are represented on the board of FÁS	Government, social partners	Much involvement of social partners in planning and design of qualification profiles	Mostly through national training institute and local governments	Responsibility on the state level
Other features (access to the forecasts, particularities of the forecasts)	Gender sub-model	Large governmental commission presents results and spurs public debate; part of the economic outlook debate	Besides the general occupational outlooks, the perspectives of school-leavers are shown	Simple macro-economic projection methods to derive a baseline projection for skill needs	Much of the material can be obtained from the Internet; every state is required to produce state employment projections

The basic data sources for the forecasts are quite similar across the whole range of countries represented in this volume. Most analysts use annual labour force survey data, sometimes also called micro-census data, to achieve a sufficient level of disaggregation of employment trends by industrial sector, major occupational groups or levels of qualifications. Changes in classifications of one of the three key variables create additional problems with deriving coherent time trends within detailed subgroups.

A major additional data source which has also found its way into the forecasting of skill needs is the use of representative surveys among firms. However, only very few countries make systematic use of this data source, either because of an insufficient number of years for which such data are available or because of deficient depth of information on skill levels and changes of employee skills. Some hints of how these data can usefully be applied to enrich the forecasts are demonstrated by Barnow (2002).

We shall now compare some institutional features of the forecasting efforts across the range of countries. In the majority of countries the forecasts are carried out by independent research institutes that receive additional funds for their regular forecasting activities. In Canada, France, Germany and Japan, research institutes affiliated with the ministry of labour or charged with the collection and publishing of statistical information and research reports take responsibility for producing and disseminating the results of the forecasts. In the United States, for example, the Bureau of Labor Statistics is an agency within the U.S. Department of Labor and publishes the very detailed Occupational Outlook, which is also available online. Funding for the forecasts often comes from one single ministry, usually the ministry of employment, but in a few instances there is also funding from national institutions that are charged with decision-making or the administration of active labour market policies. Whereas the former approach usually ensures a large dissemination of results and wider policy debates, the latter form of funding appears to favour the internal use of the forecasts for administrative purposes and decisions on how to channel available funds to achieve specific policy targets.

Particularly in Europe the use of forecasting results seems to be still rather limited to government officials, expert groups, social partners and professional associations. Because of the scarce availability of attractive online facilities to consult forecasting results, use by individuals interested in learning about economic restructuring, occupational orientation or career guidance with up-to-date information is quite rare. Delays in providing printed material to the public at large are substantial, and most likely there are few additional efforts that would suffice to satisfy an apparently large demand by individuals for this information. The North American efforts in this direction can serve as best-practice examples: for example, the search facilities of the Occupational Outlook Handbook for the United States (<http://stats.bls.gov/oco/home.htm>) or for Canada (<http://www.jobfutures.ca>).

Just as important as the preparation of the forecasts are the processes of implementation, that is, what kind of reactions there are to the additional knowledge gained through the forecasts. To put it in simple terms: if the weather forecasts announce heavy rain and, as a likely consequence, floods, it is important that preventive actions should follow. Ideally the forecast would help to limit the negative consequences, such as damages; just to have the forecast results without some form of ensuing action is clearly not enough. We call this process the implementation of forecasts. In the case of forecasts of skill needs we would like to see a similar chain of reactions induced by the publishing of such forecasts.

A cross-country comparison seems to indicate two types of 'organized' reactions. The United States, Canada and Great Britain focus in their implementation first on a kind of regional responsibility for implementing reactions to counter, for example, skill shortages. The other countries with a more corporatist tradition and governance structure also get the employers' organizations and trade unions, the so-called social partners, involved at a very early stage. In countries where general education (Germany), further training (France) or lifelong learning is the responsibility of or under the autonomy of the regions, regional committees are involved in discussing and drawing conclusions based on the national and, in some cases, additional regional forecasts. The co-financing of active labour market policies in the European Union through the European Social Fund and the community initiative EQUAL has given a new impetus to the forecasting activities, particularly on the regional level.

Some special features of countries' forecasting models deserve mention. In Canada and in Denmark a systematic approach to checking between national forecasts and the aggregation of results for regional forecasts is applied, which allows for the early identification of regional imbalances in these countries. To the best of our knowledge Ireland is still the only country that produces forecasts that systematically differentiate between men and women. Some countries that apply a deeply disaggregated occupational classification indirectly come close to the same result because of persistent gender segregation into occupational groups. With the political emphasis on equal treatment and equal opportunities for women and men in the current employment guidelines of the European Union, more countries might apply this specification in coming years.

We stressed the importance of the wide dissemination of forecasting results earlier in this essay. This is indeed a crucial point. If forecasts remain accessible only to experts in the field, the transmission process required so that large numbers of individuals can adapt to coming changes will take too much time. Individuals need up-to-date information to make their occupational choices upon entry into the labour force as well as throughout their occupational or employment careers. After all, it does not help much to kill the messenger for bringing the news of a lost battle, that is, to blame forecasters for having brought the message of continued structural change and growing shares of service sector jobs. It is through millions of individual decisions that smooth forms of structural adjustment are achieved.

Even though the forecasting models presented here allow disaggregate occupational forecasts to fairly small groups of occupations and across educational levels, and, as in the case of the United States, some efforts have been made to predict skill needs directly, there remains a fairly large unknown because changes in the occupational structure revealed in the forecasts cannot perfectly be matched to changes in the skill composition of the labour force. The whole issue of how skills are related to types of education and occupations, including the measurement of skills, has only recently started to attract the interest of researchers (see, for example, the special issue in the *Oxford Economic Papers* on skills measurement and economic analysis, edited by Borghans, Green and Mayhew, 2001). This does not make forecasts an inappropriate tool from which policymakers cannot gain information. Rather, it requires scholars to extend the existing models and complement occupational forecasts with skill requirement studies.

In this essay we opted for a transatlantic comparison of forecasting and implementation. Certainly, we would have liked to include more countries in the comparison—some Scandinavian countries, in particular, have interesting approaches to offer in this respect—but we were not always successful in identifying suitable presentations of national models or obtaining English translations within our budget constraints. We apologise for this neglect, but can only advise the reader to directly contact the responsible institutes in these countries via the continuously updated forecasting homepage of the Wissenschaftszentrum Berlin (WZB) <http://www.wz-berlin.de/amb/ab/qb/qb.en.htm>.

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