Forecasting Education and Training Needs in Transition Economies: Lessons from the Western European Experience

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PREFACE

A person choosing the career path must take a whole range of issues into account, such as interests in personal development, the specific skills one does or does not have, the level and quality of previous schooling, competition for places on future study programmes, family traditions, opinions of parents, school teachers and career counsellors, and many other factors that can eventually influence the decision. In many cases the prospects of the chosen career path on the labour market are not a primary factor in the decision and are often not taken into account at all. This may be due to a lack of precise knowledge of labour market developments in the next four or five years, or to a lack of trust in existing information about future trends. It is worth giving credit to such an opinion, as in many countries such forecasts do not exist or are not sufficiently reliable. This is the case of most countries with transitional economies. On the other hand, a lack of concern about the future prospects for the qualification to be obtained is sometimes a result of a lack of awareness of the available information on the predicted medium term trends in the labour market. This is due to too little action on the part of state authorities and career counsellors to increase awareness. In any case, students of the new generation are or shortly will be educated in broader occupational profiles with indispensable key skills and abilities as a part of the curriculum. This allows for easier inter-occupational mobility and makes qualifications already gained less vulnerable to future changes. Key skills and competencies are safety umbrellas which we take with us in cloudy weather instead or in spite of yesterday's weather forecast, but early warning of radical "climate changes" would help us to act for our own benefit.

Although unemployment has diminished slightly (by about 1 %) over the last year, it remains a major problem in Europe. Unemployment, and especially youth unemployment, is continuing to grow in the majority of transitional countries. The failure to complete the restructuring of formerly state-based economies has led to industries failing, structural unemployment in certain regions and a high risk of unemployment among certain occupations in the countries of transition. At the same time these countries are experiencing the same trends as affluent western economies: rapid technological change and a generally more skilled workforce, de-industrialisation and a shift to the service sector, rapid change of job profiles and the disappearance of some professions. A qualitative change in the content of work in post-industrial economies and a subsequent change in the organisation of the work process place new qualification needs to sustain the quality and content of work. The universal introduction of entrepreneurial skills at all qualification levels, creativity, independence and responsibility not only at the level of management but right across the process of production are all features of post-industrial societies. What guise will future development take? How can the transition economies catch up with these global developments? What will be the labour market trends arising out of the enormous rate of change as a result of the transition from planned economy alongside the global patterns of change? All these factors and

questions make forecasting both increasingly challenging and vital, posing dilemmas in the work of analysts.

In the post-communist countries, the term "manpower planning" has negative connotations due to the general discrediting of planning as such. In the past these counties had an elaborate mechanism of calculating the future needs of the economy, which was predominantly or fully planned and state-owned. After the collapse of communism, the structures for prognostic analyses were dissolved, largely without any replacement. In the west the manpower planning approach has undergone several changes and adjustments. It is now one of the modifications of quantified manpower supply and recruitment demand, sometimes presented in certain versions of development-scenarios. At the same time, some countries have given up preparing quantified national forecasts and work mostly with sector and/or regional forecasts using a combination of quantitative and qualitative methods.

The present publication is the first outcome of the project *Regular Forecasting of Training Needs: Comparative Analysis, Elaboration and Application of Methodology* ("***LABOUR***atory"). This project aims at elaborating forecasting methodology, applicable not only in relatively stabilised western economies but also in the transitional countries of Central Europe. The two-year project compares existing prognostic approaches in the countries of the partnership and beyond. The leader of the project – the Czech National Observatory of Vocational Training and Labour Market – invited an extensive transnational partnership to enrich existing forecasting methods. This partnership includes the Centre for Economic Research and Graduate Education at the Economic Institute of the Czech Republic (CERGE is a scientific co-ordinator of the project), the Research Centre for Education and the Labour Market of the Netherlands (ROA), the Economic and Social Research Institute of Ireland (ESRI), the Regional Employment and Training Observatory of Burgundy in France (OREF), and a private French consultancy firm Quaternaire. The partnership also includes two National Observatories of Vocational Education and Training – one in Slovenia and another in Poland – which work together with the Czech team on adjusting western forecasting tools for the needs of countries in transition. The project involves independent experts from the Institute of Employment Research (IAB) in Germany, CEDEFOP and others.

Each of the partners or experts from the countries of the EU has a slightly different approach and these are described in the present publication. For instance, while ESRI's forecasting is largely produced for the purposes of decision-making, ROA's forecasts also serve for current and future students, counselling and guidance services. Each of the approaches imposes certain requirements on the level of disaggregation of the forecasted result and consequently on the data input. OREF works at the regional level with available national statistics in both stocks and flows in composition with qualitative school and company surveys, broadly applying networking and a dialogue with social partners. Quaternaire has elabo-

rated many sector forecasts at the national level, predicting employment shifts and qualification and training requirements mainly for the needs of decision-making and also of social partners. Projections of manpower demand by the German experts include adaptation scenarios, taking into account specific features of the transition process and changes caused by unification. All the methods analysed produce medium-term forecasts (and possibly also long-term ones) in order to allow for prospects beyond the current economic and education cycle. By comparing the different approaches we hope to come to a mutual enrichment of methodologies on the one hand, and a better understanding of the constraints and advantages of each method on the other. The initial analysis has demonstrated that the starting point for the Central European countries should be to improve data availability and adjust the structure of the information base. The lack of certain types of data in these countries means that it is not possible to produce a reliable quantified forecast without using expert estimations and qualitative methods to verify the quantified projections.

The authors of the present publication are well aware of certain deficiencies of forecasts. One of these has been already mentioned: the quality of the forecasts directly depends on the reliability of the data input. Furthermore, forecasting is actually done on the basis of a particular development scenario, where the starting point is the present situation. This static viewpoint imposes certain limitations and lacks a dynamic perspective. Projections are far too general to produce sufficient information with a reliable precision of employment prospects for an individual career choice. Finally, the use of the results of forecasts is also a delicate issue, as such questions as democratic access to education versus regulatory actions immediately arise. Nevertheless, experts working in the field of prognostic methods for the labour market have largely reached a consensus that as long as the forecaster is well aware of these and other reservations and takes them into account, forecasting is both useful and legitimate. The analysts have found ways to tackle certain drawbacks of forecasting, elaborating alternative scenarios, producing projections in ranges, regularly repeating forecasts to allow for overlap and verified adjustments. Information for students and guidance services is produced with a high degree of caution, giving an early warning only in general terms and only where it is justifiable.

Forecasting involves many parties and requires a great deal of effort to adjust the data supply, and is therefore both a time-consuming and a costly task. Hence, the crucial issue for the usefulness and legitimacy of forecasts is who actually benefits from forecasting. Although forecasting predictions are somewhat general, they may influence the decision of an individual to choose a particular type of training or to avoid an unfavourable choice because of poor prospects in the labour market. Forecasts are highly relevant to vocational and career guidance, which could validate the available forecasting data by their expert knowledge if they work hand in hand not only with clients but also both with educational institutions and potential employers. Forecasts are useful for both the supply and the

demand sides of the labour market. The demand side (companies) gains from early warning of future recruitment problems or excess supply of certain qualifications, which allows them to adjust human resource development policies and provide tailor-made training courses, or even eventually to adjust a company's expansion, investment or slimming policies. The supply side (the education system and its component parts, training providers, active employment policy) benefits from the forecasts for policy adjustment, the adaptation of a reform process in education and the regulation of investment in education. Retraining courses, sponsored by the government, especially non-specified re-training courses with no assigned prospective employment, can directly benefit from forecasting by redefining training priorities.

We must state very clearly that decision-makers do not have a direct responsibility towards the current and future workforce in terms of guaranteeing a work place for every qualification by avoiding mismatch between the supply of education and demand of the labour market. Some degree of mismatch will always exist. Decision-makers do, however, have a clear responsibility to provide best and most reliable information possible on future prospects on the labour market. Therefore our team expects that at the end of the project (March 2001) further recommendations produced under this project will be taken on board by decision-making authorities of the countries where forecasting methods have not yet been developed.

There is one last issue that I would like to stress at the end of this short introduction. Forecasting is certainly not a universal tool to support employment. It must go hand in hand with curriculum innovation and the adjustment of vocational standards to provide for flexibility and mobility of the labour force. Knowledge is not a static substance; its fluidity and complexity can be grasped only through close cooperation between the education and employment sectors. Here we return to the starting point of the introduction: broadly defined occupations and general skills should not be left out from the current agenda of the reform of education – we should not forget to provide present and future students with an umbrella for their life-long walk through the foggy uncertainty of labour market prospects.

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Forecasting Education and Training Needs in Transition Economies: Lessons from the Western European Experience

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Executive Summary

In an era of rapid technological change, information exchange, and emergence of knowledge-intensive industries it is critical to be able to identify the future skill needs of the labour market. Growing unemployment in EU member states and pre-accession countries in Eastern Europe, combined with technological changes which make the skills of a significant number of workers obsolete each year call for adequate knowledge of the medium- and long-term demand for specific skills.

Some EU member states have developed employment forecasting methods to identify future skill requirements that take account of the sectoral, occupational, and educational and training factors which influence supply and demand in the labour market for skills. A number of countries in Eastern Europe which are preparing to join the EU are interested in developing employment forecasting models that would provide them with similar information relating to skills.

Taking account of the requirements of the Single European Market and increasing international mobility, it is desirable that the pre-accession countries should develop models which, if possible, are comparable with existing methods of forecasting training and qualification needs in existing member states of the EU. This requires regular medium-term forecasts which will extend the time horizon of decision makers beyond the current economic cycle, be applicable to the whole economy, allow speedy adjustment to changing circumstances, and which take into account relevant factors such as investment plans, output and labour productivity forecasts, and technological change. The development of such forecasts will require the use of quantitative and qualitative methods which will systematically organise and integrate data and analysis relating to the education and training, sectoral, and occupational dimensions of skills.

The aim of this paper is to take stock of the labour market data and methods used to forecast education and training needs in four members of the European Union and compare them with the situation in three pre-accession countries. We first provide a detailed account of the different approaches to forecasting education and training needs in France, Germany, Ireland and the Netherlands. For each of these countries, we consider the labour market data on which employment forecasts are based and the current methods in use, examine how data reliability and accuracy of forecasts are dealt with, and discuss the dissemination and usage of forecast information generated by those systems. We then look at the same range of issues for three pre-accession Central European countries (Czech Republic, Poland and Slovenia.) The paper concludes by suggesting a number of actions needed to prepare for the development of an approach to forecasting education and training needs in the three pre-accession countries.

List of Abbreviations

BIPE: Bureau d'Information et de Previsions Economiques, France

CEE: Central and Eastern Europe

CEREQ: Centre d'Etudes et de Recherche sur les Qualifications, France

CERGE: Center for Economic Research and Graduate Education, Charles University, Czech Republic.

CPB: Central Planning Bureau, Netherlands

CSO: Central Statistics Office, Ireland

Czech SO: Czech Statistical Office, Czech Republic

EI: Economics Institute of the Academy of Sciences of the Czech Republic.

ESRI: Economic and Social Research Institute, Ireland

ESS: Employment Service of Slovenia

EU: European Union

FAS: Foras Aiseanna Saothar, Ireland

HRDF: Human Resource Development Fund, Slovenia

IAB: Institute für Arbeitsmarkt and Berufsforschung der Bundesanstalt für Arbeit (Institute of Employment and Occupational Research, Germany)

INSEE: Institut National de la Statistique et des Etudes Economiques, France

OREF: Observatoires Regionaux de l'Emploi et de la Formation, France

ROA: Research Centrum voor Onderwijs en Arbeidsmarkt, Netherlands

RSSO: Republic of Slovenia Statistical Office

SN: Statistics Netherlands

Introduction

In an era of rapid technological change, information exchange, and emergence of knowledge-intensive industries it is critical to be able to identify the future skill needs of the labour market. Growing unemployment in EU member states and pre-accession countries in Eastern Europe, combined with technological changes which make the skills of a significant number of workers obsolete each year demand adequate knowledge of medium- and long-term demand for specific skills. Some EU member states have developed employment forecasting methods to identify future skill requirements which take account of the sectoral, occupational, and educational and training factors which influence supply and demand in the labour market for skills. A number of countries in Eastern Europe which are preparing to join the EU are interested in developing employment forecasting models that would provide them with similar information relating to skills. Taking account of the requirements of the Single European Market and increasing international mobility, it is desirable that the pre-accession countries should develop models which, if possible, are comparable with existing methods of forecasting training and qualification needs in existing member states of the EU. This task requires regular medium-term forecasts which will extend the time horizon of decision makers beyond the current economic cycle, be applicable to the whole economy, allow speedy adjustment to changing circumstances, and which will take account of relevant factors such as investment plans, output and labour productivity forecasts, and technological change. The development of such forecasts will require the use of quantitative and qualitative methods which will systematically organise and integrate data and analysis relating to the education and training, sectoral, and occupational dimensions of skills.

The aim of this paper is to take stock of the labour market data and methods used to forecast education and training needs in four EU member countries (France (Giffard and Guegnard, 1999), Germany (Dostal, 1999), Ireland (Hughes, 1999), the Netherlands (de Grip and Marey, 1999)) and compare them with the current situation in three pre-accession countries (Czech Republic (Münich, Jurajda, Campos and Strietska-Ilina, 1999), Poland (Kabaj, 1999), Slovenia (Luzar and Gerzina, 1999)). In addition it will summarise how forecasts are made in the EU countries and consider what forecasting methods are likely to work successfully in the pre-accession countries. This will be done in three parts. The first part provides an overview of the factors which determine the different approaches which are taken to forecasting education and training needs in the four EU countries, considers the labour market data which are available for each country on which employment forecasts are based, examines the methods used to make employment forecasts in each country, looks at the reliability of the basic data and how the accuracy of the forecasts is evaluated and presents information on who the final users of the forecasts are and how the results of the forecasts are disseminated. The second part looks at the same range of issues for the three pre-accession countries. The paper concludes with suggestions about what issues need to be considered before developing an approach to forecasting education and training needs in the pre-accession countries.

Part I: Forecasting Models of Education and Training Needs in EU Countries

A Brief History of Occupational and Educational Forecasting in Four EU Countries

France has the longest tradition of trying to regularly forecast occupational and educational requirements, the Netherlands comes next, and Ireland has only recently developed expertise in this area. Broadly speaking, occupational and educational forecasting has gone through two phases (see Hughes, 1991 and van Eijs, 1994). The first phase extended from about the end of the Second World War until the aftermath of the first oil crisis and the second phase covers the period from the early 1980s until the present day. France adopted a rigorous approach to economic planning with the publication of the First Economic Plan for the period 1947–50. This plan and the second and third plans for the periods 1954–57 and 1958–61 contained employment forecasts for sectors but not for occupations. An occupational breakdown was provided in the Fourth Plan for the period 1962–65 when forecasts were given for twenty sectors and six occupations. The aim of providing occupational projections was to establish if there were likely to be sufficient qualified people in each occupational group to achieve the goals of the plan.

In the first phase economists were concerned about the emergence of structural unemployment at a time when aggregate demand was quite strong. They were afraid there would be continuing shortages of qualified manpower in some areas (science, education, health) and surpluses of poorly educated workers in others (agriculture, building and construction). Analysis by Denison (1962) and others of the sources of economic growth identified the strong contribution which highly educated workers could make and this focused attention on the quality of the labour force. These developments stimulated demand for projections of the occupational and educational structure of the labour force by manpower planners and policy makers responsible for maintaining full employment and providing education and training facilities.

When employment in a particular occupation is growing, investment in the skills needed for the occupation is likely to be individually and socially profitable. Hence, existing and planned training and education patterns should be skewed towards the growing occupations. Manpower planners argued in the early 1950s that occupational forecasts could play an important role in ensuring a smoother long-term adjustment of supply to demand in occupational labour markets, through educational planning procedures, than would have been possible by relying on market mechanisms alone. The manpower requirements method was developed by the United States Bureau of Labor Statistics in the 1950s to meet the need for evaluation of the future demand for labour. This approach was influenced by expectations of continuing economic growth and a strong belief in manpower

planners' ability to fine-tune the supply of labour coming onto the labour market from the educational and training systems to the occupational demand for labour by the production system. Evaluations at the end of the 1960s of the results of occupational forecasting models showed that such fine tuning was very difficult to do because the relationships between education, training, and occupation were far more complex than was assumed in the early projection models.

The projections which had been made for France for the 1970s in the fifth and sixth economic plans were blown off course by the first oil crisis, because of the major occupational and sectoral transformations necessitated by the need to reallocate resources away from energy intensive industries. This poor performance of the forecasts resulted in a substantial modification of the role assigned to the educational system in balancing the supply and demand for different skills in the Seventh Plan. The Seventh Plan, for the period 1976–80, abandoned the confrontation of demand with supply "thereby rejecting any detailed normative analysis aimed at the school system" as Paul (1985, p. 50) notes.

Following this there was a period of considerable doubt in France about the wisdom of manpower and educational planning in a free-market economy in which many types of labour and education were in surplus. This resulted in the omission of any occupational forecasts from the Eighth Plan for the period 1981–85, a period also characterised by decentralisation, and such forecasts have not been included in any subsequent economic plans for France. Despite this there continued to be a demand for occupational forecasts for France and in 1987 the Minister for Social Affairs and Employment launched an initiative which brought together employers, trade unions, and professional associations at a Round Table on occupational training. This movement has led to the gradual transfer of major responsibilities for training and employment to regional authorities. In order to support this decentralisation (since 1982), tools for analysis and diagnosis have to be developed at a regional level, so the Regional Employment and Training Observatories (Observatoires Regionaux de l'Emploi et de la Formation) were created. This framework consists of a central authority and regional observatories for the co-ordination of manpower forecasting activities on which employers, trade unions, and professional organisations are represented. These organisations have three main objectives:

a) at the macroeconomic level, to provide a general framework for the analysis of medium-term occupational trends and the examination of alternative employment scenarios;
b) at the regional level, to arrange contracts between the State and the regions which will permit the development of regional manpower forecasts;
c) at the occupational level, to provide for forecasting study contracts (Contrats d'Etudes Previsionnelles) between the State and occupational interest groups which will allow a common approach to occupational evaluation by the public and private sectors.

The context within which these objectives are realised is that the forecasts are used to explore the implications of alternative scenarios for education and training needs, not to specify the needs of the economy for qualifications from which it will be possible to determine the volume of training. The new approach to forecasting education and training needs in France is to examine the conditions for coherence between a changing employment structure and the evolution of the training system. This requires a confrontation between two processes which are partly autonomous and partly interdependent (see Commissariat General du Plan, 1991).

In the Netherlands the government has a legal responsibility to provide adequate education for all individuals or groups for all levels of education. Hence, decision makers are obliged to try and anticipate the demand for education at different levels and to provide the necessary resources and educational facilities to accommodate this demand. This means that employment forecasting in the Netherlands has focused on both type of education and occupation. The forecasts which were made for the Netherlands by the Central Planning Bureau up to the first oil crisis used the manpower requirements approach to produce estimates for four levels of education and four branches of study. These were too few categories to be useful to educational planners or to help individuals make educational or training choices. In the mid-1980s the Dutch Ministry of Education and Science commissioned the Researchcentrum Voor Onderwijs en Arbeitsmarkt, ROA (Research Centre for Education and the Labour Market) to develop an information system which would help individuals in the education system to make educational and vocational training choices.

The primary objective of ROA's approach is to provide information on current and future developments in educational and occupational labour markets which is representative and integrated with relevant information on the economy and which differentiates between different occupations and types of education and vocational training. This information is intended to increase the transparency of the match between education and the labour market thereby facilitating careers advisors and individuals in making educational and vocational choices. The lead time required from the provision of this information until individuals begin to emerge from the education and training systems with qualifications ranges from several years, in the case of vocational training, to four years, in the case of higher vocational and university education. Hence, the information system for the Netherlands is focused on providing data on future labour market prospects of different types of education and occupation, as Dekker, de Grip, and Heijke (1994) point out in their account of the forecasting models used by ROA. Since there are elements of risk for individuals in choosing a type of education, an occupation, and a sector to work in, ROA's labour market information system for the Netherlands provides a series of risk indicators on the cyclical sensitivity of employment in different sectors and occupations for individuals with particular education and training qualifications and which give information on the number

and type of occupations which different educational and vocational qualifications provide access to.

Occupational forecasts for Ireland have only been published since 1993. The main objectives of the Irish forecasts are to provide information on the changing pattern of occupations and to identify possible changes in future skill requirements. A broad classification of sectors and occupations is used and the forecasts help to determine medium-term labour market strategies and to facilitate the planning of training by the national Employment and Training Authority (Foras Aiseanna Saothar – FAS).

Before 1993 a number of efforts were made to provide manpower forecasts for Ireland using the manpower requirements approach (see Hughes, 1991). Ireland participated in the work of the Educational Investment and Planning Programme initiated by the OECD Committee for Scientific and Technical Personnel in 1962. Medium-term projections were made for 7 occupational groups and 99 sectors but the results were never published. In the 1970s similar projections were made for 16 occupational groups and 24 sectors by the Department of Labour but these were not published either. Following an initiative by the Minister for Labour the national Employment and Training Authority (FAS) entered into discussions with the Economic and Social Research Institute (ESRI) to develop an occupational forecasting system for Ireland. In May 1990 the ESRI and the Employment and Training Authority entered into an agreement to develop such a system and to produce regular occupational forecasts for Ireland. To date three sets of forecasts have been produced for the periods 1990–96, 1991–98, and 1995–2003.

Before the reunification of Germany occupational forecasts were made by a variety of organisations including trade associations, market research firms, and research institutes. The manpower requirements approach appears to have been first applied in the mid-1960s by Bombach (1965) to forecast the expected demand and supply for highly qualified manpower classified by education and occupation. The objective of these forecasts was to identify the kind of graduates the educational system should be producing. Official responsibility for labour market forecasting was given by the Employment Promotion Act 1969 to the Nüremberg based IAB (Institut für Arbeitsmarkt- und Berufsforschung der Bundesanstalt für Arbeit, Institute of Employment and Occupational Research at the Federal Institute of Labour). In the 1960s and 1970s there were lively debates in Germany between advocates of occupational forecasting, who believed it could help to avoid mismatches of supply and demand, and critics who argued that it is incompatible with the exercise of free educational and occupational choices.

This resulted in the adoption of a socially determined approach to the projection of labour supply and a manpower requirements approach to the projection of labour demand and the use of growth scenarios to tease out the occupational and

educational implications of the forecasts.[1] The forecasts for Germany are principally intended for policy makers rather than career guidance officers or individuals. Hence, the policy role of the forecasts is dominant and little emphasis is placed on their role in informing educational or occupational choice.

Since the mid-1970s IAB has made forecasts in collaboration with the Battelle-Institute and subsequently with Prognos AG for 34 sectors, 60 branches of activity, and 8 graduation levels. The forecasts are made for branches of activity rather than occupation because of the desire of the forecasters to use them for policy purposes.

Role of Occupational and Educational Forecasts

It is clear from this brief account of the development of occupational forecasts in the four EU member countries that they now have two main roles – a policy role and an information role (see Hughes, 1994). Their policy role is to supply information on employment trends for broadly defined occupational groups for the employment and training authorities. Their information role is to supply data on employment trends for a large number of occupational sub-groups and types of education and vocational training which will make the labour market more transparent for career guidance counsellors, school leavers, employers and others. These users are interested in having occupational forecasts for educational planning, and other, purposes so that the intake of students into different levels of education and training programmes can be regulated to ensure that excess demand or supply are minimised across the occupational spectrum. In the past it has proved difficult to match the supply of labour by education to the demand for labour by occupation with the degree of precision expected by educational planners because of the lack of a clear relationship between education and occupation, apart from professional and technical occupations for which specific educational qualifications are required. Development of new procedures for analysing the occupational domain of different educational and training qualifications by researchers at the Research Centre for Education and the Labour Market in Maastricht have made it possible for countries which have good data on the educational profile of occupations to consider producing more detailed estimates of excess demand or supply.

Whether the forecasts focus on the policy role or the information role will depend on a number of factors including the availability of data. The forecasts for Ireland are made for policy purposes primarily for two reasons (a) the lack of information on the educational and training qualifications of those at work classi-

[1] The socially determined approach to estimating the number of places required in the educational system is generally described as "social demand". The fact that this refers to the supply side of the labour market can be confusing.

fied by occupation and (b) the need to build confidence among users of occupational forecasts by providing broadly based information on current and expected future labour market developments. Forecasts for policy purposes provide information on the implications of existing employment trends, the current position in occupational labour markets, the kind of changes which can be expected, and the effect which different courses of action could have on the level and structure of employment in the future. This case is put by Wilson (1992, p. 52). He argues that the prime objective of occupational forecasts is:

…to provide a set of 'points of reference' for policy makers and other interested parties. These should indicate the sort of economic environment they are likely to face, highlighting the main problem areas, quantifying the scale of any difficulties that may be foreseen, and estimating the impact of different policies. [Such forecasts] provide a useful 'point of departure' for those interested in planning for the future. The alternatives are, on the one hand to rely on past data 'to speak for itself' or, on the other hand to reject all attempts at quantification. The former is extremely restrictive and rules out the consideration of major structural change. It also provides little or no insight into the reasons for past developments. The latter alternative denies the very real need of policy makers for some guidance on the likely size of the problems they may face.

One result of this approach is that occupational forecasters now argue that the forecasts should be seen as an aid to governments which can help in the development of more effective employment policies and in strengthening links between education and the labour market. They also argue that the forecasts have a role in helping decision makers in education and training, business, and the trade unions to respond intelligently to changing conditions in the labour market. Governments now use occupational forecasts to develop a wide variety of schemes to cope with unemployment. Education and training authorities use them to take decisions on the provision of vocational and other training programmes, and businesses and trade unions use them to identify skills which could be in shortage or surplus.

Data

Table 1 provides summary information on the basic data which are used in each country to make forecasts of education and training needs. The four EU countries use quantitative data as the basis of their forecasts and they use trend projection or regression methods to make the forecasts. Their focus on quantitative techniques squeezes as much information as possible out of existing sources. It also means that there is no attempt to systematically incorporate qualitative data from labour market participants or from special surveys of sectors or occupations. This may exclude opinions on current labour market developments but it is the most cost effective and rigorous way to provide hard information on the labour market

implications of the continuation of existing trends. The results are evaluated to see if they appear reasonable in the light of expectations about economic and labour market developments over the forecast period. In the vast majority of cases the forecasts produced by the projection models are accepted but there are usually a small number of cases where the results may be questionable. In these cases the researchers may select another regression equation to adjust the projection or they may impose an outcome in the target year which appears reasonable in the light of expected future trends.

In the case of Ireland and the Netherlands, the basic data which are used as an input into the occupational forecasting models are provided by the Labour Force Surveys which both countries carry out in co-operation with Eurostat. The Labour Force Survey data for Ireland are supplemented by data on employment by sector and occupation from the Census of Population to furnish a perspective on occupational trends which minimises the effects of cyclical fluctuations. Data for France are provided by two surveys, the regular Employment Survey and the Training Vocational Qualification Survey, carried out by INSEE (the National Institute of Statistics and Economic Studies) in 1993. For France and Ireland similar data sources are used to provide information on the educational profile of occupations. For the Netherlands ROA has sources of information on the educational and vocational training systems using the Reference Forecasts of Flows of School-leavers carried out by the Dutch Ministry of Education, Culture and Science, the Educational Accounts maintained by Statistics Netherlands, and its own surveys of school-leavers, which include the RUBS survey of general secondary education and lower and intermediate vocational education, the HBO-Monitor of higher vocational education, and the WO-Monitor of university education. It is these sources of information on educational flows in the Netherlands which permit detailed analysis of the qualifications of the labour force and of new labour market entrants and which allow forecasts of occupational demand by type of education to be compared with those of the supply of new entrants and re-entrants by type of education. This comparison generates detailed qualitative information on labour market prospects by occupation and type of education.

The primary source of information for the German forecasts is the Mikrocenzus of establishments. To date, six of these surveys have been carried out in West Germany during the period 1985–95 and three in East Germany between 1992 and 1995. The survey is representative of 1.6 million establishments employing about 29 million people. The survey repeatedly surveys the same establishments so this panel dimension permits cross section and longitudinal analysis of the data. Some of the establishments participating in the survey undertake short- and medium-term human resource planning and information is collected about their future manpower requirements and their internal and external training activities.

In terms of the length of the period for which data is required to prepare occupational forecasts the ideal would be to have time series data with enough obse-

Table 1: Data used to forecast educational and training needs in EU countries and available in CEE countries

	Data	France	Germany	Ireland	Netherlands
1.1	Type of input	Quantitative and qualitative	Quantitative + judgement	Quantitative + judgement	Quantitative + judgement
1.2a	Sources of data: Sectors	Employment Survey; Census (INSEE), Staff Turnover Statistics	Microcenzus 1985, 1995 W. Germany 1992, 1995 E. Germany Establishment Panel (6 in West G., 2 in East G., 1.6 establishments, 29 mil people), BGR	ESRI Medium-term model	ATHENA model of Netherlands Bureau of Economic Policy Analysis (CPB)
1.2b	Occupations	Training Vocational Qualification Survey, Job seekers statistics, Census	Microcenzus 1985, 1995 W. Germany 1992, 1995 E. Germany	EU Labour Force Survey (CSO)	EU Labour Force Survey (SN)
1.2c	Education & training	Census; Trainee Population Statistics;	BGR: The IAB Educational Accounting System, running since 1986, time lag ca. 2 years Based on specific surveys of educational and employment system	Census of Population & Labour Force Survey (CSO)	EU Labour Force Survey (SN); Reference Forecasts of Flows of School-leavers (DMECS); Educational Accounts (SN); Surveys of School-Leavers, RUBS, HBO-Monitor, WO-Monitor (ROA)
1.3	Sample or census	Both	Both	Both	Both
1.5a	Data period	15 years	11 years (1985–95) West Germany 4 years (1992–95) East Germany	1981, 1986, 1991, 1995	5–10 years
1.6	Contribution of irregular surveys	Young people starting working life (CEREQ); Sensitive jobs & obsolete skills (Quaternaire Education)	BIBB-IAB-Enquiry Performed in 1985/86 1991/92 current: 1998/99 Title: Qualification and their use in the employment system	Not used	Not used

Table 1 (continued): Data used to forecast educational and training needs in EU countries and available in CEE countries

	Data	Czech Republic	Poland	Slovenia
1.1	Type of input			
1.2a	Sources of data: Sectors	Firm Census of Employment and Wages (Czech SO); Costs of Labour (Czech SO); Survey of Economic Units (Private firm + Min. of Labour)		Employment Survey (ESS); Survey of Company Training Needs – Podravje Region (HRDF) Survey of Companies (RSSO)
1.2b	Occupations	Labour Force Survey ; Business Survey ; Census of Population ; (All Czech SO)	Labour Force Survey ; Population Census; (All Polish SO)	
1.2c	Education & training	Register of Labour Offices ; School enrolment data (Min. of Ed.)	Registered Unemployment (Polish SO and National Labour Office); Survey of Labor Demand and Survey of Employment Graduates (All Polish SO)	Employment Survey (ESS); Survey of Company Training Needs (HRDF): ESS data base
1.3	Sample or census	Both	Both	Sample
1.5a	Data period	5–10 years	5–10 years	
1.6	Contribution of irregular surveys	First Destination of Third Level Graduates (Int. project); First Destination of School Leavers (National education fund): Labour Market Histories (Economics Institute);		

HBO = Higher Vocational Education;
RUBS = General Secondary Education and Lower and Intermediate Vocational Education;
WO = University Education;
Note: The figures in the first column of this and subsequent summary tables refer to the number of the question which each country was asked to answer in supplying information about data sources and forecasting methods. The source for this table is thus the individual country reports.

rvations to enable modelling of the determinants of occupational and educational change to be carried out. Sufficiently long runs of data are available for France and the Netherlands from their employment and labour force surveys to make this possible and the occupational and educational forecasts for the Netherlands use the results of such models. There is not yet a sufficiently long run of data for Ireland from the Labour Force Survey to permit occupational modelling. The first published occupational forecasts for Ireland were prepared by combining information on employment by sector and occupation from the Census of Population and Labour Force Survey to provide four data points. Trends in the occupational shares within sectors were then projected by extrapolation of the average annual growth rate or by regressing the occupational shares on a time variable.

The national sectoral employment forecasts for France produced by the BIPE DIVA model feed into the forecasting study contracts of about twenty occupational or professional interest groups which produce assessments of the qualification requirements of particular sectors at national and sometimes at regional level. At the national, regional, and sectoral levels, all the studies used data from INSEE, censuses, employment surveys, turnover surveys, data from CEREQ on training and qualifications and continuing vocational training in companies, irregular surveys for the relevant sector, and qualitative data incorporating insights from professional organisations, research centres, experts, and firms. A study of the chemical sector, for example, used survey information from CEREQ and Quaternaire Education for 20 firms on jobs and skills at risk from technological change. The approach which is used to make sectoral assessments is quantitative and qualitative. Experts' knowledge of the sector is used to identify the professional categories in which those in the sector work. A qualitative analysis is then undertaken of each profession and forecasts are made of future qualification requirements.

The Regional Employment and Training Observatory for Burgundy (OREF-Bourgogne) analyses the implications for local areas of sectoral assessments. It translates qualification requirements of a particular sector into training needs by using population censuses, surveys of employment and staff turnover, regular surveys of the integration of trainees into local workplaces, job seeker statistics, and career surveys. It identifies factors which are likely to influence skill requirements and uses qualitative and quantitative scenarios to reach conclusions about the adjustments which may be required in the future. Training data is available by level of education, type of diploma, and speciality (basic subjects, technical-vocational field, personal development field). OREF-Bourgogne classifies the type of education and specialities into thirty training fields at the regional and local level.

Forecasting Methods

While there is considerable complexity in the forecasting models used in each of the EU countries they share a common quantitative approach based on man-

power requirements and social demand models. This is illustrated in Table 2 and in the stylised flow-diagram in Figure 1. The four countries use a medium-term macroeconomic model which takes account of the domestic and international economic outlook to produce forecasts of employment by sector 6 to 10 years ahead of the base period. An occupational shares model is used to disaggregate historical data on sectoral employment by occupation and to project occupational shares within each sector to the target date. The occupational share forecasts are then multiplied by the sectoral forecasts to given estimates of expected demand by occupation. Similarly an educational shares model is used to disaggregate historical data on occupational employment by level of education or vocational training and to project educational shares within each occupation to the target date. The educational share forecasts are then multiplied by the occupational forecasts to provide estimates of expected demand by education. This completes the demand side of the forecasts.

On the supply side, models of the inflow of school-leavers and of the unemployed and those out of the labour force are used to project the number of individuals from each source with different types of education or vocational training who are expected to come onto the labour market in the target year. Summing the expected inflows from each source provides an estimate of the total number of individuals by type of education who are expected to be seeking employment in the target year. This completes the supply side forecasts.

The demand and supply forecasts are then brought together to identify which types of education or vocational training are likely to be in excess supply or demand in the target year. This information then enables the analyst to form a quantitative or qualitative view of labour market prospects by type of education in the target year.

The stripped down forecasting model in Figure 1 becomes more complex if other factors which influence the provision of employment are introduced. These factors include scenarios in which a number of different structural and other changes are allowed to occur, models in which the employment forecasts are broken into expansion demand and replacement demand, and models in which cultural and other changes are allowed to influence the social demand for education.

Of the four EU countries the forecasting method for Ireland is closest to the stripped down model. The forecasts are made for a 6 to 8 year period and are updated every two years. Estimates of expansion demand are given for 29 sectors and 45 occupational sub-groups. Although they are not an integral part of the Irish forecasts, the implications of occupational change for educational qualifications can be derived for broadly defined levels of education (see Canny and Hughes, 1994).

The national forecasts carried out by the BIPE (France) come next in terms of complexity. Estimates are made for 36 sectors and 14 professional categories. The

professional categories used for the French demand side forecasts combine occupational and employment status characteristics. This means that they are not directly comparable with the occupational forecasts produced for Ireland and the Netherlands which are derived from the International Standard Classification of Occupations. The CALIFE model is used to desegregate the professional categories forecasts by 10 levels of education. On the supply side BIPE produces forecasts of the supply of school-leavers for 5 diploma categories. In view of the difference between the number of education levels used in the demand side forecasts and the number of diploma categories used in the supply side forecasts it is not clear how the demand and supply sides of the forecasts are brought into confrontation to form a view of employment prospects by level of education.

IAB in Germany uses an Educational Accounting System (BGR) to provide information on stocks and flows of people in the education and training systems, in employment, unemployment and outside the labour force. This system allows analysis of transitions between different labour market states. It is supplemented by a model, ENTROP, based on the principle of entropy optimisation which uses the input-output RAS method to integrate heterogeneous transition data. The major difference with the RAS method is that both quantitative and qualitative information can be taken into account in transition analysis.

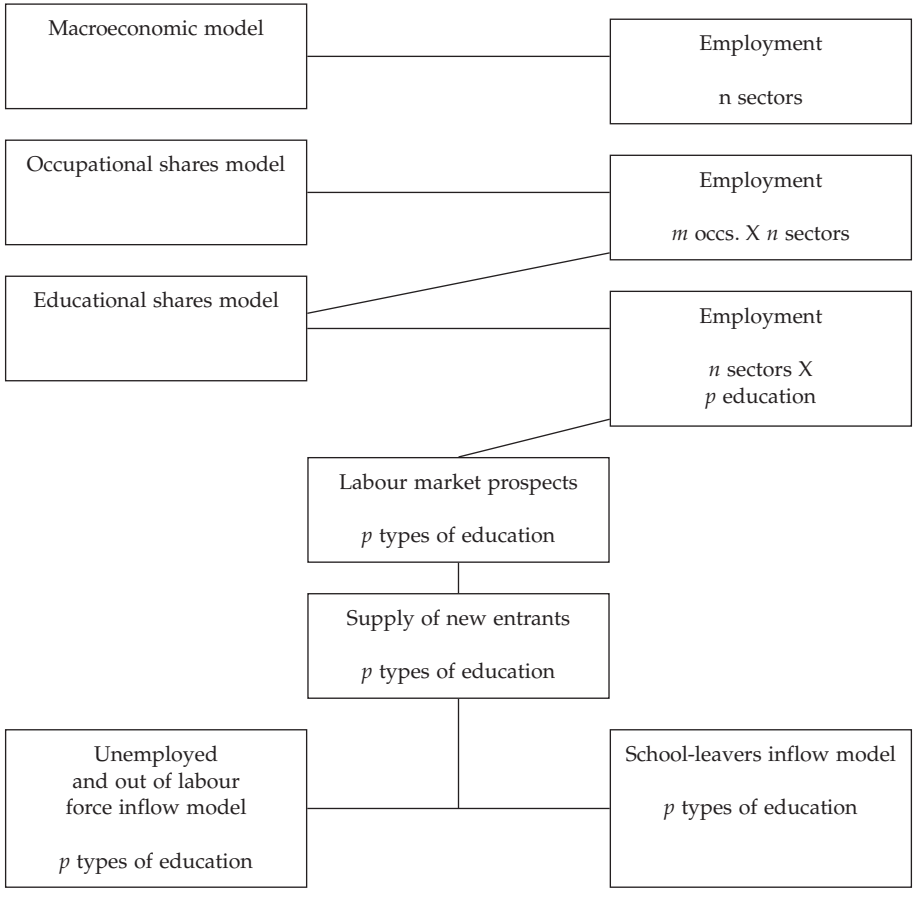
Forecasts of employment in Germany in 2010 are provided by a comprehensive model. In an ex-post analysis, the effect of influencing factors – technological, economic, social and others – on branches of activity are assessed. Qualitative factors are described and their impact is classified as positive (increase of employment in a branch of activity) or negative (decrease of employment in a branch of activity). The expected impact is based on empirical analysis of past trends and forecasts of future trends. The results are standardised and transformed from a cardinal to an ordinal measure. Matrices of sectors and branches of activity form the basis for the extrapolation. The trend is projected and modified to take account of the influencing factors. Three variations are possible. The trend is accepted, increased or decreased. This gives a range of forecast results. In addition the forecasts by branch of activity are disaggregated in a parallel analysis to provide forecasts of the demand for skills. The current model uses a multivariate approach which is still in the course of development.

The most complex and detailed forecasts are produced by ROA for the Netherlands. It uses manpower requirements and social demand models to make projections for 6 years ahead which are updated every two years. Forecasts of expansion demand are made for 13 sectors and 127 occupations and expansion and replacement demand forecasts are made for 127 occupations and 104 types of education. The inclusion of replacement demand forecasts means that estimates can be made of the total number of job openings there are likely to be in the target year. Information on job openings is particularly useful for training purposes. Given the scale of retirements and withdrawals for other reasons from the labour

Table 2: Methods used to make forecasts in EU countries

	Method	France	Germany	Ireland	Netherlands
2.1	Approach	Manpower Requirements	Manpower Requirements	Manpower Requirements	Manpower Requirements and Social Demand
2.2a	Forecast period	10 years	11 years	8 years	6 years
2.2b	Target year	2005	2010	2003	2002
2.3	Updating	Irregular	6–8 years	2 years	2 years
1.4a	Sector x occupation	36 x 14	40 x 38	29 x 45	13 x 127
1.4b	Occupation x education	14 x10	38 x 12	45 x 5	127 x 104
2.4 b	Expansion demand	14 professio-nal categories	No demographic calculations for the demand desegregation	45 occupati-ons	13 sectors 127 occupations 104 education types
2.4c	Replacement demand		See above		127 occupations 104 education types
2.4d	Job openings		No consideration of the flows on the labour market		127 occupations 104 education types
2.4e	Supply of graduates	5 diploma categories	BGR 12 categories		104 education types
2.4f	Information provided	No. of young workers required; No. of young people available with 5 diploma categories;	Aggregated demand for the above categories: Occupations Sectors Qualification levels In total numbers without consideration of the demographic changes	No. of workers required	5 point indicator of future labour market situation for 104 education types 5 point indicator of future risks of labour recruitment problems for 104 education types 5 point indicator of occupation switching opportunities for 104 education types 5 point indicator of sector switching opportunities for 104 education types 5 point indicator of employment sensitivity to cyclical changes for 104 education types
2.5	Min. cell size		300 persons		Random coefficients model allows pooling of data

Figure 1: Stylised Flow-diagram of Occupational and Educational Forecasting Method



force, replacement demand for many occupations and types of education can considerably exceed expansion demand. Hence, the total demand for particular types of education and vocational training can be greatly in excess of the demand indicated by expansion demand forecasts. In order to generate replacement demand forecasts models of replacement demand by occupation and educational qualification are added to the expansion demand models used by ROA. The production of replacement demand forecasts can require considerably more data than forecasts of expansion demand because of the age and labour market flow dimensions. However, stock data are used to derive net flows thus lowering the data requirements. On the supply side social demand models are used to provide forecasts of the expected supply of new entrants and re-entrants to the labour market in the target year for 104 types of education.

The demand and supply forecasts for the Netherlands are brought together at the end of the two stages of the forecasting process to provide a view of labour market prospects by educational qualification. These views are based on a quantitative assessment but they are presented in qualitative terms. This is because most of the information individuals require to choose a type of education in the light of labour market prospects can be given qualitatively. Presenting information on employment prospects in this way has the advantage that it does not imply a greater degree of accuracy than is warranted by estimates based on sample surveys and the errors which are an inherent part of any forecasts.

Neither of the forecasting models for France and Ireland specifies a minimum cell size for the basic data required to make the forecasts. However, small cell sizes are unlikely to pose problems for these countries' forecasts since they are made at such a high level of aggregation. They could pose problems for ROA's forecasts because they are made for a large number of occupations and types of education. However, the problem of unreliable data in some cells is minimised by pooling it and using a random coefficients model to prepare the forecasts for the Netherlands.

Forecasts for the Limburg region around Maastricht are made by ROA but there are no regional forecasts for Ireland. BIPE does not produce regional forecasts for France but the French Regional Employment and Training Observatories use the national forecasts as an input into their work at regional and local level.

Evaluation of Data and Reliability of Forecasts

Key questions for anyone wishing to produce occupational and educational forecasts are: how reliable are the basic data used to make the forecasts and how accurate are the forecasts?

In the case of all four EU countries the quality of the basic data is guaranteed by the institutions supplying the data (see Table 3). These institutions are national statistical offices, government departments and research institutes which have a long tradition of producing high quality labour market information. The labour market data is closely scrutinised in all four countries for consistency between different data sources (e.g. Census of Population and Labour Force Survey) and adjusted if required. Thus, the data for Ireland and the Netherlands are adjusted periodically to take account of revisions to sectoral, occupational, or educational categories to provide consistent data series.

The sector, occupational and educational categories used in all four EU countries reflect either classifications used by the national statistical offices in presenting their data or classifications which are of particular interest to users of the forecasts.

It is evident from the history of occupational forecasting in the four EU countries that forecasts can be seriously blown off course by unexpected shocks such as

the two oil crises in the 1970s. In the face of such major shocks the best thing to do is to take a leaf out of macroeconomic forecasters' book and to revise the forecasts to take account of the new developments. In the case of lesser shocks, the use of a medium-term rather than a short-term perspective minimises the impact of cyclical fluctuations in all four countries. The forecasts for the Netherlands incorporate a five point indicator of the sensitivity of 104 types of education to cyclical changes in employment in each sector.

The most thorough evaluation of the performance of occupational and educational forecasts in the four EU countries is that undertaken for the Netherlands forecasts for 1992 by Borghans, van Eijs, and de Grip (1994). They assessed the forecasts for 79 occupational classes and 53 types of education by evaluating how useful they were to the average individual choosing a course of study or occupation. They used the squared difference between the outcome and the forecast for each occupational and educational category relative to the outcome to permit an average loss to be calculated for each category. The forecasts for each sector, occupation (expansion and replacement demand), type of education (expansion and replacement demand) and labour market indicator were scored by relating them to a reference forecast. The reference forecast indicates the situation students would have faced if no forecasts had been available to them. In such circumstances it is assumed that choices would have been based on the current labour market situation. Since there would have been no change between the base year and the target year the reference forecasts are referred to as the Same as Before forecasts. A score greater or less than 1 indicates that the forecast for a particular category is worse or better than the reference forecast. The evaluation study for the Netherlands concluded that:

> "the score … shows that the loss in the forecasts of expansion demand per occupational class is not exceptional. In comparison with the reference forecast, the prediction of the expansion demand is thus no worse than other components of the forecast model. The score of the point forecasts for most components could be said to be mediocre. The value is generally somewhat lower than [1] which implies that the forecasts are only a little better than the reference forecast. … There is also a clear reason for the moderate quality of the forecast of expansion demand per occupational class: the lack of a trend in most of these forecasts. The table shows that if the forecasts for economic sectors had been distributed over the occupational groups using the correct structure matrix for 1992, the score for the forecasts for occupational classes would have been 54 %. The score for those occupational classes for which a trend variable was incorporated in the forecasts was 47 %." (Borghans, van Eijs, and de Grip, 1994, p. 99).

There is no information on how the forecasts which BIPE produced for France for the period 1984–94 performed but assessments of earlier forecasts made by the Commissariat General du Plan for the period 1966–70 and 1971–75 suggest that the mean absolute percentage error in the forecasts was about 10 per cent. This meets the standard of accuracy used by the U.S. Bureau of Labour Statistics in evaluating its occupational forecasts. It is clear from evaluations of occupational forecasts in France, Canada, the United States, and the Netherlands that the average

forecast error increases as the number of occupational groups increases. This is one reason why some countries use a relatively small number of occupational groups in making their forecasts. While quantitative accuracy is, of course, desirable it is not the only measure which should be employed in assessing the performance of occupational and educational forecasts. A qualitative indicator of the direction of change may be very useful. The forecasts for the Netherlands use such indicators and the National Careers Guidance Information counsellors have found them very helpful in diagnosing the employment position and employment prospects for a wide variety of courses of study (see Hughes, 1994). In Germany the forecasts were evaluated regularly until German unification. Ten years after this event, the current development returned to its former path.

Table 3: Evaluation of data and reliability of forecasts

	Method	France	Germany	Ireland	Netherlands
3.1	Data	Quality guaranteed by supplier at regional and national levels	Quality guaranteed by supplier	Quality guaranteed by supplier; Consistency checks; LFS data revised after each Census	Quality guaranteed by supplier; Consistency checks
3.2	Forecast reliability		Comparing former forecasts with real development	Compare forecasts for occupations with actual outturn	Detailed comparison and evaluation of all forecasts are made regularly and the results are published;
3.3	Sensitivity to data revisions		Data revised to provide consistent definitions	Data revised to provide consistent definitions	Time series revised to provide consistent definitions
3.4	Stratification of vocational training		The education in the dual system is incorporated in the labour market from the beginning	Sector classification reflects industry groups used by national training authority	Educational classification reflects different levels of vocational training; Group types of education with similar occupational domain;
3.5	Sensitivity to shocks		Experience of German unification used to assess sensitivity	Choice of forecast period minimises effects of shocks	5 point indicator of employment sensitivity to cyclical changes provides guidance for 104 education types
3.6	Regions	National forecasts used by regional OREF	No experience except East/West Germany	No regional breakdown	Forecasts made for one region (Limburg)

Only a preliminary assessment has been carried out of the performance of occupational forecasts for Ireland. It shows that the average forecast error for occupational groups was less than 10 per cent while the sectoral forecasts were also broadly accurate, although there was a significant underestimation of employment in services.

Dissemination and Users of Forecasts

Summary information on the users of the forecasts in the four EU countries is given in Table 4. The users are largely determined by the purpose for which the forecasts are made. In France and Ireland, where the forecasts are intended to give a broad brush picture of likely developments in skill requirements, the users are the ministries of employment and education, the authorities responsible for industrial and regional development, and employer and trade union organisations. They may also be used by career guidance advisers in the absence of more detailed forecasts which they would like for types of education. The French forecasts are also used as an input into sectoral studies by organisations responsible for

Table 4: Dissemination and role of users of forecasts

	Method	France	Germany	Ireland	Netherlands
4.1	Final users	Ministry of Education; Educational and vocational guidance officers; Professional branch of metallurgy sector; Regional institutions (regional council);	State and school administration, employers, human resources administrators, trade unions, students, parents.	Employment and Training Authority; Department of Enterprise and Employment; Department of Education; Industrial Development Authority; The Policy and Advisory Board for Industrial Development in Ireland;	Ministry of Education; Ministry of Social Affairs; Ministry of Economic Affairs; Ministry of Agriculture; Public Employment Services; National Careers Guidance Information Centre (LDC); Educational and vocational guidance officers; Educational institutes; Personnel managers; Advisory Councils;
4.2	Channels	BIPE reports; OREF reports;	CD and WWW	FAS/ESRI reports	ROA reports; LDC information products (Traject Series (CD–ROM), Occupation and Work Series, The Labour Market Newspaper of the Netherlands, Chances of Finding Employment in 2002)
4.3	Users role	Active	Passive	Active/Passive	Active

employment and training at regional and local level. The forecasts for the Netherlands are used by the ministries of education, social affairs, economic affairs, and health. The National Careers Guidance Information Centre makes extensive use of them in the information products which it produces to help school-leavers make informed educational choices. Most of those who use the forecasts in the four EU countries are active participants in the labour market.

All of the forecasts in the four EU countries are published in reports issued by the organisations responsible for making the forecasts. These reports receive extensive coverage in newspapers and on radio and television, and the authors of the reports are frequently asked to present their work to a range of organisations which have a particular interest in education and occupational employment.

Part II: Forecasting Models of Education and Training Needs in CEE Countries

Introduction

The main conclusion that emerges from the reports from the Czech Republic, Poland and Slovenia (Münich et al., 1999; Kabaj, 1999; and Luzar and Gerzina, 1999, respectively) is that these three countries are in very distinct situations with respect to their forecasting systems for labor market qualifications and training needs. Because of extremely low rates of unemployment until very recently, *inter alia,* there is not only no forecasting system in place in the Czech Republic, but also a less clearly defined intention by the government to develop one. In Poland, the government has explicitly recognised the need for such a system to be in place and is taking appropriate measures. The government has set up a high-level expert team, which has assessed four different methodologies and tested them in pilot studies in a few Polish regions. In Slovenia, attempts to anticipate the need for forecasting systems cover the most problematic and industrial eastern part of the country (the Maribor region). Although coverage is regional, employment forecasting in Slovenia seems to be at a more advanced stage than in the Czech Republic or Poland. The difference between the countries largely dictates the content of the information that follows.

Data

The Employment Service of Slovenia (ESS) is the only institution which has systematically recorded training needs at the national level. The report indicates the existence of other initiatives, such as the regional survey on training needs in Podravje Region carried out by the Human Resource Development Fund (HRDF) in Maribor.

Companies voluntarily provide yearly data to the ESS Employment Plan survey. It is noted that the employers consider the survey to be more a formal, and traditional, obligation. The data includes figures for employment in the preceding and following year by level of education, expected retirements and planned openings, and on shortages of workers with specific vocational qualifications. This is complemented with data on employment, registered unemployment, structure of registered unemployment, and unemployment rates, also gathered by the ESS on a regular basis.

Data on the training needs of the companies that the HRDF is collecting irregularly (although planning to do so regularly in the future) includes data on previous education and training in the company, on existing training programs, planned vacancies, investments in human resource development in the company, and data on future skills and qualifications required by companies. The data are collected within industrial branches.

Because there is currently no regular forecasting of occupational and educational needs on the labour market in the Czech Republic, the report surveys the data sources most likely to be suitable for such forecasting and also notes those which are deemed not currently usable, but could readily be amended to serve forecasting purposes.

Among regular data sources, the report discusses the following Czech Statistical Office outputs: the quarterly Labour Force Survey, the monthly and quarterly registered unemployment data, business surveys (which are deemed not currently usable for forecasting occupational and educational needs), and company census data. In addition, the report notes that the Ministries of Education and of Labour also produce regular, potentially useful, data sets on school enrolments and on unemployed graduates. Among irregular sources, the report notes the Faculty of Social Sciences' survey of "Success of Tertiary-level School Graduates," the National Training Fund's OECD project of school leavers, and the Economics Institute's survey of Labor Market Histories. Finally, the International Adult Literacy Score Surveys have been carried out in the Czech Republic and Poland. While not of special use for forecasting, these surveys provide evidence on the quality and distribution of cognitive skills and the impact these have on labour market outcomes for individual workers.

Methods, Evaluation of Data and Reliability, and Dissemination and Users

In Slovenia, the outlooks produced by the ESS are up-dated once a year (and are made for a year ahead). They are primarily intended for quantitative measures, such as planned new vacancies of workers (for indefinite and definite periods of employment), by vocational qualification and formal education attainment. The time frame of the Slovene HRDF survey is from one to five years and there are plans to update

some of the information annually (e. g., training needs and skills.) The outlooks cover both quantitative and qualitative aspects. Forecasts are for planned new vacancies, new specific requirements due to technological development by occupation and by branch, required development of new tailor-made training programs and other development projects, unemployed, redundant workers and management. The forecasts are made on a regional level and by branches of economic activity.

The Czech report discusses various existing data that can be, but are not currently, used for forecasting of occupational and educational needs on the labour market, such as demographic forecasts which are available and regularly updated. The Ministry of Labour employs a simple time series model developed by CERGE to forecast registered unemployment at national, regional and district levels (these forecasts are updated monthly). Finally, the Ministry of Education uses a simple model to describe the acquisition and utilisation of professional skills in the national economy. Future demand factors, capacity of educational system and student demand are taken into account. Later, the labour market is modelled using Human Resources Accounting. The forecasts are used mainly for financial planing of the education budget.

In Slovenia, the reliability of data is checked by the response to the survey (size and structure of it) and by public discussions of the results. The reliability of the resulting figures is not checked for differences or changes in basic input series. In dealing with stratification of the vocational training in Slovenia, the report notes that the data on qualifications are based on formal education attainment levels (using the national coding system) and vocational qualifications. However, the education data collected are of a formal nature, and additional data on functional knowledge or special skills are not collected. The reliability of the forecasts to shocks and prolonged labour market adjustment is also checked against the responses to the ESS survey. In the case of the HRDF survey, reliability is checked by discussing the results with social partners and companies at ”round-tables.“ The report mentions plans to increase the number of participants (different target groups) in the future.

The final users of the ESS’s Employment Plan Survey in Slovenia include national, regional, and local employment services, national and regional offices of the Chamber of Crafts and the Chamber of Commerce and Industry, the Ministry of Education and Sport, the Ministry of Labour, Family and Social Affairs, individual employers or their associations, some training providers, and the Centre for Vocational Education and Training. The channels of dissemination include reports (national and regional), round tables, and press conferences. It should be noted that until the 1999 exercise, most of the final users, with the exception of the ESS offices, have had a predominantly passive role. From 1999 on, representatives of employers (Chambers of Crafts, Chamber of Commerce and Industry) will have an active role both in checking the questionnaire itself and in discussing the results of the survey.

The final users of the HRDF survey are the HRDF itself, regional Chambers of Commerce and Industry, Chambers of Crafts, ESS, MOLFSA, trade unions, employers, local communities, development agencies, training providers and other institutions involved in HRD. The information is disseminated through round-tables, articles in newspapers, and reports. The Slovene reports notes that most final users have an active role in the labour market.

Part III: Summary and conclusions

The approaches of the four EU countries to forecasting qualification and training needs differ in terms of (a) the purposes for which the information is provided, (b) the number of occupations and levels of education and vocational training for which the forecasts are made, and (c) their focus on the demand or supply sides of the labour market. Thus, the forecasts for Ireland are made for policy purposes, for a relatively small number of occupational sub-groups, and to give quantitative estimates of the medium-term expansion demand for labour by occupation and level of education. The same is broadly true of the national forecasts for France and Germany. However, the demand side forecasts for these countries are supplemented by supply forecasts which enable comparisons to be made of supply and demand by broadly defined level of education and vocational training.

The forecasts for the Netherlands are made for career guidance purposes, for a relatively large number of occupational sub-groups and types of education and training, and to give quantitative estimates of the number of job openings by occupation and type of education and vocational training. The Dutch forecasts are focused on making the labour market more transparent so that individuals will have access to information that will enable them to choose courses of study based on an informed assessment of what job prospects are likely to be when they expect to graduate. These differences in the purposes for which the forecasts are made, the number of occupations and types of education, and labour market focus are strongly influenced by the data which are available, by different views on the accuracy of forecasts for large numbers of occupations and types of education, and by the purposes for which the forecasts are made. The fact that the forecasts for France, Germany, and Ireland are made for 2 to 3 times as many sectors but for less than one-third as many occupations as those for the Netherlands clearly reflects different views about the purposes of the forecasts and ROA's view that distinguishing between a modest number of sectors enables it to distinguish between a considerable number of occupational groups.

Despite these differences in purpose, scope, and focus all four EU countries share a common approach to occupational forecasting which could be developed by the pre-accession countries to meet their particular needs if the data required are available. The critical requirement is that reasonably detailed information is

needed on the demand for labour by sector and occupation and type of education and, if possible, on the supply of labour by type of education. Ideally such data should be available for a sufficient number of data points to allow identification of (a) trends in occupational shares within each sector, (b) trends in educational shares within each occupation, and (c) trends in course choice by type of education and training.

One of the major differences to be borne in mind in considering the application of the standard forecasting method used in the EU countries in the transition countries is the extent of the restructuring which has occurred in these formerly planned economies. Whether data on changes in the structure of employment recorded in the first few years of transition (the only data yet available) provide a reasonable basis for estimating future trends is one of the major questions which has to be answered. Specifically, does the relatively short length of most time series for the pre-accession countries pose a major problem and do the frequent changes in statistical method render many of the existing labour market indicators unreliable? It is, therefore, important to establish which data are available and to develop a step-wise development of the forecasting method. It should be noted that the ideal in terms of data requirements is rarely met when countries are starting to make occupational forecasts. The Irish experience shows that useful information can be produced on the basis of a small number of data points. The first occupational forecasts which were published for Ireland were based on only four observations from three population censuses and one labour force survey and the data incorporated a significant revision of the occupational classification. The experience of IAB in using entropy optimisation in collaboration with Prognos AG in Switzerland to develop adaptation scenarios for East Germany may also provide useful guidance for the pre-accession countries. This approach shows how occupational forecasts based on limited data could be made for transition countries which are facing considerable demographic change, global economic change, new technologies, and changes in work organisation and the policy environment. In addition it is worth noting that the process of making occupational forecasts can lead to the generation of better labour market information as the authorities become aware of the many uses to which such forecasts can be put.

The state of occupational and skill forecasting in the three transition economies is very diverse, as are their future plans and requirements. The Czech Republic would benefit more from the quantitative approach to forecasting used by ROA (Netherlands) and ESRI (Ireland), while the French approach would be more appropriate in the Slovene situation.

One of the important messages of this report is that most of the necessary databases are indeed available. In general, however, they exist independently of each other because labour market information is collected by different agencies which are responsible for monitoring employment, unemployment, and education and training. Systematic integration of the information collected by these agencies

would add considerable value to existing data, close information gaps, and facilitate the analysis of a wide range of labour market issues.

What is needed to achieve this is to show that links exist, or can be created, between different data bases which will enable occupational and educational forecasting to be undertaken in the pre-accession countries. Hence, it is important to clarify if the data for the CEE countries on the occupational structure of employment are linked to (a) data on employment by sector and (b) employment by type of education and if the data on school-leavers and other labour market entrants classified by level of education are compatible with the classification of occupational employment by type of education? The three pre-accession countries appear to have data which have some or all of these links and all three have labour force surveys which might facilitate the development of such links. Consideration is now being given to how best to use data from labour force surveys to develop forecasts of education and training needs at national level in the Czech Republic and at regional, and possibly national, level in Poland. In Slovenia consideration is being given to how to develop forecasts of education and training needs which would be based on the regional and sector approach used by the French partners. It is intended that the approaches adopted will take account of individual circumstances in the CEE countries, that they will be cost effective, and broadly comparable with occupational and educational forecasting methods in the four EU countries.

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APPENDICES
Background Country Reports

Appendix I

Country Report on Labour Market Forecasting in the Netherlands

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1. Introduction

A well-trained workforce is generally seen as an important precondition for achieving economic growth. But a workforce with higher education does not necessarily imply higher economic growth. The productive value of education is in fact dependent not only on the level of the education but also on the subjects studied, and on which occupation is practised with that education. Moreover, educating the population requires educational facilities, which must be provided with resources which are then denied to other productive purposes.

The great diversity of types of education and occupations means that optimizing the contribution of education to economic growth involves solving a complex matching problem in the labour market. In a perfectly operating labour market, equilibrium would be achieved automatically. In practice the functioning of the labour market is obstructed by a wage structure which is relatively inflexible, limited opportunities for substitution between submarkets, high adjustment costs, the existence of various institutions intended to provide protection and security and the limited transparency of market events for all those who are involved. A particular problem in relation to the transparency of the labour market for students, firms and educational decision-makers is that the benefits of investments in education and training only become evident in the future.

In the past it was thought that the coordination between the education system and the labour market could be solved by planning. One well-known approach is the 'manpower requirement model' as applied, for example, by Parnes (1962), who developed a manpower planning model on the basis of the input-output structure of the economy. After a number of steps, the labour requirements in the various occupations and the educational qualifications which are demanded for these occupations are determined. The labour requirements are then compared with forecasts of the working population and the flow of graduates from the various types of training onto the labour market.

Partly due to the severe criticism on the initial manpower requirements approach, the planning function has disappeared almost completely. Van Eijs (1994) argues that nowadays manpower forecasting in the West is considered to have two functions: a 'policy function' and an 'information function'. The policy function refers to the usefulness of manpower forecasts as 'a point of reference' for policy recommendations for policy makers who have to take decisions on educational investments or other educational or labour market policies (Wilson, 1993). The information function is primarily intended to assist in occupational or educational guidance (cf. Dekker et al., 1993), although it could also inform firms on possible future recruitment problems due to the scarcity of workers with a particular educational background.

The forecasts of ROA focus particularly on the above mentioned information function of the manpower requirements approach, aiming at 'increasing the transparency of the match between education and the labour market' (Dekker et al., 1993). The labour market data are incorporated in a variety of information products for vocational and educational guidance purposes. ROA's own biennial report, *The Labour Market by Education and Occupation,* is intended rather for policy-making bodies, filling the policy function of the manpower requirements approach which was described above.

The remainder of this country report is structured as follows. In Section 2 we describe the global structure of the forecasting methodology of the ROA. Section 3 deals with the minimum data requirements for such a forecasting approach. In Section 4 we briefly discuss the reliability of the ROA forecasts. Next, in Section 5 we consider the dissemination of the labour market information generated. Section 6 concludes with the prospects for application of the forecasting methodology in the Central and Eastern European countries.

2. Forecasting Methodology

The idea behind the ROA forecasting approach is to track all the relevant flows which determine the supply and demand for school-leavers on the labour market. Figure 1 gives a schematic overview of the forecasting model used in the information system for education and the labour market. One flow volume which is important for the demand side of the labour market is the *expansion demand,* which reflects the movement in employment levels in a particular occupational class or for a particular type of education.

The forecasts of expansion demand are based on the employment level forecasts for economic sectors which are produced by the Dutch CPB Netherlands Bureau for Economic Policy Analysis. Because particular occupational classes within an economic sector grow more rapidly than others, ROA translates these changes in the economic sectors into the expansion demand per occu-pational class.

Then the implications of the predicted growth in the various occupational classes for the expansion demand for each type of education are determined. An allowance is made at this point for any shifts which may be occurring in the educational structure of occupational classes. The expansion demand per type of education refers to the number of people with a particular educational background that employers would like to be able to employ. The actual change in employment levels per type of education will generally differ from this because changes on the supply side affect relative scarcities and lead to substitution processes.

Demand on the labour market consists not only of expansion demand, but also of *replacement demand,* which arises when workers retire, leave the labour force under an early retirement scheme or due to work disability, withdraw from the labour market temporarily, or switch to another occupation etc. However replacement demand only arises if the departure of an employee actually leads to a vacancy for a new entrant. If the departure of a worker is taken as an opportunity to cut employment levels, no replacement demand results. These flows out of the labour market are in fact irrelevant for newcomers.

Thus only part of the flows leaving the market generate replacement demand. Moreover, there is an important difference between the replacement demand per occupational class and per type of education, because occupational mobility has an influence on the replacement demand per occupational class, but not on the replacement demand per type of education. Switching occupations has no effect on the educational structure of employment. On the other hand, where a worker undertakes part-time study for a higher level qualification, when he or she completes that qualification it means in fact an outflow of one worker to another educational category (type of education). In that case a replacement demand does arise in the educational category under which this worker's previous education was counted.

If employment levels are rising, the expansion demand and replacement demand together make up the *job openings* for newcomers to the labour market. If employment levels are declining job openings can only arise due to replacement demand.

In the labour market, the total demand for newcomers confronts the expected supply of newcomers. The latter consists of the future *flow of school-leavers entering the labour market* and the *outflow from training courses after and outside the regular education system* during the forecast period, plus the supply of *short-term unemployed* persons waiting to enter the market at the start of this period. It is assumed that the long-term unemployed, who have been looking for work for longer than a year, no longer constitute serious competition for school-leavers.

The forecasts of the flows of school-leavers entering the labour market correspond to the *Referentieramingen 1997* (Reference forecasts 1997) which are compiled

by the Ministry of Education, Culture and Science for courses in the 'regular' (i.e., full-time initial) education system. ROA disaggregates these forecasts, and supplementary data is used to estimate the effects of the flows from non-regular education on the educational makeup of the flows entering the labour market.

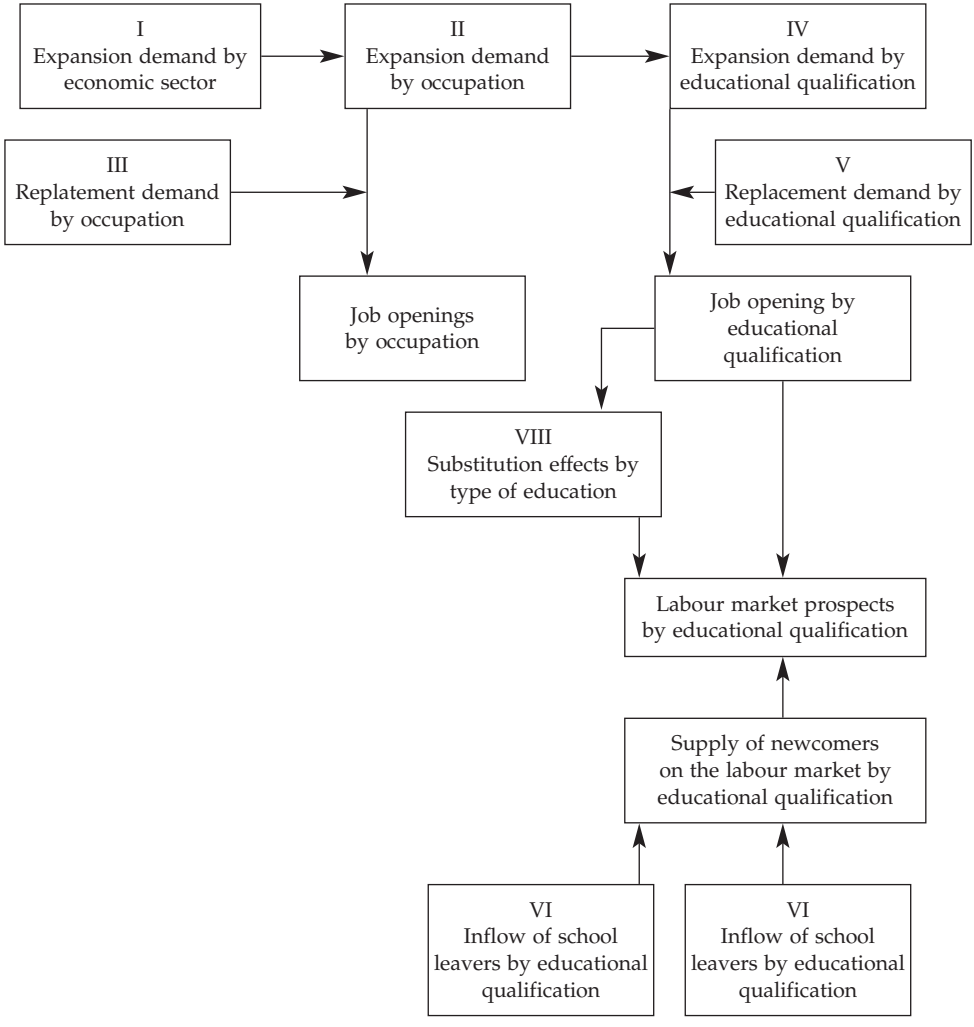
An indication of the *future labour market prospects* for newcomers to the labour market is derived for each type of education, by confronting the expected flows of demand and supply with each other. This indicator shows what discrepancy may be expected between the demand and supply for each type of education. But excess supply does not imply that the group in question will as a matter of course become unemployed, and a supply shortfall does not automatically mean that there will be unfilled vacancies. In practice, it appears that school-leavers with a type of education for which the supply exceeds demand do suffer from a deterioration of their position, for example because they are more likely to have to accept work below their level, get less favourable contracts, are less well paid or more likely to work part-time involuntarily. In such a situation, employers would normally modify their demands and recruit people with a higher educational background than was originally contemplated. On the other hand, if there is a supply shortage, the position of school-leavers will improve, and they will then not have to accept a job at a lower level, for lower wages, etc.

Because of substitution processes, there will be fewer job openings for those with the types of education which suffer from 'crowding-out' by types of education with an excess supply. On the other hand, for those with educational backgrounds which are closely related to types of education which are in short supply, there will be extra job openings. These *passive substitution effects* are thus important determinants of the labour market prospects of types of education.

The confrontation between demand and supply also gives an indication of the *future risk of labour recruitment problems* for each type of education. The expansion and replacement demand jointly determine the *recruitment requirement* for each type of education. If employment for a particular type of education is declining, this recruitment requirement is calculated in a somewhat different manner than the number of job openings for newcomers to the labour market, because from the employers' point of view it is possible to achieve part of the retrenchment by limiting their recruitment, so that fewer of the existing personnel have to be dismissed. Employers will be especially likely to use this option when they face a tight labour market for a particular type of education.

The forecasting horizon is 5 years. As at the moment the forecasts are made, only data of the previous year are available, so the forecasts actually refer to a six-year period. The forecasts are updated every two years. On the demand side, forecasts are generated for expansion demand (13 economic sectors, 127 occupational groups, 104 types of education) and replacement demand (127 occupational groups, 104 types of education). The sum of expansion demand and replacement

Figure 1: Overall Structure of the Model for Medium-term Labour Market Forecast



demand is the number of job openings (127 occupational groups, 104 types of education), which summarizes the demand side. On the supply side, forecasts are generated for the supply of newcomers on the labour market from 104 types of education.

Forecasts are not only expressed in numbers referring to the whole forecasting period, but also as a percentage of current employment, and as an average annual percentage of current employment. The forecasts are accompanied by a 5-point scale qualitative characterization ranging from "very low" to "very high". For guidance, in particular, the use of qualitative descriptions will prevent the qualitati-

ve forecasts being treated as more precise than is really the case, without any loss of information for guidance purposes.

In addition to the forecasts, five indicators are derived for each of the 104 types of education: the indicator of the future labour market situation (IFL), the indicator of future risks of labour recruitment problems (IFRL), a risk indicator which shows the opportunities for school-leavers to switch occupations, a risk indicator which reflects the opportunities for school-leavers to switch economic sectors and a risk indicator which measures the sensitivity of employment to cyclical fluctuations. All indicators are expressed in numbers, which are accompanied by a 5-point scale qualitative characterization. For example, the IFL has a scale ranging from "very good prospects" to "very poor prospects".

It should be noticed that we do not publish forecasts on the development of employment for a certain type of education in a certain occupational group. The forecasts published refer to the development of employment for a certain type of education aggregated over all occupational groups where workers with that educational background are employed. Due to the use of random coefficient models it is not necessary to make a priori decions on the minimum size of occupational cells, as in case of unreliable data in a particular cell, the information is weighted very low, which means that it hardly affects the forecasts of total development for a particular type of education.

All forecasts are at the national level. Regional forecasts can in principle be made in a similar fashion, but they are not part of the main ROA forecasting system. However, regular forecasts are made for one of the 12 provinces of the Netherlands (Limburg). The regional forecasts for the province of Limburg use stock data on employment with respect to the region itself. These data are related to the coefficients estimated in the national models. Moreover regional unemployment and vacancy data are used.

3. Data Requirements

The forecasting system of ROA uses quantitative databases. In the end qualitative judgements are made on the reliability of extreme and or intuitively unexpected developments and the in case of ad hoc information with respect to a particular sector (e.g. government plans to abolish compulsory military service). However, due to the use of random coefficient models, which restrict the impacts of trends based on cells with very small numbers of workers, only in a very limited number of cases are the quantitative forecasts overruled by qualitative forecasts.

The major data source is the Dutch Labour Force Survey (EBB) collected by Statistics Netherlands (CBS). Moreover, two types of external forecasts are used as

input in the forecasting system. For the demand side, sectoral employment forecasts are made available by the Netherlands Bureau of Economic Policy Analysis (CPB). For the supply side, we use forecasts of the flows of school-leavers from the 'regular' (initial) education system onto the labour market by the Dutch Ministry of Education, Culture and Science. These forecasts are known as 'Referentieramingen' (Reference Forecasts). Supplementary data from the 'Onderwijsrekeningen' (Educational Accounts) of Statistics Netherlands are used to estimate the effects of continuing vocational education on the educational backgrounds of the labour force. Follow-up surveys of school-leavers (RUBS, HBO-Monitor, WO-Monitor) of ROA are used for disaggregated data on the extent to which graduates of the various types of education flow onto the labour market. For the supply side, the numbers of short-term unemployed by educational background from registered data or surveys on unemployment which include information on the educational qualifications of the unemployed workers are also used.

The data requirements are compiled in table 1 (Cf. De Grip, et al., 1996). Except for the transition matrices on the flows within initial education by gender, all data refer to stocks. With respect to the educational qualification we distinguish between 104 types of education which are related to the segmentation of the labour market by means of cluster analysis. The various types of education can be linked to the standard classification of Statistics Netherlands and ISCED. The occupational classification used is the 'Standaard Beroepenclassificatie' of Statistics Netherlands, related to ISCO'88. The industrial branch classification is the 'Standaard Bedrijfsindeling' of Statistics Netherlands, related to ISCIC and NACE.

Table 1: Data Requirements for the Labour Market Forecasting Model

Module	required data	time series required (number of years)
Expansion demand by occupation	occupation x economic sector	5–10
Expansion demand by educational qualification	occupation x educational qualification	5–10
replacement demand by occupation	occupation x sex x age group	2–10
replacement demand by educational qualification	educational qualification x sex x age group	2–10
supply of school-leavers	students x educational qualification x school-year x sex	1–5
	transition matrix initial education x sex	1–5
	additional training x educational qualification x initial educational qualification	1–5
short-term unemployment	short-term unemployed x educational qualification	1

As we think it is important to publish forecasts on a regular basis (i.e. biannually) the data used are all based on regular surveys, which enables us to make time series analyses and comparisons over time. Moreover, these regular data sources have the advantage of using standard classifications on industry, occupation and type of education, which is usually not the case in ad hoc surveys.

4. Reliability of the Forecasts

Verification of the data from the LFS takes place by a comparison of new data with previous observations and also by checking CBS publications on the new data. We also check for aggregate consistency: all the categories should add up to e.g. the total size of the labour force. We try to be very keen on changes in definitions, etc. in our main data sources. Major changes lead to corrections of the data on earlier years in order to work with comparable data for the various years.

We deal with stratification in vocational education by distinguishing types of education which refer to courses with a more or less similar occupational domain. These types of education include both initial education and continuing vocational training courses. Moreover we explicitly distinguish between the various levels in the Dutch educational system, i.e. (1) primary school, (2) junior vocational education, (3) senior ('intermediate') vocational education , (4) higher vocational education and (5) university education.

In order to deal with the problem of statistical reliability at low levels of aggregation – as is the case with the ROA forecasting system which distinguishes between 104 types of education – the random coefficient model used provides a systematic way of pooling the data. After the model is estimated in this way, the estimated coefficients and resulting forecasts are inspected. A closer look is taken at outliers (results for specific types of education that are very different from the other types of education) and at results which seem implausible in the light of economic intuition.

Moreover, the forecasts made are systematically evaluated. These evaluations stimulate a learning process which enables us to improve the quality of the forecasting methodology. The evaluation studies show that in particular the qualitative characterizations of the labour market prospects by educational qualification perform very well (see Borghans et al. (1994) and Borghans et al., 1996).

The major structural changes which are occuring in transition economies are unlikely for the Netherlands in the medium term (which our forecasts refer to). Nevertheless the risk indicator which measures the opportunities to switch occupations is also informative in the case of structural change.

5. Information Dissemination

The forecasts are disseminated through various tailor-made information products and thus find their way to all parties on the labour market. The main outlet of the forecasts is the ROA report *The Labour Market by Education and Occupation to 200x,* which is accompanied by a Statistical Appendix. In particular this statistical appendix is used by a large number of people: civil servants in the Ministries of Education, Social Affairs, Economic Affairs, Agriculture, etcetera, the Public Employment Services, educational institutes, personnel managers, advisory councils, etc. The National Careers Guidance Information Centre (LDC) incorporates the labour market forecasts of ROA in various information products for vocational guidance. For instance, the ROA forecasts are included in public information products on CD–ROM in the *Traject* series, in the book series *Beroep en Werk* ('Occupation and Work') and in a newspaper-like journal disseminated on a large scale among the pupils at secondary schools: *De Arbeidsmarktkrant van Nederland ('The Labour Market Newspaper of the Netherlands').* A separate custom-made product to disseminate the labour market information for guidance purposes is the LDC publication *Kansen op Werk 2002* ('Chances of Finding Employment in 2002'). The latter is also available is English and French (financed by the EU-Leonardo-programme).

6. Prospects for Application of the Forecasting Methodology in CEE Countries

Obviously, a forecasting system which has been developed for the Netherlands cannot be applied directly to other countries. However, the ROA forecasting methodology can be adapted to meet the specific needs and possibilities of labour market forecasting models for CEE countries. Therefore it is important that the development of these models takes place in close cooperation between ROA and CEE research teams. Through an interactive approach it will be possible to combine the forecasting experience of ROA with the country-specific expertise of the CEE research teams.

This cooperation can be achieved in the following phases. In the first phase, the CEE research teams collect the relevant data on the labour market in their country that are available. During the second phase the appropriate occupational and educational classifications and levels of aggregation are determined by the CEE research teams. In these first two phases ROA plays an advisory role. In the third phase, forecasting models are developed through an interactive collaboration between the CEE research teams and ROA. This approach ensures that all research teams involved will benefit from the project. In this phase the CEE research teams can make use of the ROA forecasting experience to develop their own models, without having to go through all the development stages that would be necessary if

the forecasting system had to be developed from scratch. At the same time, ROA will learn more about the applicability of its forecasting methodology to other European countries, which in turn may give new insights with respect to its forecasting system for the Netherlands.

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Appendix II

Forecasting Methodology for Qualification and Training Needs in France

Andre Giffard

Christine Guegnard

OREF of Burgundy

Initially, we look at the findings of the work group study on "qualification and trade forecasting", undertaken by Freyssinet in 1991 for the Commissariat Général du Plan, which underlines the experts' belief that "it is impossible to answer" such a question. These demands are based on *"the myth according to which economic needs exist in the qualification domain from which it would be possible to determine the content volume of training flux"*. It is an historic fact that France, in the period from 1962 to the 1980s, used quantitative controlled economic methodology needs and work forces resource, which were abandoned in the first years of the economic crisis.

Today, the new approach is this: *"forecasting trade and qualification is to analyse the conditions of* ***coherence*** *between developments in employment structure and the evolution of the training system. It confronts two processes which are partly autonomous but equally interdependent"*. To implement this idea, three levels of analysis are used: the national, the sectoral and the local.

At the national level, only one institute the **BIPE** (the Institute of Economic Forecasting) suggests a model for calculating recruitment needs according to professional categories. On the sectoral level, roughly twenty professional branches carried out **forecasting study contracts,** sometimes with a regional point of view. On a local level, **OREF** (the Regional Employment and Training Observatory), contributes greatly to the research.

1 Data

1.1 What type of input?

Quantitative data on jobs according to professional category, and training level, type of diploma, speciality.

1.2 Which institutions?

At the national level, the BIPE forecasts were carried out firstly for the Ministry of Education, then for some professional branches (particularly metallurgy). This quantitative framework is systematically completed by interviews of industrial leaders and some employment experts.

On a local level, the results were given to the decision-making bodies responsible for training and training centres. The OREF of Burgundy is an inter-institutional network and does not collect quantitative data. Nevertheless, the OREF uses all available data from each institution.

1.3 What is the basic structure?

A) BIPE

At the national level, three models are used from which different forecasts or scenarios are recommended: a macroeconomic model which suggests an employment level for each branch (DIVA model); a model which provides an employment level for each professional category (CALIFE model); a geographic and professional mobility model of the working population which provides the hiring needs for each professional category (GESPER model).

For example, to estimate the hiring needs of young people, the BIPE's approach is carried out in three steps based on the results of regular surveys (Employment Surveys, and the Vocational Training Qualification survey carried out by INSEE (the National Institute of Statistics and Economic Studies) in 1993. Then, the BIPE created four scenarios: an average scenario, a scenario with a youth's promotion (firms favourable to internal promotions and the hiring of young people), favourable to young qualified people holders and to job seekers, and an industrial scenario (economic growth through industry).

The methodology scheme was as follows:

– First step: the estimation of external hiring needs of the economy from different macroeconomic scenarios using specifications from the DIVA and CALIFE models;
– Second step: the impact analysis of professional movement (promotion, movement between sectors…) on the external hiring needs structure, using data from the Employment Surveys and the Vocational Training Qualification survey carried out over the ten last years;
– Third step: the analysis of the competition between young people/job seekers/inactive women looking for a job – the Employment Surveys are also used.

B) Forecasting study contracts

At the sectoral level, some data supplied by certain branches are used according to this scheme:

The data used came from INSEE (the National Intitute of Statistics and Economic Studies) and the statistical institutions of central administration (census, employment surveys, turnover surveys…, regular administrative surveys). Other public data are:

– data from CEREQ (the Centre for Research on Training, Employment and Qualifications) on the young people starting out in working life (irregular surveys) and continuing vocational training in companies (annual and compulsory survey);
– data from each sector and the companies themselves (irregular surveys);
– qualitative data: assessment of existing studies from professional organizations, research centres, from experts or firms. In fact, these surveys are limited, for example in the hotel-catering-trade to the wage-earners of the sector. In another example from the chemistry industry, surveys in 20 firms were carried out by two institutions (CEREQ and Quaternaire Education) about sensitive jobs and particularly obsolete skills for the working population as regards new technologies.

C) OREF (The Regional Employment and Training Observatory)

On the local level, the OREF of Burgundy uses two supplementary approaches. A first scheme links the jobs, the sectors and improving qualifications as the pivot. A second scheme organizes the findings which begin with a situation diagnosis (using regular surveys on trainee integration) and is followed by an analysis of explanation factors of the change, the identification of development factors and the probability of their continuation or cessation, culminating in recommendations.

The OREF uses all data concerning employment, demography, training, unemployment, integration, which are available in each institution:

– population censuses (each 8 years),
– surveys of employment structure, of staff turnover (regular),
– trainee population statistic(regular),

– about job seeker statistics (regular),
– career started surveys (regular).

1.4 What is the content of each data set used?

Data on jobs are described according to professional categories and according to the operational occupation list; there are data on training according to the level of education, the type of diploma, the speciality.

– The professional categories classify employment according to graded scale by collective agreement and also the social position (wage-earners, self-employed workers). It has 455 occupations which can be compacted into 42, 24 or 8 levels. The BIPE uses the 24 level scheme. For each professional category, employment is described considering principal and secondary skills. In general, these professional categories are used at the national and local levels. Sometimes, there is another consideration, such as the OREF professional groups. In Burgundy there are a hundred professional groups which permit analysis when the numbers are too small at a local level, in order to obtain an easier reading of the relationship between training and employment.

– The sectoral approach is based on a nomenclature of activities and company products classified in 17 sections, 36 or 60 or 240. It is devised from the APE code (principal activity) which is given by the INSEE.

– The operational occupation list, which is used for job seekers, is devised from a main activity, that is the hard core of main qualifications required to work. Its aim is to help the job seekers to choose a set of skills which allow them to find a job. This nomenclature is used by the National Employment Agency, which takes into account the job seeker's last job, training and vocational project. It has nearly 10,000 appellations, which are composed of 466 jobs/trades.

– With respect to training, the data used are the speciality training nomenclature. Its aim is to describe all initial and adult education, vocational or general, whatever the level of qualification, with three groupings (100, 17 and 4). Three main categories of speciality are: the basic subjects, the technical-vocational fields (technical and vocational knowledge), and the personal development fields. The OREF of Burgundy has gathered these specialities in thirty training fields, for a regional reading.

In France, six levels of education are used, since the nomenclature was prepared in 1969:

level VI: left finished school without qualification
level V: left school after the first vocational training
level IV: left school after the baccalaureat
level III: left school two years after the baccalaureat
levels II et I: finished university.

According to survey needs, the data are used as stocks or flows.

1.5 What is the periodicity data?

The length of time series: the speciality training nomenclature has been used since 1994, the sectoral nomenclature since 1984, the professional categories since 1983, the Rome since 1993. Excluding the population censuses, all data can be given for each year.

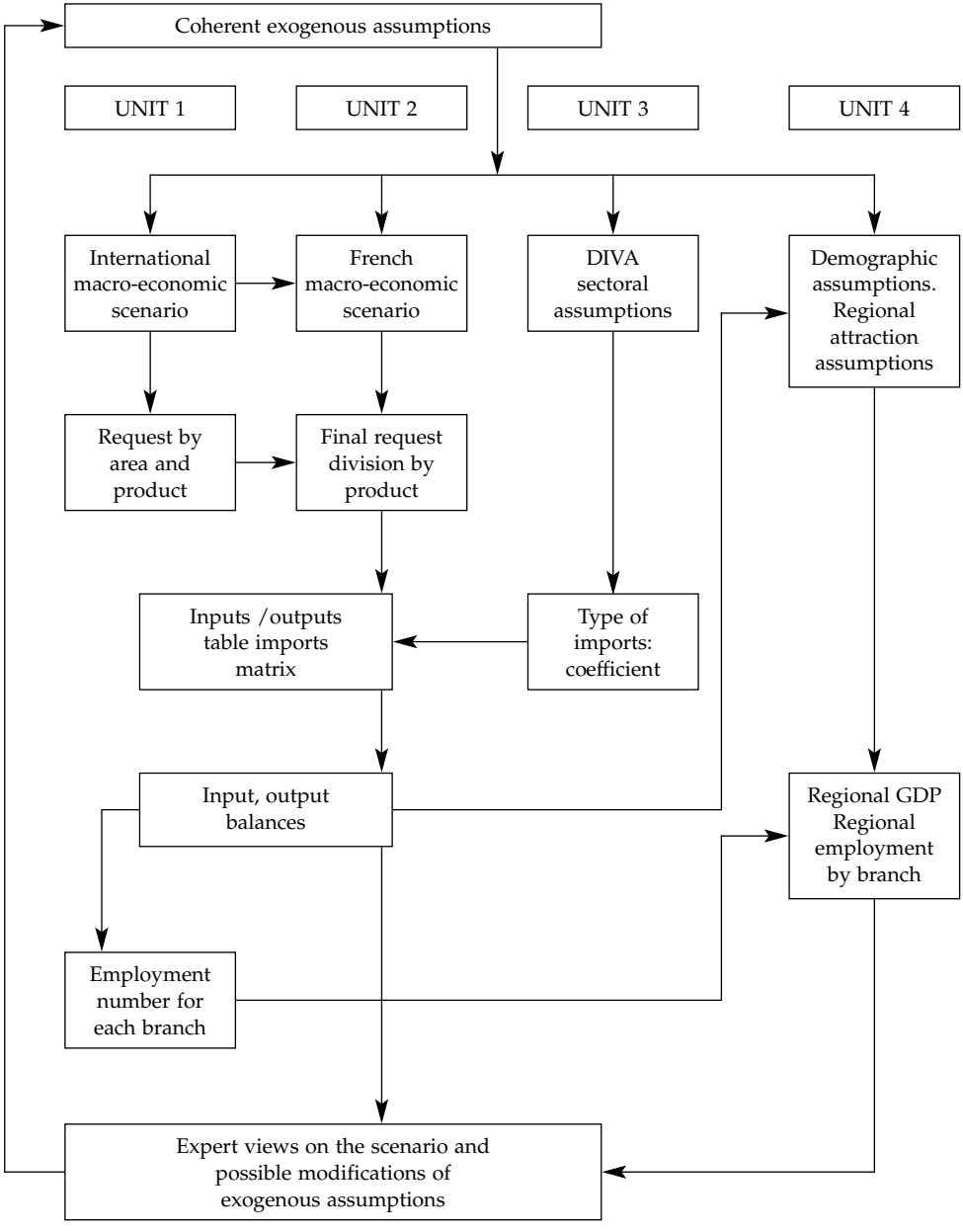
1.6 An example of irregular surveys in the hotel-catering trade.

In the forecasting studies contract for the hotel-catering trade, in addition to the standard statistical data used, a special survey was carried out on in 16 firms, 472 self employed workers and 1 000 wage-earners. The interest of this wage-earners' survey is to analyse the professional paths: training before the first job, access to an hotel-catering trade job, the various occupations in or out of the hotel-catering trade. The second interest is that the national results are used to give some framework data for the local level.

2 Methodology according to three approaches

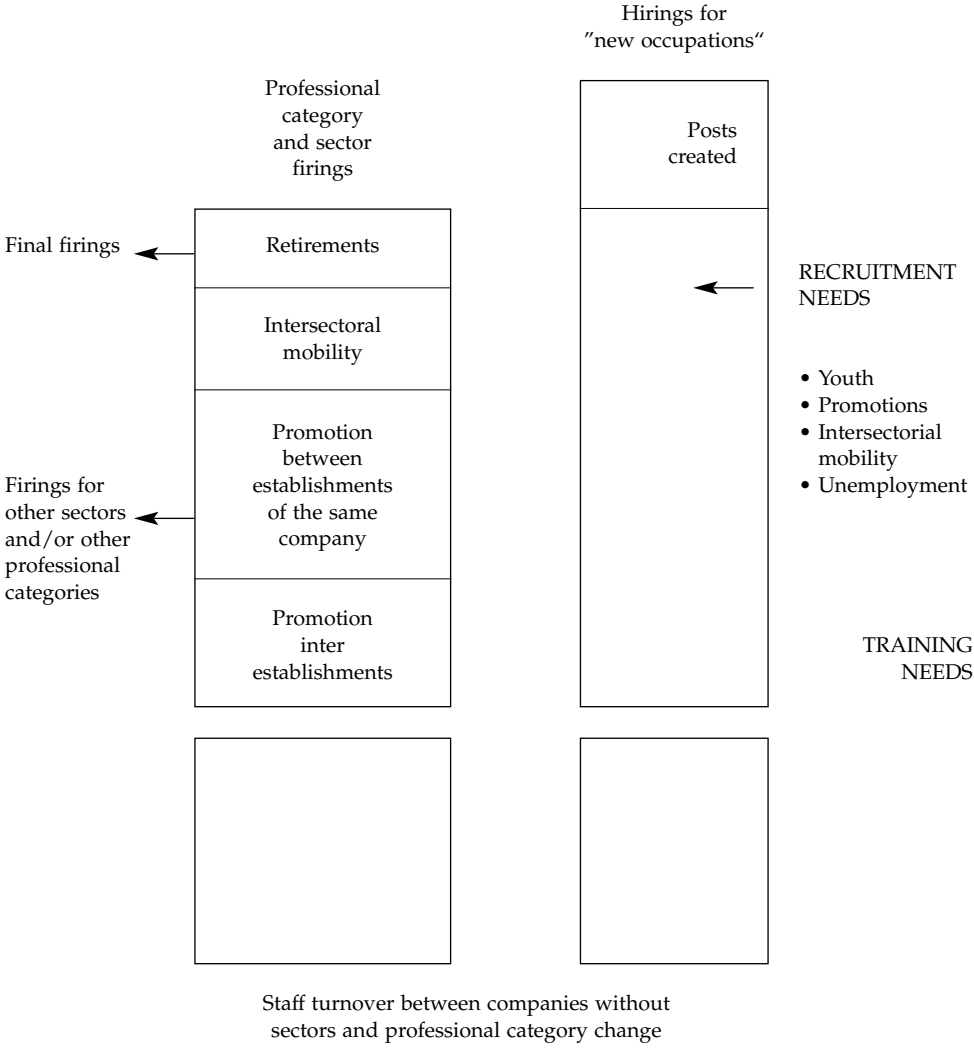
A) BIPE "employment training forecast for 2005"
2.1 Methodology (DIVA, GESPER and CALIFE)

Diva model



Gesper model

RECRUITMENT ASSESSMENT FOR EACH SECTOR AND PROFESSIONAL CATEGORY



Calife model

Nomenclature of activities and products companies		**Professional categories**
T01	Agriculture	10 Agriculteurs – exploitants
T02	Viande et lait	21 Artisans
T03	Autres IAA	22 Commerçants
T04	Combus. Minéraux solides	23 Chefs d'entreprise de 10 salariés et plus
T05	Pétrole	31 Professions libérales
T06	Electricité	32 Cadres de la fonction publique, professions intellectuelles et artistiques
T07	Sidérrugie	
T08	Non-ferreux	
T09	Matériaux de construction	36 Cadres d'entreprise
T10	Verre	41 Professions intermédiaires de l'enseignement, de la santé, de la fonction publique et assimilés
T11	Chimie	
T12	Parachimie – pharmacie	
T13	Fonderie – métaux	46 Professions intermédiaires administratives et commerciales des entreprises
T14	Mécanique	
T15	Matériel électronique – électrique	47 Techniciens
T16	Automobile	48 Contremaîtres, agents de maîtrise
T17	Aéronautique – navale – armement	51 Employés de la fonction publique
T18	Textile – habillement	
T19	Cuir – chaussures	54 Employés administratifs d'entreprise
T20	Bois – ameublement	
T21	Papier – carton	55 Employés du commerce
T22	Presse – Edition	56 Personnels des services directs aux particuliers
T23	Caoutchouc – mat. Plastiques	
T24	Construction	61 Ouvriers qualifiés
T25–8	Commerce	66 Ouvriers non qualifiés
T29	Réparation automobile	69 Ouvriers agricoles
T30	Hôtels, cafés, restaurants	
T31	Transports	
T32	Télécommunications	
T33	Services aux entreprises	
T34	Services aux particuliers	
T36	Assurances	
T37	Organismes financiers	
T38	Non marchands	

2.2 The time frame

The analysis covers the period from 1995 to 2005 with a study on the 1984–94 period.

2.3 The periodicity

As far as we know, there are no updates of this forecast.

2.4 The form

Forecasts on the development of the main professional categories (14 categories), the quantitative recruitment needs for young people by levels of education (10 categories), the quantitative hiring needs for young people by levels of diploma (5 categories) were prepared according to four different scenarios. For example, for qualified factory workers, the hiring needs for young people between 1995–2005 vary from 4 to 11 % according to scenario:

– the promotion youth scenario: 4 % of young people hired would be qualified factory workers,
– the diploma/unemployment: this rate is 6 %,
– the referential scenario: this rate is 9 %,
– the industrial scenario: this rate is 11 %.

If we are looking at the hiring needs structure for young people between 1995–2005 according to the diploma level, the results for the holders of diploma three years after the baccalaureat are, for example:

– the promotion youth scenario: 17 % of young people hired
– the diploma/unemployment: this rate is 27 %,
– the referential scenario: this rate is 22 %,
– the industrial scenario: this rate is 26 %.

These forecasts are carried out on a national level, without public debate or a real analysis of sensitivity or volatility.

B) A forerecasting study contract: metallurgy at a regional level

2.1 Methodology

At the national level, the BIPE models were done according to the above methodology, but the quantitative results were little used by the professional branch at regional level. This branch preferred to make a qualitative analysis. Interviews were carried out in thirty highly successful firms, the assumption being that other companies in this sector could profit from the same future development. The OREF has given advice on methodology according to quantitative framework elements in the regional area and also the study of a company survey.

2.2 The time frame

A first quantitative BIPE analysis was made in 1994, for the period 1982 to 1998. A second quantitative analysis was carried out with OREF between 1982–1990,

and also for 1992. The company survey was in 1994. The time frame of forecasts of job development were in the medium term.

2.3 The periodicity

As far as we know, there are no updates of this forecast.

2.4 The form

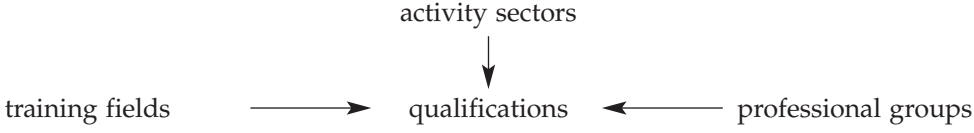
Some recommendations have been made as to the professional skills that the working population should have in the future. Qualitative job development was studied in this sector and in the medium time frame term (2 or 3 years) at a regional level. Today, this work is leading to an analysis of professional skills, for example, industrial jobs: technical skills must also include qualities or abilities such as decision-making and communication skills. These skills concern metallurgy companies, whatever their size.

In view of the degree of sensitivity and volatility, the OREF prepared tools to observe skill development during the period to discuss the recommendations, but the professional branch did not use these.

C) OREF: a local analysis

2.1 Methodology

The OREF of Burgundy carried out an employment training diagnosis of young people according to employment area using this system:



The OREF organized the available employment and training data scattered throughout the various institutions, in order to facilitate the action of regional and local policy-making bodies, specially underlining the insufficiencies as regards the initial and continuing training offer.

2.2 The time frame

Some recommendations on terms of training specialities and levels of education were made in the short time frame term, that is, between three and five years.

2.3 The periodicity

As far as we know, there are no updates of this forecast.

2.4 The form

An employment and training diagnosis was carried out for each employment area. For example Avallon, with 50,000 people, is a rural area with two small industrial centres. The analysis consisted of linking demographic data (the migration

of young people from this area), to situation data (the percentage of young people in training is low), training (the level of education is low), the main occupations, and their staff turnover, the unemployment data (many unqualified young job seekers), and the results of surveys on the young people starting out in working life (difficulties of finding a job). These observations lead us to make certain recommendations: to raise the level of training for youth in this area, to lance a debate on occupation and training in the plasturgy and rubber sectors, bearing in mind the dynamics of the local companies.

The local recommendations were amde without a real measure of the volatility/sensibility forecast. However, the conclusions on training for each employment were discussed, analysed, and modified by each OREF expert.

3 Sensitivity (validation cheks)

3.1. What tools do you use to verify the obtained data?

Each institution guarantees the quality of given data.

3.2. How do you assess the reliability of your forecasts in general?

In OREF working, the network allows a diagnosis to be made using various data (employment, unemployment and so on) and the analysis to be discussed. For example, the numbers given by the hotel-catering-trade branch were contested by OREF. In fact, the branch did not take into account the jobs linked with its sector (cooks) which are in other activity sectors (cooks in hospitals and catering firms); moreover, the branch took into consideration all the post-diploma trainees in this line of catering work and did not take into account people still at school. Consequently, the branch overestimated the number of young new employees in its sector!

Within the context of the contractual arrangements between the State and the Regions, today, every region of France has a regional employment and training Observatory (OREF), as *"decision making tools permitting the linking analysis and forecast for vocational training, initial and continued vocational training"* (Mandate of the Prime Minister, February 1988). Thus the purpose was to support decentralisation by providing diagnosis and forecast tools to be shared with every regional partner.

The regional employment and training Observatory of Burgundy (OREF) is an inter-institutional network and its aims are to organize the available information concerning training and employment, in such a way as to build decision-making tools for policy-making bodies. This job is achieved by connecting these different pieces of the puzzle in order to highlight how they interact. Thus the observatory has to gather data and to carry out analyses which will keep the decision-making bodies updated.

3.4. What lessons or recommendations can you derive from your experience?

The reality of the relationship between training and employment is a complex phenomenon, so no single institution, national or local, can master this problem alone whether through analysis or action. Thus, it is absolutely necessary to create an inter-institutional working group in order to build the necessary conditions of shared understanding or even concerted action.

There are many reasons why this mathematical or mechanical attempt to match training and employment could not work: the trainees coming from the educational system are not the only ones looking for a job, firms' recruitment policy is to take into account even the individual strategies of mobility whereas planning assumes that the individuals will stay forever in the specific job they have been trained for. Beyond the technical problems of forecasting, this approach breaks down because of the the uncertainty of future economic, social, technological and organizational developments. If this link between training and employment is "unobtainable" (L. Tanguy, 1986), it is above all because this relationship must be understood in a different way.

The same training courses can lead to various types of jobs, and work places can be occupied by people trained in different ways. In addition, firms' needs fluctuate and the individual demand for education and work (for young people or adults) also changes according to fashion, social reputations, economic necessities and so on. However, the lack of a rigid and simplistic link between training and employment does not mean that education does not structure the access to a job. The economic crisis has reinforced the selective aspect of diplomas in governing access to a job and has maintained a strong link between the hierarchy of diplomas and the hierarchy of jobs.

The request that the end product of training courses should correspond exactly to firms' qualification needs therefore presents real difficulties: beyond the short term the firms' needs are difficult to measure, and at any rate remain highly changeable. Most training courses are not specific to one trade or sector, and in the context of profound restructuring, they succeed less and less in preparing people for one specific job. The gap is too large between the time a profession or a firm sees the need for staff with a certain qualification and the moment the first holders of a diploma leave a training course; so either the need has been met (hiring of neighbouring qualifications, internal promotion) or has disappeared under the effect of new economic transformations or redundancies. The idea is to give everybody a qualification and to adapt the educational level of wage-earners to a technical, more exacting environment in rapid mutation.

3.5. How do you assess the reliability?

The approach today is to propose several options, then to analyse new information and to choose the best scenario. Afterwards, it can be updated/ /modified.

3.6. How do you adjust your forecasts for regional variations/conditions?

According to national qualitative analysis, the forecasts provide assumptions for regional analysis. The problem is to link them to the local and historic economic situation, the size of firms, number of trainees and so on, and to different cultures and mentalities which exist at a local level.

As regards national quantitative analysis, lack of local knowledge makes their use risky at a regional level. For example, an aeronautical firm came to Burgundy (+ 200 jobs), with a linear forecast, while the BIPE estimated a growth of 1000 jobs in the next five years!

With regard to regional quantitative forecasts, if we add all the regional data together we get an absurd and unrealistic situation at a national level!

4 Information dissemination

4.1 Who are the final users?

For the BIPE: the Ministry of Education (ministry, school administrators, educational and vocational guidance officers); the professional branch of metallurgy at the national level.

For the OREF: at the regional and local levels, all the institutions of the OREF network, and also the professional branches and the initial and continuing vocational training centres, school regional administrators, the regional council, the unions and managment.

4.2 What are the channels of dissemination?

At present, the channels are only studies and reports from OREF, Burgundy.
Some OREF in other regions use CD and WWW.

4.3 What is the role of final users?

It is difficult to calculate the impact and the application of OREF studies, even if the deciding bodies find them interesting.

The BIPE studies were used at the national level by the High Educational Economic Commitee which helps the Ministry of Education to specify its aims.

5 Propositions to work

5.1 Objectives

The aims are on the one hand to improve the methodologies used in France to analyse quantitative and qualitative developments of jobs, to study the relationship between quantitative and qualitative aspects, and on the other hand, to refine

the creation of indicators in order to help with political public decisions for vocational training.

It is interesting to recall that:

– in France, the quantitative macro-economic forecasts of training and employment have been abandoned. Only the regional and sectoral analysis isdeveloped in a context of available national and local data, plentiful and comprehensive (overseveral years) information. In the same way, many professional trades could be mobilize in order to debate the quantitative and qualitative informations.
– In the Leonardo project, the approach of the OREF is: to carry out a situation diagnosis, to identify the explanation factors of the change and the probability of their continuation or cessation and at last to make recommendations. Quantitative data over several years makes it possible to identify the quantitative trends of change and to envisage several scenarios which can be enriched by observations concerning qualitative development of jobs and required professional skills.

The OREF's process completed by Quaternaire could be, in a selected sector, the following:

a) Diagnosis (June–July 1999)
   – quantitative analysis from data as to stocks and flows for certain jobs.
   – validation of the correspondence between the type of jobs in firms and the type of professional categories by means of trade unions.
b) Factors of the change (September–October 1999)
   – From a quantitative point of view, analysis of trends in order to create several scenarios with the professional unions.
   – From a qualitative point of view:
     + choice of firms with the most recent division of labour, the assumption being that other companies could know the same future developments.
     + creation of a questionnaire or analysis scale concerning the change of last and future skills, interviews of company managers or wage earners' trade unions…
c) Formalization of conclusions about the study with the professional branch (November–December1999)

5.2 Collaborations/Exchanges between the teams' partners

Throughout the work carried out by OREF and Quaternaire, information will be disseminated, in addition to methodological exchanges between France and the volontary teams from transition countries, in order to define the possible conditions of transfer. Initially, it will be useful to specify a common analysis structure in three points:

a) Analysis structure/Forecasts
b) Process suggested by Quaternaire and OREF
c) Elements to gather for the participation of different partner countries

a) Analysis structure/forecasts

a.1 What annual data?

– Employment:
  Database: the jobs as stock according to sector and professional categories, the turn-over staff (flows) according to sector and professional categories, and the job seekers in these sectors and at regional level?
  Complementary data: pyramid-shaped diagram representing population by age-groups and professional categories…?
– Vocational training:
  the number of trainees by specialities (last years of schooling), the outgoing trainees of the educational system, statistics on careers started …?

a.2 Previous choices for a quantitative analysis

Jobs present in all the sectors (for example secretary) or specific jobs in some branches? Jobs which record an increase or a decrease of staff or a quantitative stability? The most important jobs (in number) or the ones which change the most quickly? A sectoral analysis at the national or local level?

a.3 Conditions to gather for qualitative analysis

The presence of a trade union or a consular establishment or firms association or companies representative… in order to debate the results and to build a panel of firms.

b) Process suggested by the OREF

b.1 Available statistics

– Employment:
  Database for the metallurgical sector (cf annex 2) and the hotel-catering-trade: the stock jobs by sector and professional categories (sources census, survey of employment structure), the staff statistics turn-over (flows) by professional categories, and the job seeker statistics in these sectors and at regional level.
  Complementary data: /
– Vocational training:
  the number of trainees by specialities (last years of schooling), the outgoing trainees of the educational system, statistics on careers started.

b.2 Previous choices for a quantitative analysis

Specific jobs of the metallurgy and the hotel-catering-trade: choice of the main professional groups at a local level.

b.3 Conditions to gather for qualitative analysis

There is a highly organized professional trade union in the metallurgy and the hotel-catering-trade sectors.

This project is proposed by the OREF in order to share and to compare analysis methodology with al the countries involved. QUATERNAIRE will use the conclusions from studies carried out at national level in previous years.

c) Elements to gather for the participation of different countries

It will be interesting that every country to identify the sector(s) and the job(s) in which these conditions have developed beforehand.

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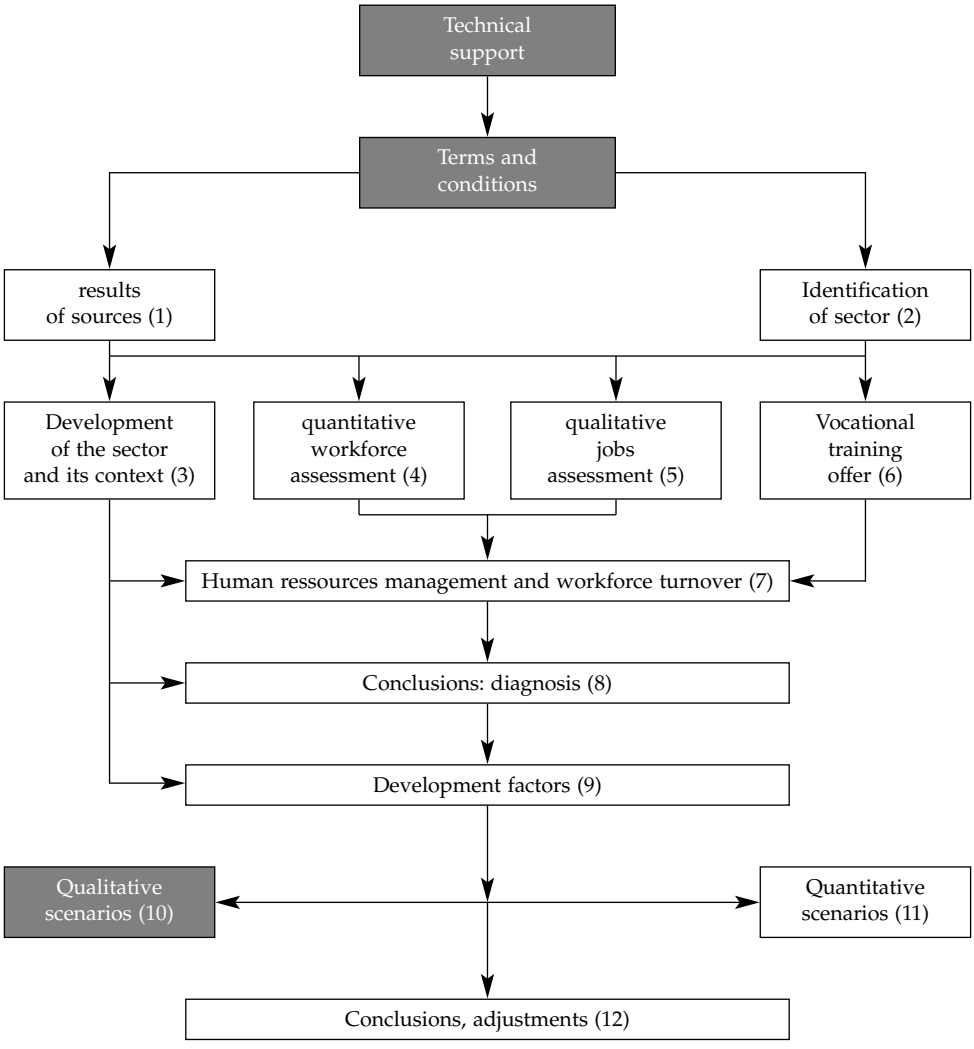
Annex 1



Strategic steps for a forecasting studies contract in the hotel-catering trade

Professional category 6221

Definition: Qualified solderings and boiler makers
Travaillent au formage, pilage, découpage à froid des pièces mécaniques de toutes dimensions

		*Level of diploma required**			
INDUSTRIAL ACTIVITY	**TRADES**	**AREA 21**	**AREA 58**	**AREA 71**	**AREA 89**
Soldering	Boiler maker	5 and 4	5 and 4	5 and 4	5 and 4
	Cisailleur	5	5	5	5
	Oxycoupeur	5	5	5 and 4	5 and 4
Forge	Débiteur	5	5	5	5
	Lamineur ébaucheur	5	5	5	5
Laminoirs	Cisailleur	5	5	5	5
	Lamineur	5	4	5	5

*LEVEL OF DIPLOMA REQUIRED FROM YOUNG PEOPLE ACCORDING TO FIRMS
LEVEL V: EDUCATION ENDED AFTER THE FIRST VOCATIONAL TRAINING
LEVEL IV: EDUCATION ENDED AFTER THE BACCALAUREAT LEVEL

Professional category 6221

	STOCK JOBS							*STAFF MOBILITY*													
	Census		Survey of Employment Structure					Firms with 10 to 49 workers							Firms with 50 or more workers						
	82	90	87	90	93	94	Annual Stock	90	91	92	93	94	95	Annual Flow	90	91	92	93	94	95	Annual Flow.
Area 21	316	288	232	211	234	219	68	34	9	15	25	20	29	47	25	25	13	11	23	20	23
Area 58	316	264	291	175	234	194	224	10	3	0	0	0	0	2	21	4	9	7	6	6	9
Area 71	1108	860	1121	946	804	617	872	123	60	70	79	78	105	86	104	73	38	19	23	18	46
Area 89	240	292	347	252	267	238	276	50	32	68	52	35	50	48	53	27	19	15	21	24	27
Burgundy	1980	1704	1991	1584	1539	1240	1591	251	129	147	146	138	175	164	225	129	79	52	73	68	105

Appendix III

The FÁS/ESRI Occupational Forecasting Model for Ireland

Gerard Hughes
ESRI
Dublin

Introduction

The occupational forecasting model for Ireland developed by Foras Aiseanna Saothar (FÁS) – The Training and Employment Authority and the Economic and Social Research Institute (ESRI) is designed to provide information on the changing pattern of occupational and sectoral employment and to identify possible variations in skill requirements across broad occupational areas of the economy. The initiative for this project was taken by the Minister for Labour towards the end of 1989 when he requested The Training and Employment Authority to make information available on which to base plans for future vocational education and training.

The Training and Employment Authority's interest in occupational forecasts derives from its national responsibility to examine trends and developments in the labour market, and to advise on actions that should be taken to ensure that skill shortages do not develop as the Irish economy modernises and structural changes occur in the sectoral and occupational composition of employment. The ESRI's interest in occupational forecasts derives from its responsibility to provide economic and social analyses and advice as an aid to general policy formulation. Since the middle of the 1980s, the ESRI has been involved in preparing sectoral employment forecasts using its own medium-term macroeconomic model.

The FÁS/ESRI project to develop an occupational forecasting model for Ireland raised a number of questions about occupational forecasting which were investigated in a review of the practice of occupational forecasting in Canada, France, West Germany, the Netherlands, the United Kingdom, and the United States (see Hughes, 1991). This review provided an understanding of the uses and limitations of occupational forecasts which influenced the structure of the model that was developed to make the forecasts for Ireland.

Uses of Occupational Forecasts

Occupational forecasts now have two main roles – a policy role and an information role (see Hughes, 1994). Their policy role is to supply information on employment trends for broadly defined occupational groups for labour market decision makers. Their information role is to supply data on employment trends for a large number of occupational sub-groups which will make the labour market more transparent for career guidance counsellors, school leavers, employers and others. These users are interested in having occupational forecasts for educational planning purposes so that the intake of students into different levels of education and training programmes can be regulated to ensure that excess demand or supply do not emerge for particular occupations. In the past it has proved difficult to match the supply of labour by education to the demand for labour by occupation with the degree of precision expected by educational planners because of the lack of a clear relationship between education and occupation, apart from professional and technical occupations for which specific educational qualifications are required. The development of new procedures for analysing the occupational domain of different educational and training qualifications by researchers at the Research Centre for Education and the Labour Market in Maastricht has made it possible for countries which have good data on the educational profile of occupations to consider producing more detailed estimates of excess demand or supply.

Whether the forecasts focus on the policy role or the information role will depend on a number of factors including the availability of data. The forecasts for Ireland are made for policy purposes primarily for two reasons (a) the need to build up confidence among users of occupational forecasts and (b) the lack of information for Ireland on the educational and training qualifications of those at work classified by occupation. Forecasts for policy purposes provide information on the implications of existing employment trends, the current position in occupational labour markets, the kind of changes which can be expected, and the effect which different courses of action could have on the level and structure of employment in the future.

Criticisms in the 1970s and 1980s of occupational forecasting work have not convinced researchers to abandon it, as some commentators have urged (see Debeauvais and Psacharopoulos (1985)), but they have led to a reappraisal of the objectives of such forecasts. During the 1980s occupational forecasters argued that unrealistic expectations about the performance of occupational forecasts should be modified and that greater emphasis should be placed on their potential to help labour market decision makers in implementing active manpower policies in the areas of training, job placement, and job creation. Wilson (1992, p. 52), for example, argues that the prime objective of occupational forecasts is:

> …to provide a set of 'points of reference' for policy makers and other interested parties. These should indicate the sort of economic environment they are likely to face,

> highlighting the main problem areas, quantifying the scale of any difficulties that may be foreseen, and estimating the impact of different policies. [Such forecasts] provide a useful 'point of departure' for those interested in planning for the future. The alternatives are, on the one hand to rely on past data 'to speak for itself' or, on the other hand to reject all attempts at quantification. The former is extremely restrictive and rules out the consideration of major structural change. It also provides little or no insight into the reasons for past developments. The latter alternative denies the very real need of policy makers for some guidance on the likely size of the problems they may face.

One result of this approach is that occupational forecasters now argue that the forecasts should be seen as an aid to governments which can help in the development of more effective employment policies and in strengthening links between education and the labour market. They also argue that the forecasts have a role in helping decision makers in education and training, business, and the trade unions to respond intelligently to changing conditions in the labour market. Governments now use occupational forecasts to develop a wide variety of schemes to cope with unemployment. Education and training authorities use them to take decisions on the provision of vocational and other training programmes, and businesses and trade unions use them to identify skills which could be in shortage or surplus.

Data Requirements

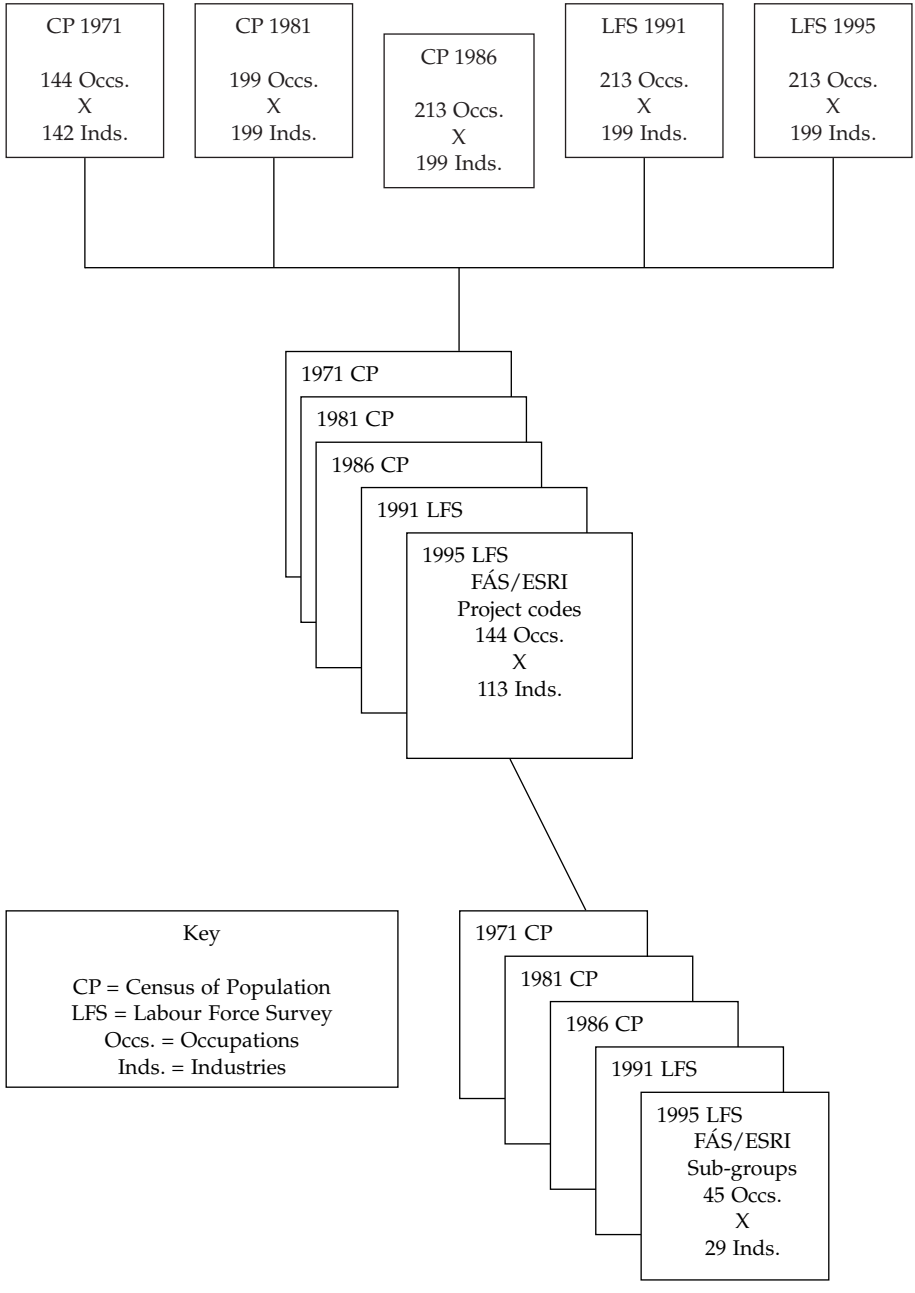
The basic information required to make forecasts for the whole occupational structure is employment data for the labour force classified by occupation and sector. Occupational data show the quality of the labour force in terms of intrinsic abilities and skills acquired through education and training. Sectoral data show the industries in which people work. The great value of using this kind of information to make occupational forecasts is that every occupational and sectoral group has to be taken into account.

The prime sources of comprehensive data on the structure of employment by occupation and industry for Ireland are the Census of Population, the Labour Force Survey, and the Quarterly National Household Survey. The Census is taken at five year intervals. In addition to providing data on employment the Censuses for 1981, 1986, and 1996 supply information on scientific and technological qualifications by occupation. The Labour Force Survey provides annual information for the period 1987–97 for the Spring of each year on employment by occupation and industry and level of education. The Quarterly National Household Survey provides the same information on a quarterly basis since the last quarter of 1997. The annual Labour Force Survey was undertaken as part of the harmonised survey of the labour force carried out by Eurostat in all member states of the European Union. The Irish survey was undertaken in the Spring of each year and it covered approximately 50,000 households containing about 150,000 persons or about 4 per cent of the total population.

The Quarterly National Household Survey began in September 1997 and it replaced the annual Labour Force Survey. It is part of Eurostat's harmonised quarterly surveys of the labour force and involves surveying 3,000 households every week to provide a total sample of 39,000 households each quarter. A two-stage sampling procedure is used for the quarterly survey. In the first stage a sample of 2,600 small areas, each containing 75 dwellings, is selected at county level to give proportional representation to eight different kinds of population strata ranging from large cities to rural areas. In the second stage, 15 households are selected from each small area to give a total quarterly sample of 39,000 households. Each household is requested to participate in the survey for five consecutive quarters before being replaced by other households from the same block. This means that 20 per cent of the households are replaced in each quarter and that there is an overlap of 80 and 20 per cent respectively between consecutive quarters and the same quarter in consecutive years (see CSO (1998)). Figure 1 provides an overview of how the Census of Population and Labour Force Survey data were used in the latest FÁS/ESRI forecasts to provide consistently classified data matrices for 1971, 1981, 1986, 1991, and 1995 which could be used to project occupational employment trends up to 2003.

The employment analysis in the 1971 Census of Population identifies 144 individual occupations and 142 industries. Figure 1 shows that a process of sub-division increased these numbers to 199 occupations and 199 industries in the 1981 Census and to 213 occupations and 199 industries in the 1986 Census and in the Labour Force Survey for 1991 and 1995. Since the number of occupations and industries for which the employment data is available varies across Censuses and Labour Force Surveys it is necessary to reclassify the data from all sources to produce an occupation by industry classification which is consistent for the five data points. A consistent classification of the employment data is limited to 144 occupations and 113 industries which can be identified across all data sources. International experience of occupational forecasting in OECD countries suggests that the accuracy of the forecasts is improved if they are confined to a relatively small number of occupational and industrial groups. Hence, these 144 occupations and 113 industries are aggregated to provide information on employment in 45 broadly defined occupational and 29 broadly defined industrial sub-groups. The sub-group classifications are then aggregated into 14 major occupational and 13 major industrial groups to facilitate presentation of the forecasts.

Figure 1: Data Reclassification in FÁS/ESRI Occupational Employment Forecasting Model



The Industrial Classification[2]

As already noted the Census of Population 1971 identifies 142 industrial unit groups while subsequent censuses and Labour Force Surveys identify 199 unit groups. These changes in the level of detail provided by the industrial classification reflect changes in the structure of economic activity. For example, the development of supermarkets in the 1960s reduced specialisation in the retail sector and this was reflected in the amalgamation of seven different categories of retailer into a single category in the 1981 Census. Increased specialisation in office equipment, where data-processing grew rapidly, and other sectors was also reflected in the1981 Census, when a number of unit groups were split into two or more separate groups. The development of consistent unit groups encompassing the data from 1971 onwards means that some of the detail present in some but not all Censuses is lost. However, as Figure 1 shows it has been possible to consistently identify 113 industry unit groups.

The approach to reducing these 113 unit groups to a manageable number of sub-groups and major groups was influenced by two factors. The first was the need for compatibility with the sectoral structure of the ESRI macroeconomic model which produces output and employment forecasts for 11 sectors. The second was the need to provide information which would conform with the classification used by the Employment and Training Authority's sectoral training committees. This has resulted in the development of the industrial classification consisting of 13 major groups and 29 sub-groups presented in Table 1.

The industrial classification provides more detail for the services sector than for the manufacturing or agricultural sectors because the main source of employment growth over the last three decades has been in services. Where possible, industries have been grouped by source of demand. For example, the Census category "other personal services" is included in the business services sub-group because its major components, such as contract cleaning firms, debt collectors, and commercial photographers, are largely dependent on other businesses for their sales. Similarly, health care activities are allocated to "other non-market services" as privately financed health care is fairly limited in Ireland.

[2] The description in this section is based on material contained in Corcoran, Sexton, and O'Donoghue (1992).

Table 1: Industry Groups Used in the FÁS/ESRI Occupational Forecasting Model

Group	*Sub-group*	*Project codes*
1. Agriculture	1.1 Agriculture	001–004
2. Metals and engineering	2.1 Metals	040–041
	2.2 Engineering/machinery/ /vehicles	042–047
3. Food, drink, tobacco	3.1 Food	007–014
	3.2 Drink and tobacco	015–016
4. Clothing, footwear, textiles	4.1 Textiles	017–020
	4.2 Clothing and footwear	021–024
5. Other manufacturing (incl. mining and utilities)	5.1 Chemicals	030–032
	5.2 Paper and printing	028–029
	5.3 Other manufacturing	025–027, 033–039
	5.4 Mining and utilities	005–006, 054–056
6. Construction	6.1 Public construction	048–049
	6.2 Other construction	050–053
7. Distribution and catering	7.1 Wholesaling	057
	7.2 Retailing of food, etc.	058
	7.3 Garages/filling stations	064
	7.4 Other retailing	060–063
	7.5 Hotels/restaurants/pubs	059, 100–102
8. Transport and communications	8.1 Transport	070–075, 077
	8.2 Communications	076
9. Finance, business and professional services	9.1 Banking/insurance	065–066
	9.2 Professional services	092–096, 098
	9.3 Other business services	067–069, 106
10. Public administration/ defence	10.1 Public admin./defence	078–080
11. Other non-market services	11.1 Health/welfare services	081, 087–091, 105
	11.2 Education, research/ development	082–086, 097
12. Other (mainly personal) services	12.1 Personal services	099, 103–104
	12.2 Recreational services	107–112
13. Other and unstated	13.1 Other and unstated	113

Source: Corcoran, Sexton, and O'Donoghue (1992).

The Occupational Classification[3]

As already indicated, the most detailed occupational classification used involves 45 occupational sub-groups which are, in turn, amalgamated into 14 major groups. These form the basis of most of the analytical presentations made in the published reports. As already outlined the 45 sub-groups were initially formed by grouping much larger numbers of occupational codes used in the 1981 Census of Population. The 1981 Census structure was used to ensure a consistent trend pattern. Census classifications are revised on an ongoing basis, usually in a more detailed form, and this means that the classification is constrained by the level of detail in the structure for the earliest year chosen in the period over which trends are observed. The detailed 1981 Census occupational codes, which are referred to as the "project codes", are basic to the forecasting exercise and the data in detailed occupational tabulations taken from later Censuses and Labour Force Surveys were subject to amalgamations in order to render them consistent with the 1981 figures as shown in Figure 1.[4]

The basic rationale underlying the amalgamation procedures applied to the detailed Census codes is to try and achieve occupational groupings which bring together (a) persons exercising similar types of employment-related functions and (b) possessing similar levels of skill and/or qualifications. The functions were chosen in the context of the pattern of activity in the labour market and how this has evolved over time. The functional areas covered relate to agricultural activities, management, own account activities in certain services, professional activities (distinguishing those at associate professional level), clerical work, skilled and semi-skilled manual work (the latter covering mainly production operatives and workers in transport and communications), sales activities and a number of other service functions and, finally, unskilled manual work. While every effort was made to establish appropriate relationships between the standard occupational categories and the functions chosen, and, where appropriate, specific skill or qualification levels, the source material clearly limits the extent to which this can be achieved. Nevertheless, it is considered that the occupational categories which have been devised constitute relevant and distinct entities on the basis of the criteria employed.

Details of the occupational classification are set out in Table 2. It shows the major functional groupings, the constituent occupational sub-groupings within these groups and the detailed project codes which make up each sub-group.

[3] The description in this section is based on material contained in Duggan, Hughes, and Sexton (1997).

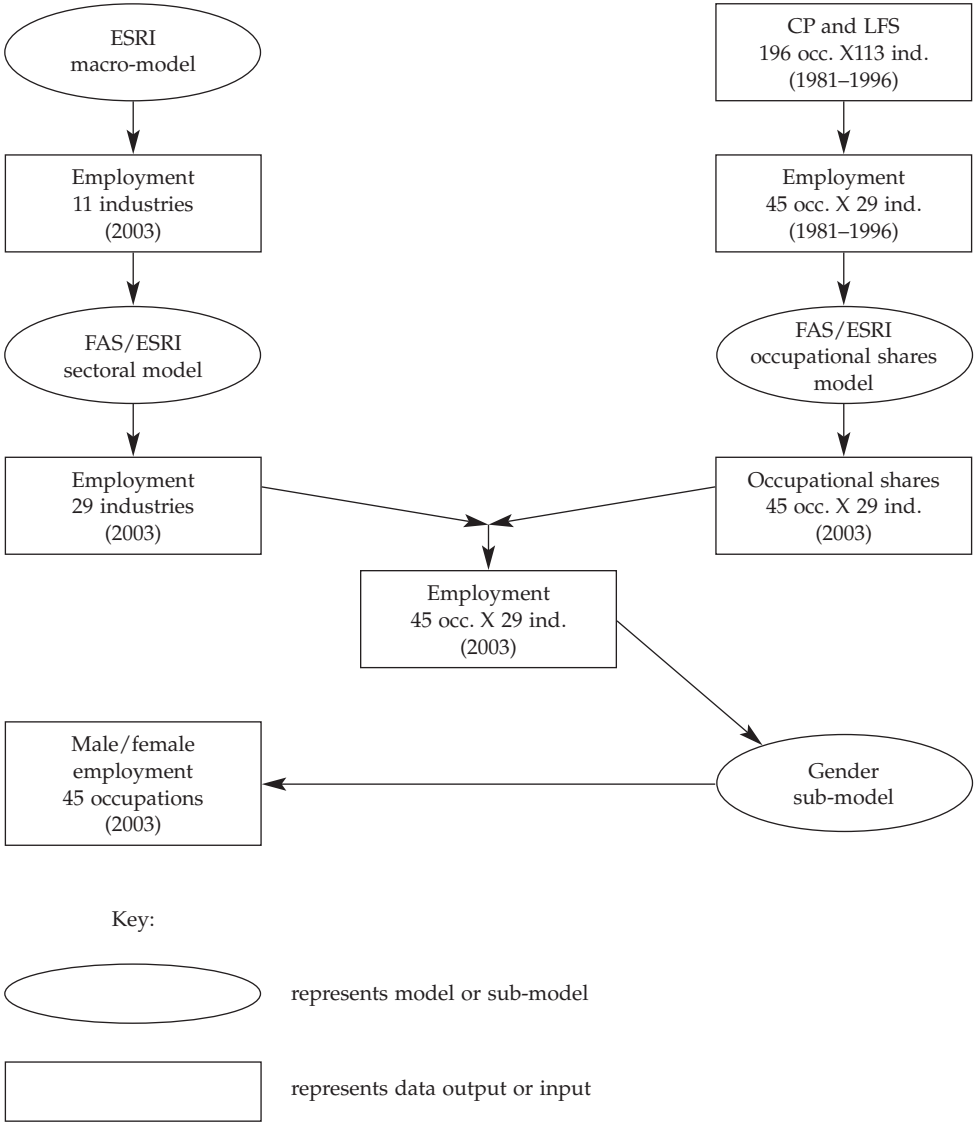
[4] The occupational classifications used in the Census of Population and in the series of Labour Force Surveys are the same.

Table 2: Occupational groups, sub-groups, and project codes

Group	*Sub-groups*	*Project Codes*
1. Agricultural occupations	1.1 Agricultural	201–203, 206, 207, 209–211
2. Managers	2.1 Higher managers	204, 344, 351, 352, 354, 394, 397
	2.2 Other managers	280, 309, 318–320, 333
3. Proprietors in services	3.1 Proprietors in services	321–323, 334
4. Professional occupations	4.1 Health professionals	366, 369–371
	4.2 Education professionals	384, 385
	4.3 Engineering and science	329, 355, 357–360, 367, 378
	4.4 Business/finance/legal profs.	328, 377, 380, 381
	4.5 Religious	382, 383
	4.6 Other professions	365, 373, 386, 388, 390, 391, 393, 395
5. Associate professionals	5.1 Health	235, 372, 375, 376
	5.2 Science and engineering	218, 356, 362, 368, 379
	5.3 Others	286, 361, 363, 364, 374, 389, 392, 396
6. Clerical occupations	6.1 Clerks	306, 307, 316, 317, 353
	6.2 Typists, telephonists etc.	305, 314
	6.3 Warehouse/dispatch clerks	315
7. Skilled workers (maintenance)	7.1 Electricians, electrical fitters	214, 215, 217
	7.2 Fitters and mechanics	221, 222
8. Other skilled workers	8.1 Metal/engineering workers	223–225, 229, 230
	8.2 Woodworkers	239, 240
	8.3 Clothing/textile workers	245, 246, 248, 249, 251, 253–256
	8.4 Printers	268, 269
	8.5 Skilled building workers	281, 282, 283, 284, 285, 287
	8.6 Foremen/supervisors	297
	8.7 Other skilled workers	273, 278
9. Production operatives	9.1 Electrical/electronics	216, 219, 220
	9.2 Metals/engineering	226–228, 231–234, 237
	9.3 Food, drink, tobacco processing	258–265
	9.4 Clothing/textiles	244, 247, 250, 252, 257
	9.5 Other plant and production opers.	212, 213, 236, 238, 241–243, 266, 267, 270–272, 274–277, 279, 288, 289, 292
	9.6 Packers/bottlers	291
10. Transport/communications workers	10.1 Drivers	298, 301–303
	10.2 Postmen, couriers	312, 313
	10.3 Others	293, 294, 299, 300, 304, 308, 310, 311, 347
11. Sales workers	11.1 Sales agents	324, 327, 332
	11.2 Retail sales assistants	325, 326
	11.3 Others	330, 331
12. Security workers	12.1 Army/Gardai (excl. officers)	345, 398
	12.2 Other security workers	341, 346
13. Personal service workers	13.1 Catering occupations	336–338
	13.2 Domestic servants and cleaners	339, 340
	13.3 Other personal service workers	208, 335, 342, 343, 348–350, 387
14. Labourers and others	14.1 Agricultural labourers	205
	14.2 Other labourers	290, 295, 296
	14.3 Occupations unstated	399

Source: Sexton, Canny, and Hughes (1996)

Figure 2: FÁS/ESRI Occupational Forecasting Model



Forecasting Method

The industrial and occupational classifications provide a framework within which forecasts of the occupational structure of the Irish economy can be derived from the ESRI medium-term projections of employment by sector. Considerable

familiarity with past and present patterns of occupational change in different labour markets are required to make the forecasts. This familiarity was gained by studying labour market developments during the period 1971–1990 using data from the Census of Population, the Labour Force Survey and other sources (see Corcoran, Sexton, and O'Donoghue (1992)). It showed how the occupational and sectoral employment structure of the Irish economy has changed over the last twenty years and it also helped to identify the factors which have influenced changes in the relative importance of different industries and occupations.

Conflicting views among economists about how labour markets work and differences between countries in the availability of labour market data have led to the development of a number of occupational forecasting methods. The most commonly used method of forecasting the whole structure of employment by occupation and industry is the manpower requirements method. This method was developed by the Bureau of Labor Statistics in the United States in the 1950s and adapted for use in educational planning by the OECD for its Mediterranean Regional Project in the 1960s. The manpower requirements method takes forecasts of employment by industry from a macroeconomic or input-output model and provides forecasts of what the occupational composition of employment is expected to be within each industry. Figure 2 shows the steps which are followed in the FÁS/ESRI occupational forecasting model to produce forecasts of employment by occupation from the forecasts of employment by sector given by the ESRI medium-term macroeconomic model.

The forecasts are made in two stages which are brought together at the end of the procedure. In the first stage, shown on the left hand side of Figure 2, the ESRI medium-term model's employment forecasts for 11 sectors are disaggregated into 29 sub-sectors by projecting the trend of each sub-sector's share of employment within each sector. In the second stage, shown on the right hand side of Figure 2, the trend in the share of each occupation in each sub-sector is examined and projected to the target year using linear, logarithmic, or semi-logarithmic equations and judgement to select the projection which appears most reasonable in the light of what is expected about labour market developments during the projection period. In this second stage, therefore, each cell of the 45 by 29 matrix of employment by occupational and industrial sub-group, derived from the data reclassification shown in Figure 1, is projected to the target year.

The results of the forecasts of the number expected to be employed in each sub-sector in the target year and of each occupational sub-group's share in each sub-sector in the target year are multiplied together and summed, as indicated in the middle of Figure 2, to provide forecasts of the number expected to be employed in the target year in each occupational sub-group. Finally, the female share of employment for each occupational sub-group is projected using a gender sub-model. In this sub-model linear trend regressions of the female share of employment and semi-log regressions are used to make forecasts of the female share of

employment in each occupational sub-group. Total female employment for each occupational sub-group is then derived by multiplying the projection of total occupational employment for each sub-group for 2003 by the projected female share.

The procedure for projecting the occupational share of employment within each sub-sector is to use geometric extrapolation or to fit linear or semi-logarithmic regression equations to the trend in each share. In the latter case the fitted equation is used to project the trend value to provide an estimate of the occupational share in the target year. In making the forecasts of occupational shares within sub-sectors, a number of rules were employed to decide whether a geometric, linear, or semi-logarithmic projection should be used. These rules were based on the change which had occurred in the occupational share between 1981 and 1991 or 1991 and 1995. For example, if the absolute change in the occupational share over the relevant period was less than 10 per cent, between 10 and 40 per cent, or more than 40 per cent, a semi-logarithmic, geometric, or linear projection would be selected. In making the forecasts of occupational shares within sub-sectors, the projections based on application of the decision rules for the period 1991–95 were adopted as being the most appropriate and were therefore taken as the preferred basic or default option. This decision was taken since forecasts compiled on this basis generally provided the best representation of the trend, and were not unduly affected by cyclical influences. Approximately one-sixth of the projections were made using a geometric projection while one-half and one-third were made using linear and semi-logarithmic projections respectively.

The analyses showed, however, that there were a small number of cells for which a projection using a different projection to that chosen by the application of the decision rules would give a better result. This occurred, for example, in situations where application of the decision rule resulted in a projection which appeared out of line with the long-term trend in the occupational share. In these cases judgement was used to select an appropriate projection equation. The equations used to make a geometric, linear, or semi-log projection are as follows:

$$\text{Geometric:} \quad \hat{a}_{ij}^{(t+k)} = a^{(0)}_{ij} (1+r)^n$$

$$\text{Linear:} \quad \hat{a}_{ij}^{(t+k)} = \alpha_{ij} + \beta_{ij} (t+k)$$

$$\text{Semi-log:} \quad \hat{a}_{ij}^{(t+k)} = \alpha_{ij} + \beta_{ij} \ln (t+k)$$

where $\hat{a}_{ij}$ is the projected share of the ith occupation in the jth sector, t is time, k is the number of years to the target date, n is the number of years from the beginning of the projection period to the target date, and α_{ij} is the intercept of the projection equation and β_{ij} is the regression coefficient for the variable in question.

Use of Shift-Share Analysis to Interpret the Results

An important question which has to be answered in interpreting the results of the occupational forecasts is: what underlying trends are driving change in the level of employment in different occupations? A useful means of answering this question is provided by shift-share analysis. Shift-share analysis is used to statistically attribute employment changes to a *scale effect,* arising from general economic growth or decline, an *industry effect,* due to shifts in employment between industries, an *occupation effect,* arising from changes in occupational structure within industries, and an *interactive effect* between these three factors. The scale effect is the change which takes place if employment in each industry simply expands (or contracts) in line with employment overall. The industry effect reflects changes in interindustry purchases and in the structure of final demand which result in expansion or contraction of employment in each industry. The industry effect is influenced by technological change, product development, and changes in relative prices. The occupational effect results from organisational changes in the use of workers by occupation and job restructuring. This effect results primarily from technological change. The interactive effect is the residual change which is not accounted for by any of the three preceding factors (see Silvestri, 1993, p. 81).

Historically, changes in the industrial structure of employment have a more widespread influence on occupational employment than changes in the organisation of work, as Corcoran, Hughes, and Sexton (1993, p. 36) point out. A strong industry effect is expected to prevail again over the period 1995–2003 according to the latest occupational forecasts for Ireland (see Duggan, Hughes, and Sexton (1997)). In only one third of the occupational sub-groups is the occupational effect expected to be larger than the industry effect and there are only four sub-groups for which the occupation effect is greater than the combined industry and scale effects. During the period 1995–2003 it is expected, therefore, that changes in the aggregate level of employment in individual occupations will tend to be determined by developments in industries in which the employment of workers in those occupations is mainly concentrated.

Agricultural workers represent a polar case since nearly all of those employed in agricultural occupations work in the agricultural sector. However, the same general point applies to other workers where changes in occupational employment tend to be determined by the industry in which they are mainly located. Thus, skilled production workers and most operatives predominantly work in manufacturing and the fortunes of this sector will largely determine whether there will be more or less people employed in these occupations in the future.

Assessing Earlier Forecasts

The reliability of earlier forecasts has been assessed by Duggan, Hughes, and Sexton (1997) to see how they compare with what actually transpired in terms of employment levels in the different occupations in the target years chosen. The first set of forecasts, by Corcoran, Hughes, and Sexton (1993), issued in the FÁS/ESRI series in March 1993 contained predicted employment levels by occupation for 1996. The availability of the detailed results of the 1996 Labour Force Survey afforded the opportunity to make comparisons between the 1996 occupational employment forecasts and corresponding actual data for 1996.

It was evident for some time, before this exercise was undertaken, from published CSO labour force estimates,[5] that the 1996 sectoral employment forecasts which formed the basis of the occupational forecasts were too low. The sectoral data were taken from the *1991 ESRI Medium Term Review* by Bradley, FitzGerald, and McCoy (1991). While this exercise did predict fairly significant employment increases, it did not anticipate the very rapid employment expansion which subsequently occurred in the post-1994 period. However, it is worth noting that when the 1996 occupational forecasts were published the view was expressed in the actual report that the employment increases foreseen were, perhaps, too optimistic in the light of the economic situation prevailing at that time.

Some detailed comparisons between the forecasts and the actual outcomes are set out in Table 3 in order to identify the precise areas of divergence. This table contains a classification of the actual 1996 employment totals, and those forecasted for the same year classified by broad occupational groups. It should be noted that these figures are, of necessity, based on the occupational classification as previously used in the FÁS/ESRI publication series and are, therefore, somewhat different from those set out above in the table showing the current occupational classification.

The overall employment forecast for 1996 was 1,181,000, which understated the actual level of 1,285,300 by over 104,000, or 8.1 per cent in relative terms. However, the position varies significantly across occupations. For agricultural occupations, managers/proprietors, skilled manual workers and security personnel the forecasts were quite accurate, in each case lying between 0.5 and 3 per cent of the actual total. In the case of skilled manual workers (comprising both maintenance and core production craft workers) the forecasts actually exceed the corresponding Labour Force Survey estimate, but by a very small amount, 1,300 in an overall total of 166,000 or 0.8 per cent. There is then a further group of occupations for which the understatements associated with the forecasts is broadly equivalent to, or

[5] Preliminary estimates from the 1996 Labour Force Survey at aggregate sectoral level were published in October 1996.

Table 3: Comparison between the Occupational Employment Forecasts for 1996 and the Actual Labour Force Survey Estimates

Occupational Group	*1996*			
	Actual	*Forecast*	*Differences*	
	000		*000*	*%*
Agricultural occupations	140121	139100	-1021	-0.7
Managers/Proprietors	127833	124200	-3633	-2.8
Professional workers	166898	149400	-17498	-10.5
Associate Professionals	70362	62700	-7662	-10.9
Clerical	179018	163000	-16018	-8.9
Skilled Maintenance	62727	61500	-1227	-2.0
Other Skilled Manual	103474	106000	2526	2.4
Production Operatives	102457	94500	-7957	-7.8
Transport & Communications	50378	44700	-5678	-11.3
Sales workers	100912	85700	-15212	-15.1
Security workers	36003	35500	-503	-1.4
Personal Service workers	102974	77200	-25774	-25.0
Unskilled labourers	42160	37500	-4660	-11.1
Total	1285317	1181000	-104317	-8.1

Sources: (a) Labour Force Survey 1996; (b) Corcoran, Hughes, and J. Sexton (1993).
Notes: The Other Skilled Manual Group includes Foremen and Supervisors.

somewhat in excess of, the overall employment shortfall of 8 per cent. This group comprises professional personnel, clerical workers, production operatives, workers in transport and communications and unskilled labourers. There are, however, two occupational groups, involving workers in sales activities and personal services, for which the divergences are quite large; in these cases the understatements lie in the 15 to 25 per cent range. In fact, for these two occupational groups the aggregate shortfall is nearly 41,000, accounting for 40 per cent of the overall difference of 104,300 between the forecasts and the actual employment outturn.

Inspection of these three groupings may appear to involve diverse or unrelated elements. However the outcomes can, to a significant degree, be traced back to divergences in the underlying sectoral forecasts. The fall in agricultural employment has, apart from occasional fluctuations, followed a fairly predictable trend pattern over the years, a feature which was reflected in the basic macroeconomic model forecasts.

The sectoral forecasts for the broad industrial area (including building) were also accurate, which was a major factor in ensuring that the aggregate occupational forecasts for skilled manual activities were very close to the employment levels that eventually materialised. However the underlying sectoral forecasts for employment in services (both market and non-market) were significantly unders-

tated, which in turn contributed to substantial shortfalls in the projections of employment levels for related service occupations.

Table 4 shows the percentage distributions across occupations for both the forecasts in question and the 1996 Labour Force Survey estimates. These are quite similar, indicating that when the position is viewed purely in this distributional sense, the forecasts measure up reasonably well. However, this perspective obviously does not convey the full picture, and in assessing overall accuracy consideration must also be given to the results in the preceding table, which gives comparative data involving both absolute and relative aspects.

The reliability analysis provides a rather unique perspective on the degree to which the expectations which were current when the forecasts were prepared were, or were not, ultimately fulfilled. In this context the time in question relates to the early 1990s encompassing the period when both the *Medium Term Review* and the 1996 occupational employment forecasts were published. It was a period which involved depressed levels of economic activity. One might broadly summarise the position by noting that the forecasts correctly predicted the employment changes for a group of occupations including, most notably, skilled manual activities; for other occupations (including professional activities) the shortfall in the overall forecast of total employment gave rise to a similar deficit in relative or percentage terms; however, apart from any global understatement, what the methodology did not anticipate was the huge surge in employment in mainly semi-

Table 4: Comparison between the Distribution of the 1996 Employment Forecasts by Occupation and that for the actual Labour Force Survey Estimates for the same Year

Occupational Group	*1996*	
	Actual %	*Forecast* %
Agricultural occupations	10.9	11.8
Managers/Proprietors	9.9	10.5
Professional workers	13.0	12.7
Associate Professionals	5.5	5.3
Clerical	13.9	13.8
Skilled Maintenance	4.9	5.2
Other Skilled Manual	8.1	9.0
Production Operatives	8.0	8.0
Transport & Communications	3.9	3.8
Sales workers	7.9	7.3
Security workers	2.8	3.0
Personal Service workers	8.0	6.5
Unskilled labourers	3.3	3.2
Total	100.0	100.0

skilled service activities that characterised the rapid growth in the economy after 1994. It should be noted that a significant proportion of these job gains would have related to part-time work in which at least 20 per cent of persons in the service type occupations in question are employed.

Information Dissemination

The occupational employment forecasts for Ireland are intended to provide policy makers with guidance on the economic and labour market environments they are currently facing and which they are likely to face in the future, to identify the areas where the main problems are likely to arise, to quantify the scale of those problems, and to provide estimates of the impact which different policies could have on these problems. The main user of the forecasts is FÁS – The Training and Employment Authority, which commissions them from the Economic and Social Research Institute. It has used the forecasts in a number of ways:

1. The occupational forecasts provided an important input into the preparation of an advisory document submitted to the government by the Training and Employment Authority in connection with the national *Operational Programme 1994/1999 for Human Resource Development* (Ireland, 1995) agreed with Brussels in the negotiations on the allocation of the European Community's Structural Funds. The advisory document set out medium-term strategies for investment in human resources. The Training and Employment Authority believes that the occupational forecasts were important in demonstrating that the government's proposals to Brussels were built on a sound understanding of future developments in occupational labour markets. The decision of the government to include the occupational forecasts in the operational programme agreed with Brussels attests to the value of the forecasts.

2. The Policy and Advisory Board for Industrial Development in Ireland – Forfás undertook a major study of economic and social developments expected in Ireland over the period up to 2010 (Forfás, 1996). The Training and Employment Authority requested the ESRI to use its occupational forecasting model to project the occupational pattern of employment in the target year. These projections provided an overview of how skill and educational requirements are likely to change in the future and they supplied a framework for policy proposals in the document in relation to the development of higher education and continuing vocational training.

3. The Training and Employment Authority produced a strategy document for the delivery of vocational education and training in the future. The extent of the Authority's future activity in these areas linked in with the government's operational programme for human resources, referred to in point 1 above, which are based on the occupational forecasts.

The occupational forecasts are also used by a range of government departments, government agencies, educational and training providers, employer and trade union organisations, private recruitment agencies, and careers advice officers.

The main channel for dissemination of the results are the reports in the FÁS/ESRI Manpower Forecasting Studies series. These reports are presented to the media in a press briefing prior to publication and they receive extensive coverage on radio, television, and in the national newspapers.

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Appendix IV

Forecasting Methodology for Qualification and Training Needs in the Labour Market in Germany

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Overview

The IAB is following different approaches to find the basic information for forecasting. It has made several forecasts of future qualification and training needs mostly from the view of the demand side of the labour market. The following approaches will be reported shortly in this paper:

1. Educational Accounting System (BGR)
This project delivers information on the stock of qualifications in the German economy and the flow figures. It has a time lag of about two or three years and is a comprehensive source for building forecasts.

2. Comprehensive Forecasts of Employment to 2010
These forecasts are newly brought up to date – in collaboration with Prognos Basel – and show a very interesting methodology which will be reported in detail.

3. Early Recognition System of Qualification and Training Needs in the German Economy
This Project is running under the aegis of the German Ministry of Education and Research and will be undertaken by several scientific institutions, mainly by the BIBB Berlin. The first step of this project, an analysis of job offers, has taken place, but the project is in a pilot phase and there are as yet few results. The methodology has not been elaborated in detail.

4. IAB Establishment Panel
With the Establishment Panel the IAB has built up a reporting system that enables the structures and development on the demand side of the labour market to be continuously monitored, on the basis of surveys of employers.

5. Training as a Dominant Active Labour Market Policy in the Eastern German Transformation Process
After German Unification in 1990, labour market policy makers were confronted with a drastic reduction in employment and a rapid sectoral change. It was

therefore necessary to retrain great numbers of unemployed people to fill the needs of a sudden emerging service economy. Because of the obsolete production infrastructure in East Germany and openings in West German markets, more time was needed for restructuring production than services. The labour force was indeed oriented towards production jobs and skills, so a rapid restructuring of the labour force was a dominant objective in the unification policy.

Part 1: Projects in the Field of IAB-research

1. Educational Accounting System (BGR)

The main aim of the educational accounting System (BGR) by the IAB is to follow the stocks and flows of people in education and training systems, in employment, the unemployed and persons outside the labour force, as well as the transitions between these areas, by using a comprehensive but consistent method.

Although there is a great deal of particular data available for calculating transitions, they are often too disaggregated or delimited or not completely representative. For this reason a method was developed for the BGR to calculate a consistent overall picture, integrating all these heterogenous transition data.

This method was named ENTROP, analogous to the principle of "optimising entropy". It represents a further development and generalisation of the RAS method, for example well-known from the input-output calculation. The major difference to the RAS method is that "hard" as well as "soft" information can be taken into account for individual transitions.

As a result of this project Figure 1 shows the time series of the skill-level unemployment rate from 1975 to 1997. It shows a clear polarisation between the unskilled on the one hand and the highly skilled on the other. This leads to the conclusion that formal skills are a highly discriminating factor in the labour market.

Similar results will be reported for the eastern part of Germany (Figure 2) – only for the recent years from 1991 to 1997 – with more intensive polarisation: In this region the unskilled show an unemployment rate of 55 %, while the highly skilled range between 4,3 and 6,8 %. High level skills are able to reduce unemployment even in a sudden transformation process. But this result has to be thoroughly reflected on: it is a clearly documented fact that there was high mobility between the two parts of Germany, which brought highly skilled people from the west to the emerging eastern service jobs while people from the east migrated to the west to improve their skills in training on jobs in Western Germany. The positive employment situation for the highly skilled in the eastern part of Germany may only be an answer on their mobility potential.

2. Comprehensive Forecasts of Employment to 2010

The beginning of the forecasts of occupational tasks with respect to skill demand leads back to 1975, when the IAB made a first forecast together with the Battelle-Institute. These structural forecasts showed a disaggregation in 34 sectors and 60 occupations. Since 1979 the IAB has collaborated with Prognos in preparing forecasts which concentrate on the occupational tasks.

The first result of this collaboration was the 1985 forecast with the target year 2000. It was disaggregated into 24 occupational tasks and 30 sectors, and also brought a matrix for the future development. The forecast was based on a reference period from 1973 to 1980 and showed projections for 1990, 1995 and 2000. Three variations were calculated: a low trend, a medium trend and a high trend in employment. In addition, a forecast of four levels of qualification was elaborated:

Level I	unskilled
Level II	vocational school (first level), the German "dual system" of vocational training
Level III	vocational school (second level)
Level IV	college and university

The overall results show the trend towards a service economy, with a massive move to the secondary services which are mostly information oriented occupational tasks. A broad skill improvement seemed to be necessary to cope with the needs of the employment system.

A second forecast was prepared in 1989 with the target year of 2010. The methods were the same, the reference period comprised the years from 1973 to 1987. The disaggregation was made for 34 occupational tasks and 37 sectors. The projections were made for 1995, 2000, 2005 and 2010. As in 1985 three variations were calculated: a low trend, a medium trend and a high trend. In a separate project Tessaring elaborated a forecast of the demand for qualifications in 1992 through 2010 in five levels:

Level I	without completed formal training (unskilled) "NFQ"
Level II	completed apprenticeship training or in-school vocational training ("Lehre/Berufsfachschule") – (initial training) – BL/BFS
Level III	completed further training at trade and technical schools ("Fachschulen") incl. Health schools and schools for master craftssmen FS
Level IV	completed non-university higher education ("Fachhochschulen") – FH
Level V	completed university higher education including colleges of art and music, theological and teacher training institutions ("Universitäre Hochschulen") UNI

The results of this forecast are similar to those of the 1985 forecast. In the course of preparing this forecast, the unforeseeable event of German unification led to

severe problems in evaluating the results. There was no actual possibility to change this forecast with respect to the new challenge of the unified Germany. These questions will be discussed in part II of this paper.

The recent development of a third forecast in the years from 1997 to 1999 led to a new comprehensive model, for which the approach is shown in Figure 3. Due to the new unified German region and to several other changes in economy and employment this forecast shows the following framework:

The target year for projection was still 2010 due to uncertainties as to future development. The results are reported for the year 2000 and 2010. The reference period comprised 1985 to 1995 for West Germany and 1992 to 1995 for East Germany. Disaggregation of sectors gives 17 economic sectors and 34 occupational tasks. Variations (low, middle and high) have not been elaborated, but the two parts of the German economy were separated and an additional separation was made for full-time and part-time employees.

The demand for skill levels was elaborated only for the western part of Germany. It contains 11 skill levels:

Level I	without completed schooling and without completed vocational training
Level II	schooling level 2 (”Mittlere Reife“) without vocational training
Level III	schooling Level 1 (”Hauptschule“) plus vocational training (”Lehre, Berufsfachschule“)
Level IV	schooling level 3 (”Abitur“) without vocational training
Level V	schooling level 2 plus vocational training (”Lehre, Berufsfachschule“)
Level VI	schooling level 1 plus further training at trade and technical schools (”Fachschulen“) incl. health schools and schools for master craftsmen FS
Level VII	schooling level 3 plus vocational training (”Lehre, Berufsfachschule“)
Level VIII	schooling level 2 plus further training at trade and technical schools (”Fachschulen“) incl. health schools and schools for master craftsmen FS
Level IX	schooling level 3 plus further training at trade and technical schools (”Fachschulen“) incl. health schools and schools for master craftsmen FS
Level X	College education
Level XI	University education

The forecast was methodically performed in the following manner:

In an ex-post analysis a collection of influencing factors – technological, economic, social and other – are investigated for their impact on occupational tasks (see Prognos 1995). Qualitative issues are described and their impact is classified as positive (increase of employment in this task) or negative (decrease of employment in this task). These impacts are result of empirical analysis of the past and

are estimated for the future. They will be standardised and transformed from cardinal to ordinal status. These qualitative trends may show the same tendency in the reference period and in the forecast period, but there is, however, the fact of contra-indicating developments (Figure 4). As a second qualitative decision, the relevance of the qualitative issues for each of the 34 occupational tasks will be quoted and attached. So for each occupational tasks more or less qualitative impacts are selected. The transformation from cardinal to ordinal status is then made, leading to a variation of the trend extrapolation.

Parallel to this estimation, a sectoral forecast is imported from other research carried out by Prognos. Alternaitvely a sectoral forecast resulting from our own IAB-model will be produced. However, due to delays in the research work of the IAB, this forecast has not yet been prepared, but we hope reach a result in late 1999.

In the adjustment process both forecasts, the occupational and the sectoral forecast were put together into a matrix which is not ready for publication yet. Verification also needed on the sectoral input data of the IAB.

The result is a new matrix for the forecast which contains sectors and occupational tasks. Toreach a quantitative model the global absolute result (number of employees in 2010) is externally estimated and serves as a framework for disaggregation.

Figure 5 shows the results of the sectoral view, Figure 6 of the occupational task view and Figure 7 shows a segment of a typical matrix.

In addition to this sector/occupational task-forecast a parallel analysis and forecast is made for the demand for skills. Early approaches (made by Tessaring, see above) used the above mentioned sector/occupational task matrices and looked for the specific skill structure in the respective field of this matrix. In an aggregation it became possible to add all skill elements and come to an overall skill demand forecast.

The recent model (now in print) uses a multivariate model and is not as yet disaggregated into sectors or occupational tasks. We hope to get this further work done in 1999. Figure 8 shows a global overview of the results.

This step by step process of forecasting in cooperation with Prognos in fact shows the difficulties and the gains of forecasting in a dynamic field of waffle. The evaluation of the former forecasts shows a high stability in development, in spite of the dramatic impact of German unification. This may be a result of market processes, which have to take into account both the supply side on the labour market and the existing blueprint of an market economy characterised by the western part of Germany.

This forecasting in the framework of this collaboration between Prognos and IAB does not cover the whole activity in this field. There are further approaches to get more information for planning and accompanying the process of analysing the demand for skilled labour.

3. Early Recognition System for Qualification and Training Needs in the German Economy

There have been numerous approaches used in Early Recognition Systems for qualification and training needs. They most often use job advertisements in dominant newspapers and fill a databank with the relevant information. If it is expected that job advertisements are used for the acute demand they are valid indicators, but there is no proof of the overall demand. We know that different ways to show demand in the labour market can be found and no clear relevance of the results can be stated. Employers and job seekers use multiple efforts and in most cases no information about the final decision is available.

These approaches are of considerable importance in the field of labour market policy, but the methodology is poor and not as yet satisfactory.

4. IAB Establishment Panel

Major determinants of corporate employment and personal policy can be analyzed. So far, a total of six extensive surveys of establishments in Western Germany and three in Eastern Germany have been carried out, all in late summer. The data is representative of about 1.6 million establishments employing around 29 million people (of whom about 23 million pay statutory social insurance contributions). Owing to the design of the panel, i.e. repeated surveys of identical establishments over time, both cross-section and longitudinal section analyses are possible.

The employers are planning future activities and some of them are undertaking short and middle term personnel planning. The IAB Establishment Panel includes some questions concerning future needs for personal capacity and motives for rejecting candidates. An important part of the panel deals with further training activities in the firm and outside. The panel character of this study makes it possible to isolate economic growth or decline on the one hand and the importance of training or skill level on the other hand. Some scientific results could be elaborated, as there are great number of publications.

The time horizon of these panel based studies cannot however be more than 2 years at a maximum.

5. Long Term Labour Force Projections

Labour supply projections are relevant within the scope of a labour market information system. The number of jobs needed is determined by first calculating how many people want to participate in the labour market. The labour supply is measured by the labour force approach, usually as defined by the ILO.

Similar to this definition the labour force is quoted as the number of gainfully employed persons plus the number of (registered) unemployed people in Germany. This number is to indicate the overall supply of labour available to the economy. When compared with the demand for labour it should indicate how far a specific labour market situation deviates from a previously observed situation of high employment.

Results of the IAB long term labour force projections are as follows (see also Fig. 9 and 10):

Labour force projections are an important tool for labour market policy. They can be helpful for labour market monitoring and for setting up and evaluating employment programmes.

Projections of labour market participation (activity rates) and population figures are the elements of a labour force forecast.

The future development of population figures and the predicted potential activity rates will probably lead to a rising potential labour force in Western Germany up to the year 2010.

The most important elements for the change in the potential labour force are migration and the potential activity rates of married German females.

Part 2: Forecasting in the Eastern German Transformation Process

Some aspects of the transformation process in Eastern Germany, which has now been under way for nine years, may help other countries to cope with the global challenges in the move from a socialist planned economy to a social market economy.

With the process of opening up to world markets, both the domestic division of labour in the former German Democratic Republic (GDR) and the division of labour of the COMECON central and eastern European state-trading countries became obsolete. The sudden advent of competition sent shock waves through the

eastern Germany economy, which had formerly been isolated. The impact of the change was further aggravated by the German-German monetary union when currency was revalued by 300 to 400 %. To make things worse, there were additional problems, such as the frequently poor quality of production.

By the new western standards, eastern German capital stock was obsolete. Productivity per labour hour was about one third of that in western Germany. As a consequence, production, particularly in industry and agriculture, dropped drastically. The situation was exacerbated by the disappearance of major export markets, particularly in Eastern Europe. Because initial innovation and investment was inadequate and because of the privatisation policy, eastern Germany first underwent extensive de-industrialisation before embarking on the current slow re-industrialisation process.

The labour market trends in eastern and western Germany showed a complex situation: in East Germany employment dropped down to 6.2 million in 1993, which is only two thirds of the original (pre-unification) number. Due to the economic situation, the labour force in eastern Germany has been shrinking again since 1995 after a slight growth in 1994 and 1995. The productivity gap between western and eastern Germany persists, while the level of incomes (gross wage and salary sum per employee) is clearly closer to the western German figure (by 77 %).

Medium and long-term labour market forecasts indicate that the recovery of the employment situation will be extremely slow – even assuming considerable economic growth. The main underlying reason is the productivity lag compared to western Germany, and wages that have jumped far ahead of productivity.

Investments to renew plant and infrastructure will play a key role in solving the labour market problems in the new Länder. Economic and structural policy will have to maintain or even boost levels of private and public investment in order to create competitive jobs. In this situation, labour market policy has an indispensable supplementary role to play. It may now contribute to structural changes and the creation of permanent jobs to a greater extent than was previously possible in the western part of Germany, but it cannot do so alone. It must continue to take the peculiarities of what was a drastic transition to a market economy with all of the ensuing problems fully into account. The problem is not merely a temporary slump in employment, but longer-term, persistent mass unemployment.

The active labour market policy measures which proved to be very positive in West Germany for many years were, however, used in the unification process. The cumulative effects of labour market measures covered labour market problems for totally nearly 2 million persons and limited the rate of unemployment in this transition process.

The dominant measures were:
- Early retirement
- Full-time training/retraining schemes
- Job creation schemes
- Short time workers

Out of this spectrum the full-time training/retraining schemes were a dominant issue in preparing employees for new occupational tasks.

When evaluating the success of integrating participants into the work force one must generally be aware of the following: most participants in job creation schemes in West-Germany and an increasing number in Eastern Germany are individuals who are difficult to place. Participation in an job scheme cannot eliminate all of the factors impeding placement. Furthermore, opportunities for integration are significantly affected by the general situation on the labour market. This is why the integration rate of job creation schemes should not be regarded as the principal yardstick for their success.

The same is true of training schemes. A special IAB-study revealed that of the German participants in AFG-subsidised full-time vocational further training schemes who completed this training in the third quarter of 1993, 51 % in the western and 43 % in the eastern part of Germany were in employment and contributing to social security by the end of March, 1994 (i.e. 71 month later on average). 44 % of the East German participants and 52 % of those employed in eastern Germany after the scheme had ended consider that the training had changed their career situation in a positive way – either because they found a new job, because they were able to advance in their careers, or because their job became more stable.

Although training efforts are indispensable in view of the fundamental economic restructuring process underway, they might be in vain if the jobs that are needed are not there. Priority must then be on job creation measures, including business start-up assistance. On the other hand, under these circumstances, finding a job can only be regarded as a relative indicator of success. From an individual perspective, taking a training programme instead of remaining unemployed for a long time can counter the process of skill loss and destabilisation and improve later employment prospects.

Regions have to maintain and expand the available skills pool to remain attractive as an industrial location and to drive future development. However, it is clearly difficult to design vocational further training to meet regional demands for skills, and the more uncertain the regional development prospects are, the more difficult it becomes.

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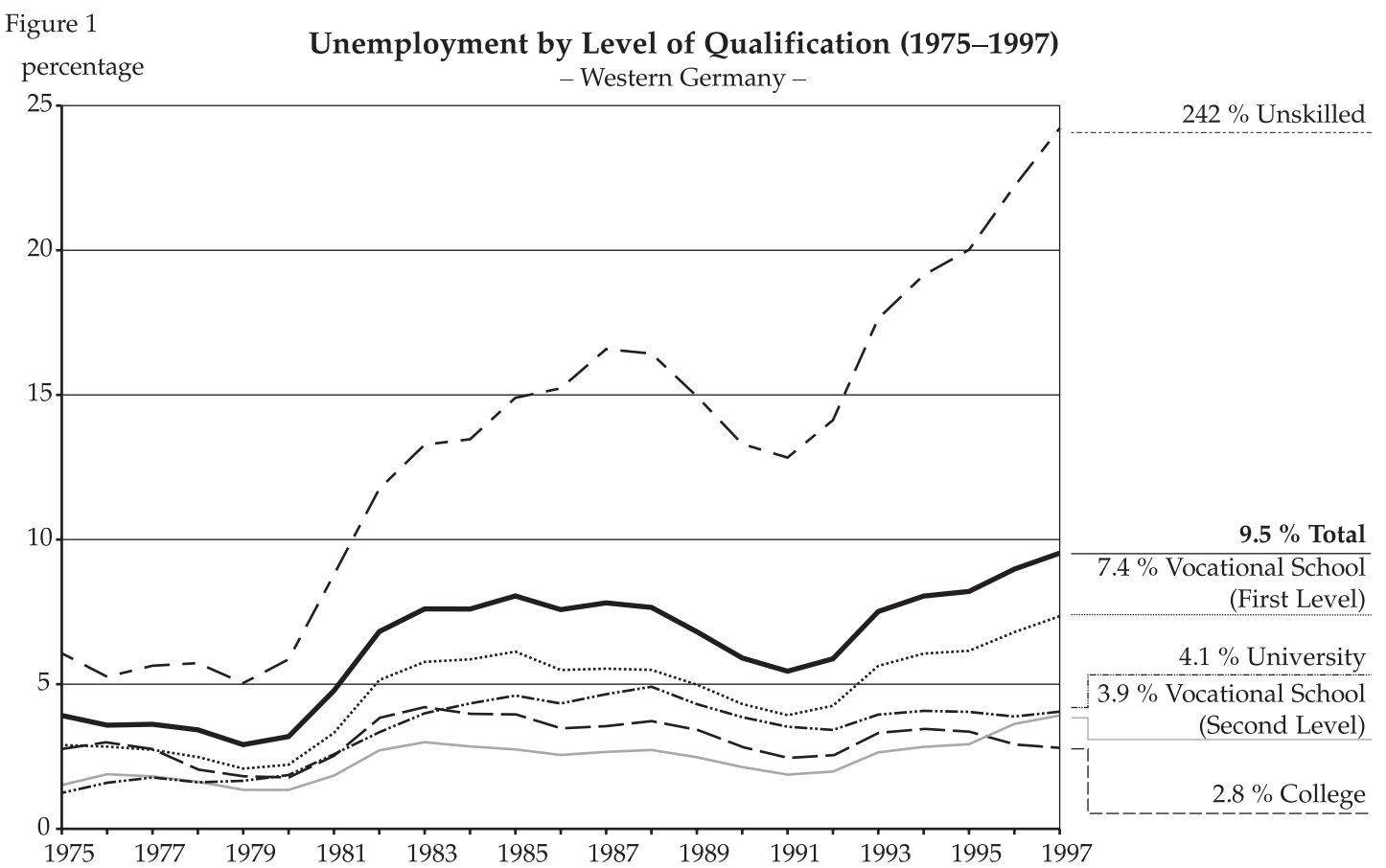
Figure 1



Unemployed as a % of the civilian labour force of the corresponding level of qualification (excluding apprenticeships)
Source: IAB-V/4

Figure 2

Unemployment by Level of Qualification (1991–1997) – Eastern Germany

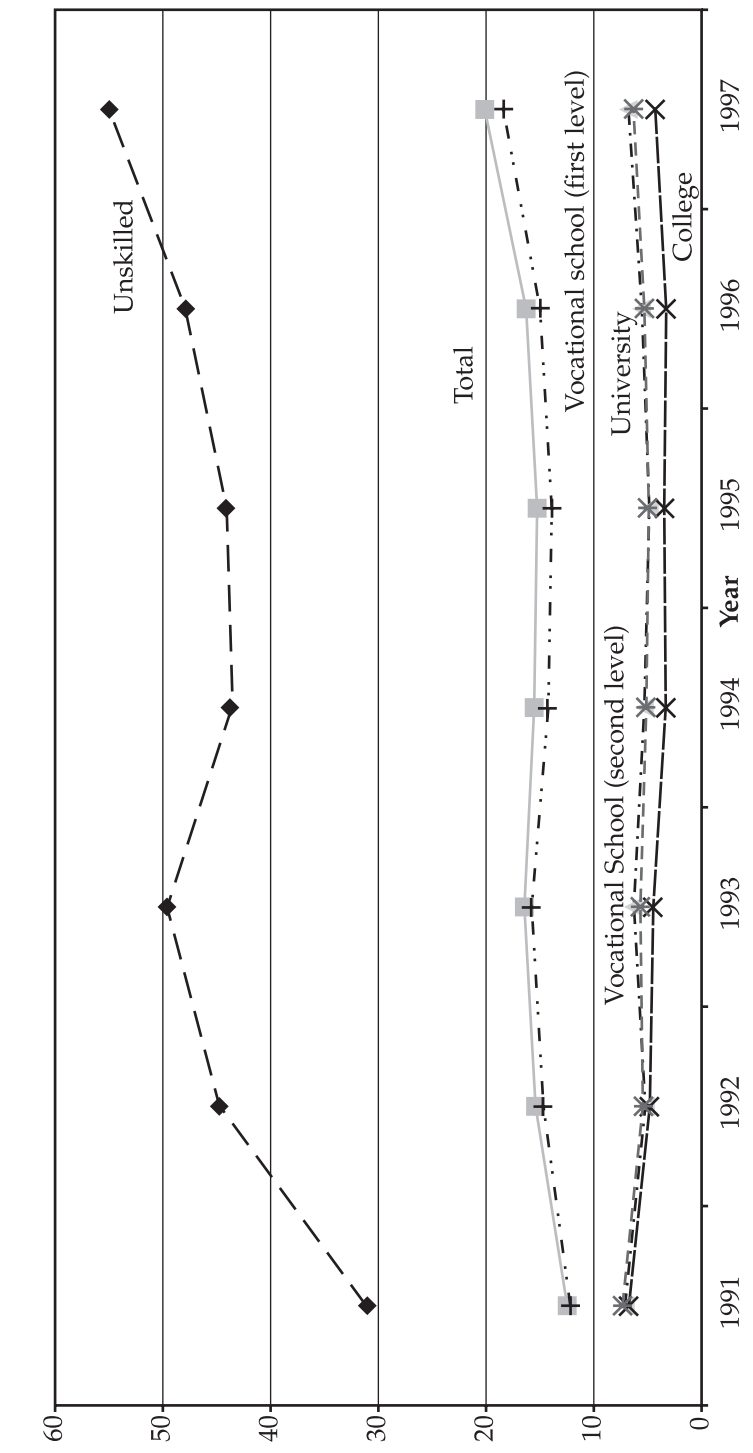


Figure 3: Research Design IAB-Prognos Projection

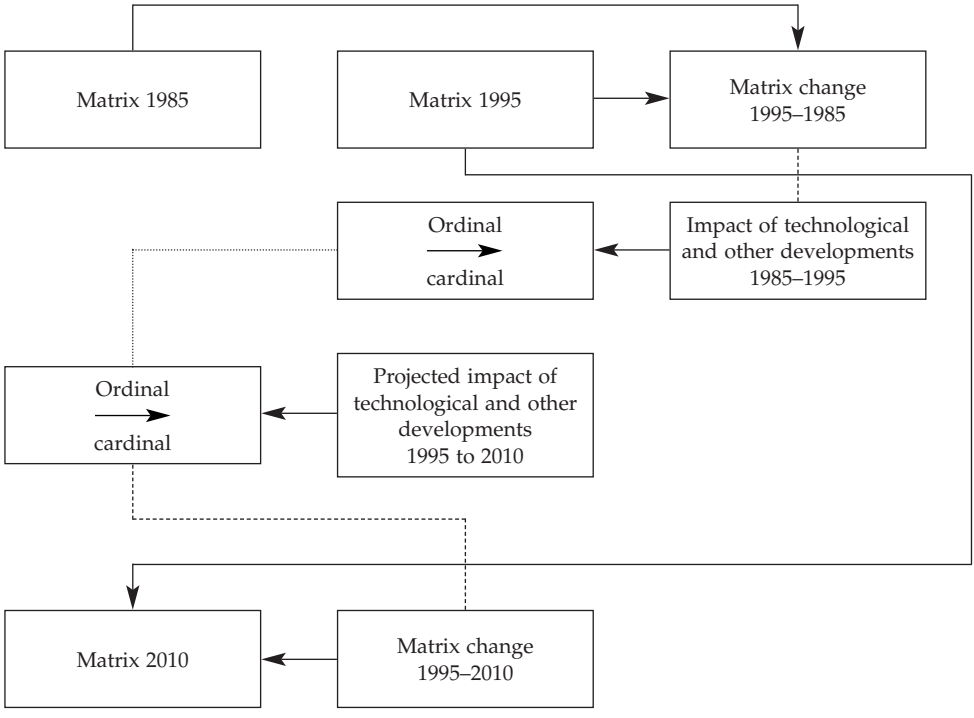
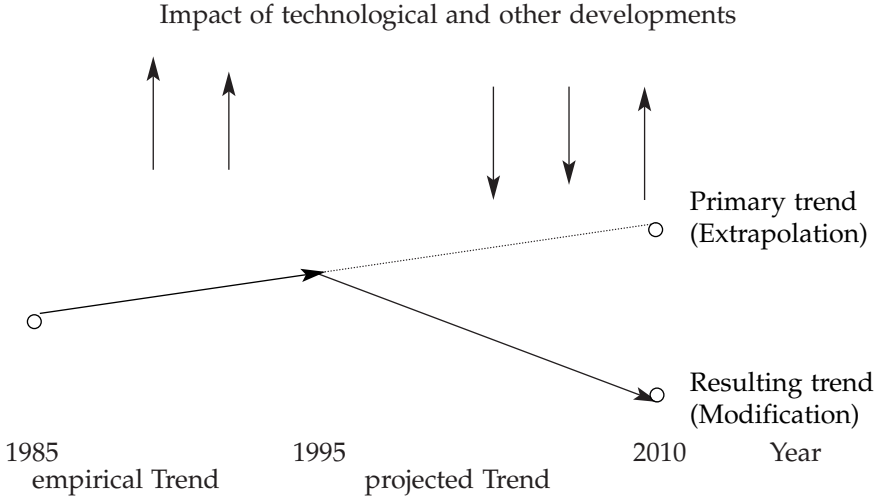


Figure 4: Method of the IAB-Prognos-Projection



This calculation is performed for all matrix-fields and the sum is adjusted to an externally defined value.

Figure 5: Employees 1991–2010 in Germany per Sector

	1991	**2000**	**2010**
Agriculture, Forestry, Fishing	1398	832	606
Mining, Electricity, Gas and Water Supply	664	409	327
Manufacturing	10582	7644	6984
Construction	2484	2448	2292
Wholesale and Retail Trade	4398	4462	4636
Transport, Communication	2119	1689	1587
Financial Services	941	951	940
Hotels and Restaurants	1406	1611	1868
Medical Services	1833	2248	2432
Personal Services	623	754	816
Education, Science, Art, Publishing	2387	2893	3232
Other Services	1811	2767	3550
Non-economic Organisations, Private Households	656	902	1011
Public Administration, Social Security	3673	2827	2678
Total	**34972**	**32436**	**32960**

Employees, without Apprentices
Source: Prognos 1999, Tables A-64, A-70, A-73

Figure 6: Projection of Employment per Occupational Task 1991–2010 Germany

	1991	**2000**	**2010**
Production-related Activities			
Machine operating/control	2764	2150	1970
Extraction, Processing	6343	4838	4196
Repairing, Restoring	2330	1981	1735
Primary Service Activities			
General Services	5308	4422	4338
Trading, Selling	3709	3897	4463
Clerical Work	6023	5823	5848
Secondary Service Activities			
R&D, Planning, Construction	1731	1696	1798
Management, Organisation	2377	2362	2765
Social Service, Training, Information	4388	5268	5845
Total	**34972**	**32436**	**32959**

Employees, without Apprentices
Source: Prognos 1999, Table A-1

Figure 7: Employees 1991 in Germany: Matrix Sector / Occupational Task

	Machine Operating	Extraction, Processing	Repairing Restoring	General Services	Trading, Selling	Clerical Work	R&D, Plan, Construct.	Managem. Organis.	Social Serv. Train. Info	Total
Agriculture, Forestry, Fishing	40	1077	49	77	32	57	11	35	21	1398
Mining, Electricity, Gas and Water Supply	143	137	105	44	14	107	49	52	14	664
Manufacturing	1961	3151	963	793	594	1396	830	771	124	10582
Construction	148	1121	534	114	52	267	89	143	16	2484
Wholesale and Retail Trade	86	185	179	468	2314	717	64	311	74	4398
Transport, Communication	158	77	153	903	89	431	58	193	57	2119
Financial Services	6	4	7	46	177	511	20	140	30	941
Hotels and Restaurants	13	207	27	673	81	63	5	40	196	1406
Medical Services	20	50	31	166	25	187	36	38	1282	1833
Personal Services	13	23	15	275	38	26	5	17	211	623
Education, Science, Art, Publishing	44	73	40	186	76	277	163	105	1423	2387
Other Services	58	67	68	209	179	661	223	191	155	1811
Non-economic Organisations, Private Households	8	40	15	143	6	123	13	36	272	656
Public Administration, Social Security	67	131	146	1212	31	1200	167	305	415	3673
Total	**2764**	**6343**	**2330**	**5308**	**3709**	**6023**	**1731**	**2377**	**4388**	**34972**

Employees, without Apprentices
Source: Prognos 1999, Table A-64

Figure 8

Labour Demand by Levels of Qualification 1976, 1991, 2010

– Western Germany only; excluding apprenticeships; percentages –

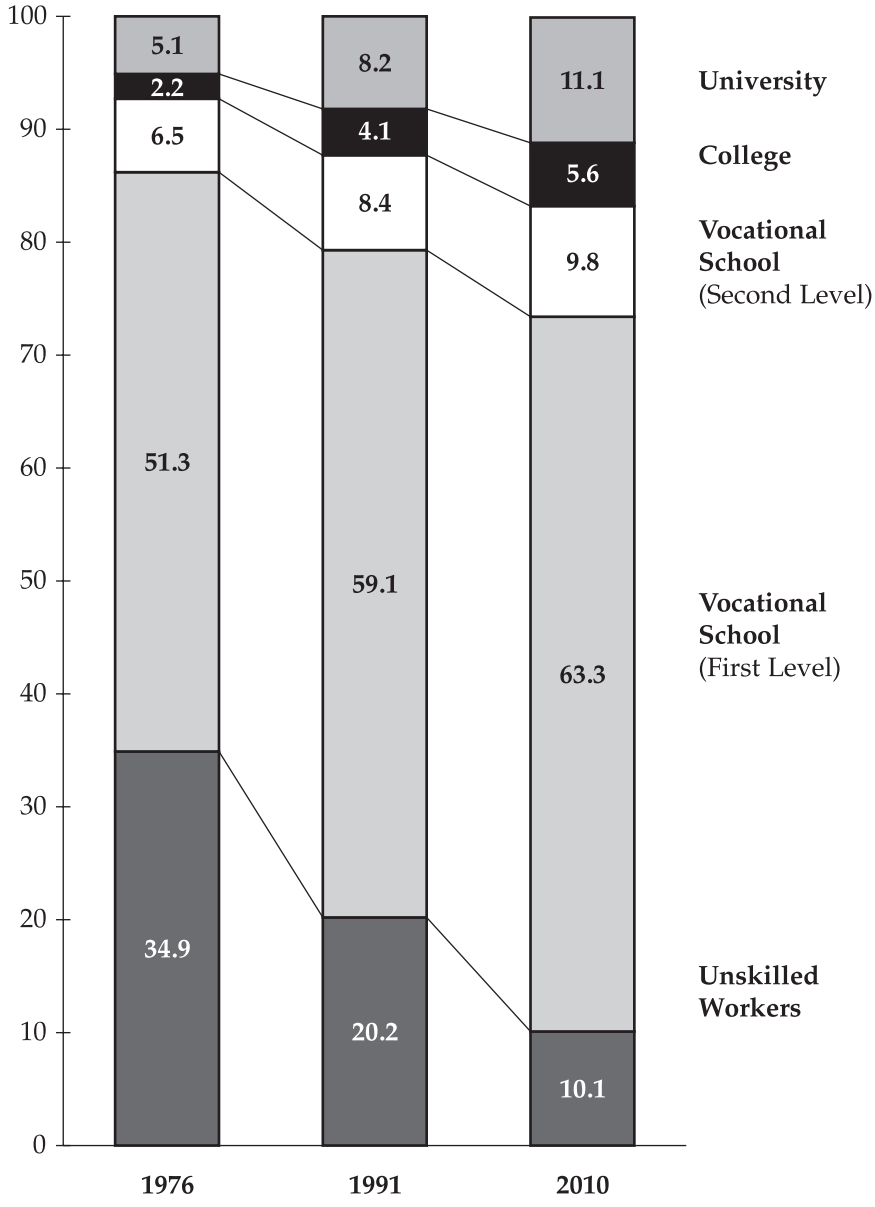
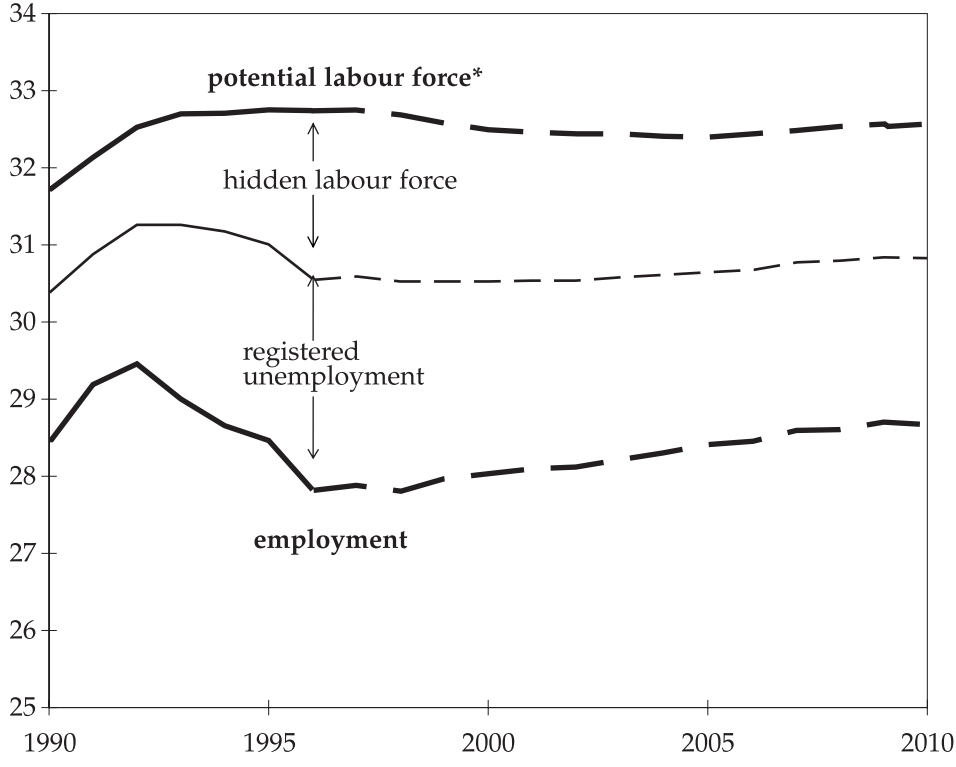


Figure 9

Labour Supply and Labour Demand in West Germany, 1990–2010

– million persons, residence concept –



* Net migration of 80,000 per year from 2000 to 2010; slight increase of labour force participation

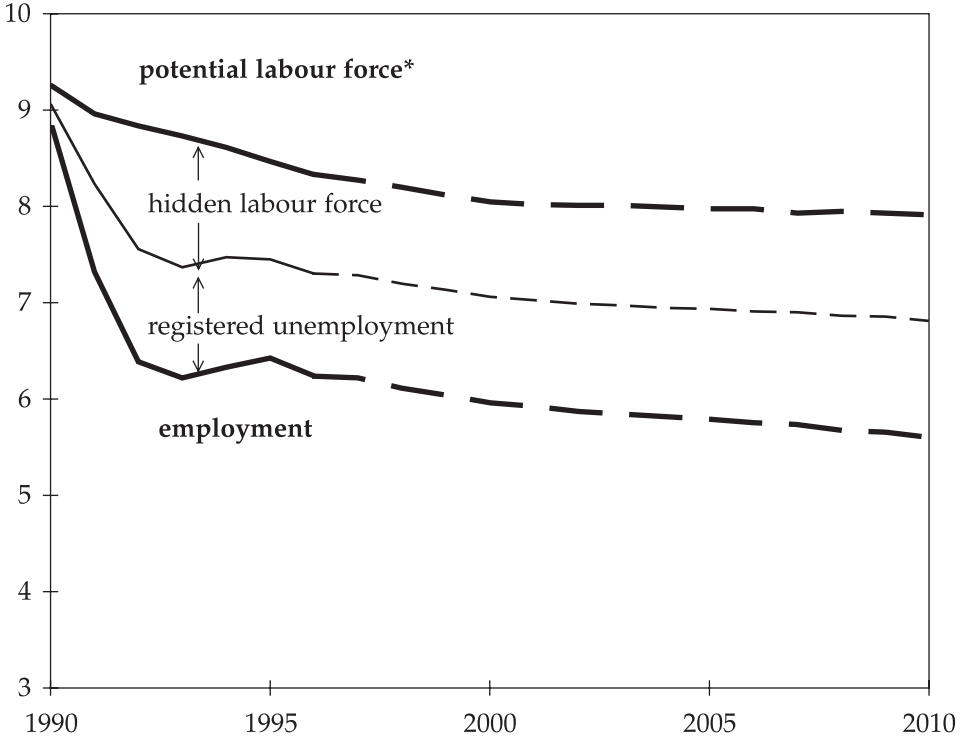
Development of main indicators

	Average growth rates (%)		
	1997/2005	**2005/2010**	**1997/2010**
Nominal gross value added:	+4.4	+4.8	+4.6
Real gross value added:	+2.8	+2.6	+2.7
Productivity per employee:	+2.6	+2.4	+2.5
Wage rate:	+2.5	+2.6	+2.6
Average yearly working hour per employed:	+0.0	+0.0	+0.0
Inflation rate for Germany:	+2.0	+2.5	+2.2

Figure 10

Labour Supply and Labour Demand in East Germany, 1990–2010

– million persons, residence concept –



* Net migration of 20,000 per year from 2000 to 2010; slight increase of labour force participation

Development of main indicators

	Average growth rates (%)		
	1997/2005	2005/2010	1997/2010
Nominal gross value added:	+4.7	+5.2	+4.9
Real gross value added:	+2.2	+2.4	+2.3
Productivity per employee:	+3.1	+3.1	+3.1
Wage rate:	+3.0	+3.0	+3.0
Average yearly working hours per employed:	+0.0	+0.0	+0.0
Inflation rate for Germany:	+2.0	+2.5	+2.2

East/West-relations (%)

	1997/2005	2005/2010	1997/2010
Nominal gross value added:	14.2	14.5	14.8
Productivity per employee:	63.5	71.1	75.7
Wage rate:	76.2	79.0	80.6

Appendix V

Country Overview of Data and Methods for Forecasting of Qualification and Training Needs of the Labour Market in the Czech Republic

Daniel Münich
Štěpán Jurajda
Nauro Campos
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Olga Strietska-Ilina
(Czech National Observatory)

1. Data

As there is currently no regular forecasting of occupational and educational needs on the labour market in the Czech Republic, we surveyed the data sources most likely suitable for such forecasting and mention also those which are currently not usable, but could be readily amended to serve forecasting purposes. Characteristics of all regular statistical data sources, which could in principle be employed for regular forecasting of labour market needs, are listed in Annex IV.

1.1. Regular Data Sources

We have identified four main data sources and a few other data sets which could potentially be used in the analysis as well. The four basic databases are the Labour Force Sample Survey, registry unemployment data, school enrolment data and a Survey of Unemployed Graduates. Below, we discuss each of the data sets in detail.

Labour Force Sample Survey

By far the most important statistical data source for our purposes, the quarterly Labour Force Sample Survey (LFS) collected by CSO (Czech Statistical Office), is almost fully comparable to other LFSs in Europe. The surveys have been conducted since 1993 on a quarterly basis. At present the surveys cover almost 30 000 households (about 70 000 individuals) each quarter. Standard ISCO and ISIC codes are used and standard ILO definitions are applied. Beginning in 1994 the surveys do not provide information on pecuniary incomes, including salaries, welfare benefits. In the period between 1993 and 1997 the surveys were conducted in seasonal quarters, since 1998 the reference period has been changed to standard calendar quarters. This may cause some implications for comparability in

time series. LFS data is representative at a regional level if not overly disaggregated. LFS cannot be applied at a district level. A consistent time series of major labour market indicators based on the LFS data for 1993–1999 will be published in 1999. The LFS survey also plans to extend the questionnaire with the information about participation in continuing training courses in 2001.

Unemployment registry data

There are district level data on the structure of registry unemployment available from 1991 onwards. They come from the registers of all 77 District Labour Offices of the Czech Republic and represent detailed and standardised monthly and quarterly sources of information collected for the Ministry of Labour and Social Affairs (MoLSA). It is important to note that primary data processing is conducted in Labour Offices and only aggregated data are supplied to the central administration. The database includes end-of-the-month/quarter values of stock variables and period-cumulative values of gross flows of unemployment. For analytical purposes one has to merge the data into a panel structure. Most importantly, information on educational and occupational structure of the pool of *unemployed* and *vacancies* is available quarterly. This supports both typical forecasting by education/occupation, but also mismatch analysis, which is particularly important in the Czech Republic due to low territorial mobility of the labour force. However, there are persistent deficiencies of data on posted vacancies (estimated 50 % underreporting and imperfect removal of filled vacancies from the database). Employers are legally bound to post all open vacancies to district labour office info-system but they do not fully comply with this. See Annex II for detailed structure of the data.

Monitoring of employers and retraining courses

We should also mention that the information system of the Labour Offices has several other modules that are interactive and have great potential. However, not all modules are functional and not all of them are relevant for forecasting purposes. The *Monitoring* module is supposed to gather information on the most significant employers in the region and their plans in terms of recruitment and lay-offs. The module has a great potential, but is not at present used to its full potential. The enterprise-level data are only valid for the present situation and for a very limited short-term planning. The data on lay-offs and recruitment are not detailed (no qualification structure, etc.). The system also includes a module for *Re-qualification Courses,* which presents information on re-training courses supported by Labour Offices and other offers of further training in the region. The module contains a wealth of information on the training offer as well as some information on participation in re-qualification courses. Although the data is neither exhaustive nor fully consistent, it represents virtually the only regularly available information on continuing training at a district/regional level.

Business survey data

The Czech Statistical Office collects business survey data describing opinions and expectations of Czech firms. The published results express what percentage

of firms in a given sector think that a variable or condition will increase, decrease, or not change, respectively. Participation in the surveys is voluntary. Individual data are protected. The first problem with the data is that answers of individual firms are qualitative, and not quantitative. In order to get aggregate quantitative data, CSO employs weighting of the individual data. It can be asked what the meaning is of the published aggregate quantitative data, and whether these figures correlate with the ex-post observed development data. The second problem with using this data for our purposes stems from the nature of the questions which are not skill or education specific. We believe that business surveys could potentially be used in forecasting labour market needs, but that they need substantial revision to fulfil that goal. Details are attached in Annex II.

Firm census data

Czech Statistical Office regularly provides data on aggregate employment and wages by NACE industrial branches. The data come from regular reports that economic units are obliged by law to fill in. The reports differ by frequency (annual, quarterly, monthly), sample (whole population, sample of units), unit sizes surveyed (<20 employees, >19, <50, >49, <100, >99, <500, >499, <1000, >999), civil/non-civil sector, financial/non-financial institutions, legal units (not) in commercial database. The monthly data in manufacturing, for example, provide end-of-the-period and period-average values of employment and of its full-time equivalents. However, they only differentiate between blue- and white-collar employment. While these are the best data for forecasting employment by industry, the individual records are strictly protected and it is only possible to work with aggregated statistics published with delay. The only alternative is to ask the CSO to regularly calculate tailored aggregate statistics.

Firm level employees sample

A private data-collection firm collects – in collaboration with the Ministry of Labour – quarterly data on hourly wage rates and hours worked of employees from a sample of firms. The sample is gradually growing, having started with approximately 500 firms (450,000 employees) in 1995 and currently covering about 1,000 firms with about 1,200,000 individual employee records. The data sets provides information on the wage, occupational and industry structure. See Annex III for more details. The data has one serious deficiency, however. The sampling scheme is unclear, with some of the participating firms having started cooperating with the data collection agency on a voluntary basis. It is therefore questionable to what extent the firm sample represents the entire economy.

School enrolment data

ÚIV (Institute for Information on Education under the Ministry of Education, Youth and Sports) maintains detailed databases providing information on the number of students at individual education levels, school types, branches including gross flows of graduates and admitted students. The data cover the whole population of students. The data have some deficiencies, e.g. participation in edu-

cation (enrolment, graduation, etc.) is not followed by age (except for new enrolments into higher education) and therefore when calculation of age cohorts is necessary, the theoretical age of students in individual type of education needs to be estimated. Drop outs from education and transfers between individual types of schools also are not statistically followed. The enrolment data are systematically maintained and could be used to compute special purpose statistical support for forecasting model.

Unemployed graduates

Twice a year (end of September, end of April) the Ministry of Labour retrieves data on currently registered unemployed school graduates. A school graduate is defined as a person who has never worked before unemployment after graduation or has less then 2 years of labour market experience after graduation (allows for repeated employment spells). Educational structure (branch and school type) of unemployed graduates is identical with the structure described in *registry unemployment data* described above. Genders are not distinguished. Age, unemployment duration and other characteristics are not gathered.

Information system on standardised working positions

The old Catalogue of Occupations (MoLSA – 1993) contains definitions of corresponding qualifications according to a standard classification of education branches (JKOV) and presents corresponding working activity according to classification of occupations (KZAM – ISCO-88). There is an indirect link (through work activity) between the two classification systems. In addition, there have been many important transformations in the sphere of labour in the recent past, making the existing catalogue of occupations outdated. The JKOV classification of educational branches has also become too diversified and not operational.

The Ministry of Labour has therefore initiated a major effort to construct an information system on standardised working positions. The major part of the database is to include a catalogue of about 600 standardised working positions with a description of each working activity linked to the ISCO-88 code. Further, each working position will be linked to the new and more operational classification of educational branches (KKOV). The major goal of the system is to increase the efficiency of communication between all ”players“ on the labour market and to improve labour market’s transparency. The description of each working activity for the whole set of standardised working positions provides a unique opportunity to study substitution between occupations, both for the purpose of optimal retraining at the District Labour Office level and for forecasting. The Ministry of Labour is working on the catalogue in cooperation with Trexima and Research Institute of Technical and Vocational Education (VUOS). As the two classifications are used in statistics (the Institute of Information in Education is using JKOV and KKOV, and CSO and MoLSA is using ISCO), bridging of the two classifications is essential for data transparency. The project is obviously of high relevance for the purposes of predicting labour market training and education needs. It creates

a link between the highly stratified branches of the Czech educational system and a meaningful catalogue of occupations, providing a labour market forecaster a most proper base for aggregation of occupations and for translating occupational forecasts into educational ones. Unfortunately, the project is now at its very beginning with plans to finish the work in late 2000. We will therefore not be able to use its full results, but instead will try to rely on even preliminary findings as they become available.

1.2. Irregular surveys

Many irregular surveys have been carried out in the Czech Republic. Many of these are in some way related to labour market and forecasting purposes. However, the majority of the surveys are limited in size (1000–5000 individuals) and many of them are small or not representative. We refer only to surveys that could possibly provide some information for our purposes. Although irregular surveys cannot be used as a consistent data input for regular forecasting, we may use them as a substitute to lacking standard data inputs together with expert evaluations.

Success of tertiary-level school graduates

During 1998–1999, the Faculty of Social Sciences gathered a sample of about 3000 individuals who graduated from tertiary level schools in 1995–1996. The survey is done by mail to a random sample drawn from school databases. The data provide detailed retrospective information on the labour market experience of graduates and previous educational paths. The data include information on estimated average gross earnings. The data provide only opinion statements on the matching of possessed education and job skills required/used. The survey is a part of international comparative project "Higher Education and Graduate Employment in Europe".

Survey of school leavers

Within the OECD project Transition from School to Working Life, (implemented by the National Observatory of the National Training Fund under a contract with the Ministry of Education) a survey among school graduates was conducted in 1997 by UNIVERSITAS. The country representative sample contains 1900 individuals (600 from each of vocational schools, upper secondary technical schools and higher education schools plus 100 individuals with lower secondary education only) between 20–29 years of age. ISCO codes of all jobs held were reported and two digit industrial branches. The data provide information on the educational path including field. The questions are mostly of the opinion type and focus mainly on the first job in a career.

Survey of opinions on school graduates among employers

The survey was conducted by the AMD agency in 1998. It aimed to discover employers' opinions of the knowledge and skills of school graduates which are

essential for working life, and the employers' evaluation of the quality of graduates. The sample of 820 enterprises, which had employed any graduate during two previous years and had at least 5 employees, was constructed on a random basis. Firm owners or top (or personnel) managers were questioned, depending on the firm's size. The survey gives an interesting viewpoint on qualitative aspects of the placement of graduates on the labour market and may shed the light on the problem where other statistics are not available.

Regional surveys

Several initiatives have been undertaken at a regional and district levels. They differ greatly in methodology and sampling, however for the purposes of verification of once available forecasting data at a regional level, they may present a significant input. We list only some examples, bearing in mind that by the time of the regional prognostic analysis there may be the new and different surveys available.

The National Observatory in cooperation with the GAREP agency conducted a questionnaire survey of employers in the region of Ostrava (includes 6 districts) in 1998. The sample included 2,635 enterprises and was designed on representative basis, from 20 % of micro enterprises up to 100 % of large enterprises. Although the rate of response was low (20 %), the survey succeeded in covering 500 employers with almost 130,000 employees (1/4 of the labour force in the region). The survey analysed the present qualification structure of employees (type and level of education), and their recruitment and lay-off plans (also including qualifications, with ISCO codes) in the two-year time spell. The ex-post evaluation showed that employers tended to somewhat underestimate the rate of change in employment of the region. The survey is a very rich source of information which can be used for verification purposes in the region along with usage of other sources and expert inputs.

Similar attempts were undertaken in other region, but rather at a district level. A survey on employment trends in individual branches of economic activity in Plzen and on future needs in the labour force (in terms of numbers and educational level) till 2005 was undertaken by the city of Plzen, the local Labour Office and university. Another example of such a study is a survey of supply and demand on the labour market in the district of Prerov, and the estimation of the future trends till 2003, undertaken by the Prerov Labour Office. GAREP-Brno conducted several studies in the Brno district, one of them being an inquiry among employers on their future recruitment/lay-offs with the analysis of qualification structures of the personnel. GAREP also produced an estimation of the labour force supply from education in the district till 2003, and conducted a survey among current students, last year lower secondary and upper secondary schools on their future plans.

All above mentioned survey have certain deficiencies, but they might be utilised for verification purposes in combination with other inputs.

Retrospective survey of labour market histories

In 1996–1997 the Economic Institute gathered a sample of 3000 households and collected the labour market history of household members during the period 1989–1996. The sample is representative on a national level. The data provide information on all jobs held during this period and unemployment and out-of-the-labour force periods. The data provide information on earnings, occupations ISCO and industrial branches NACE.

SIALS

A random sample of a little over 3000 individuals was drawn in early 1998 as a part of the Second International Adult Literacy Survey.[6] The primary purpose of the SIALS data is to measure the quality of available human capital using adult literacy scores (prose, document, and numerical). This is especially important in countries such as the Czech Republic, where the quantitative level of human capital, as measured using attained education, appears to be quite high, but where the qualitative level might be lower as most human capital was acquired under communism. The results of the SIALS study indeed show that the effectiveness of the reported years of education is very low. While the survey itself is of little use for forecasting, being only one data point in time at the moment, it is one of the very few Czech data sets with information on life-long learning. On top of recording the cognitive ability of the surveyed individuals, there is also detailed information on the type of training courses taken, their number and duration, as well as on the sources of financing, etc. While the almost 800 workers in the data with some course taken in the reference calendar year provide a useful insight into the type of life-long learning occurring during transition, it is hard to draw precise quantitative estimates on a disaggregated level. The survey, however, provides a good starting point for future data collection efforts in this area.

Data and surveys on continuing training

Continuing training is very poorly monitored in the Czech Republic. In order to provide a complete data input on supply of education and training, it will be necessary to inquire available sources on adult education. These involve the database of accredited training providers by the Ministry of Education, statistics on retraining courses at Labour Offices (see above), and irregular surveys. The Ministry of Education has a database of adult training providers that have accreditation from the ministry. The database covers around 900 institutions. It, however, contains only basic data on institutions and the fields of training, where they provide instruction. The Ministry of Education also conducts annual questionnaire surveys among accredited institutions, which provide general information on participation in courses according to fields of training. The rate of response is about 50 %.

[6] The survey was conducted in many countries under the supervision of ETS Princeton and Statistics Canada.

Secondary and higher part-time education of adults is followed by the Institute of Information on Education. Although these statistics do not provide information on continuing training as such, they may give an idea in which type/branch and on which levels of education demand and participation of adults are concentrated. The statistics are reasonably detailed, providing information on the number and gender of students in fields and levels of studies.

An invaluable source of information from enterprises is the project on European Human Resource Management conducted by EURONET for Human Resource Management and coordinated by the Centre for European Human Resource Management at Cranfield University, UK. The project has been under way since the beginning of the 1990s. Twenty-two European countries participated in the last survey in 1998. The first enterprise survey in the Czech Republic under the project was conducted in 1993, followed by surveys in 1996 and 1998 (all carrie out by the Prague School of Economics). All surveys are identical and comparable but at the same time each of them has an emphasis on a particular topic of inquiry (the so-called National Survey). The questionnaire of the Czech survey was completed by 167 institutions with 200 and more employees. The structure of the sample represents the industrial branch structure of the Czech economy. The survey analyses human resource strategies and development in enterprises, methods of labour force formation, recruitment problems, and subjects of courses mostly in demand in the coming three years. Although the survey provides only limited information for the needs of our project, it certainly gives an opportunity to draw up trends both from a time perspective and comparing the CR with other European states. Comparative analysis of all three surveys in the Czech Republic is planned in the second phase of the project, and in the third phase comparative cross-country results will be available from Cranfield in 2000.

There are also possibilities to use future surveys, e.g. an enterprise sample survey and a subsequent sample survey among Labour Offices within the project of the Research Institute of Labour and Social Affairs (VÚPSV) State Employment Policy in Accordance with Labour Market Needs (1999). Both of the surveys will not only tackle participation in continuing training courses by adults, but also identify the areas of the need in additional training from an employment perspective and will assess the quality of education outcomes. Another sample survey is planned for 2000 by CSO, which will examine leisure time activities, where it will be possible to include additional questions on participation in continuing training courses.

The drawback of the above mentioned surveys is their irregularity and not always adequate sample size. We assume, however, that they could be used as an additional source of information or a substitute for standard data in combination with expert judgement.

1.3. Availability

LFS can be obtained from the CSO. Unemployment registry data comes from the Ministry of Labour, as does the survey of school graduates. Enrolment data is available from the ÚIV institute. It is possible to obtain all of these data sets. The availability of data resulted from irregular surveys depends either on actual public disposal of the published data, or on a special agreement with the institute in charge of preparing the survey. Usage of results from irregular surveys, especially the introduction of additional questions in surveys by external institutions, is often subject to a tailored financial contribution to the institute in charge of the survey.

2. Methodology

Regular forecasting of qualification and training needs in the Czech Republic is next to non-existent. PHARE (1997) and the Czech Ministry of Labour and Social Affairs (1997) "Technical Assistance to Study Methods of Forecasting Employment and Unemployment in the Czech Republic" designed several possible approaches to forecast employment and unemployment with existing data structures. The project's focus, however, was the overall level of employment and it did not focus at all on the prediction of training needs.

The economy is still subject to many transitional processes. This makes regular forecasting more difficult. There are also relatively high institutional uncertainties concerning future reforms of the education system. These issues do not preclude forecasting, but make it more difficult and will require some adjustments of methods successfully and regularly employed in Western countries.

Another distinct feature is the relatively short time series of available statistics. Only monthly statistics provide sufficiently long series to base forecasts on medium-term trends of developed indicators, but they are affected by many sources of variation unrelated to the phenomenon under scrutiny here. Aggregate time series are frequently affected by changing methodologies.

Demographic forecasts

The demographic prospects are available and regularly updated. The baby booms after World War II and in the early 1970s create instability on the supply side of the labour market. The sizeable post-war generation in the labour force is approaching retirement age (57–62 years of age) and the early 1970s cohorts are now leaving the education system, temporarily increasing the labour supply. In addition, the fertility rate declined substantially (by about 1/3) soon after 1989. This will have implications on the labour market during next two decades when those cohorts will enter the labour market.

Unemployment forecasts

The Ministry of Labour employs a simple time series model developed by

CERGE to forecast registered unemployment at national, regional and district levels. ARIMA modelling is used on monthly gross flows into and out of unemployment. Separate ARIMA models for inflow into and outflow from unemployment are used to forecast both gross flows. Predicted flows are summed to obtain the forecasted level of unemployment. To forecast the unemployment rate, the constant labour force is used as predicted values. Despite its simplicity, the model has been very successful for short term forecasting. Although the labour market still has many transitional characteristics and the time series available are relatively short, the national-level forecasts are very reliable in the short-term. Unemployment forecast for specific labour groups cannot be carried out because gross unemployment flows are not available by education, age, etc. The forecast are updated monthly. The existing length of monthly time series (90 observations) is sufficient, although observations from early in the transition have to be considered carefully.

Incidence of unemployment among recent school graduates

Using the above mentioned data on *Unemployed graduates,* and *School enrolment data,* the Ministries of Labour and Education compute labour market matching indicators comparing relative sizes of cohorts of recent school graduates and of registered unemployed school leavers with different education twice a year. There are however no predictions made in this respect.

Prospects of recent school graduates

Based on the *Survey of school graduates,* P. Kuchař et. al. (1999) provide descriptive analysis of professional paths, qualification vs. occupation matching, job searches of school graduates. The analysis is again not concerned with forecasting.

Manpower planning

The Ministry of Education in collaboration with external experts (K. Kronrádová) employs a system dynamics method using data analysis on a reversed time scale and with external shocks typical for unstable systems. Their procedure has two stages. In the first stage, a simple model is used to describe the acquisition and utilisation of professional skills in the national economy. Future demand factors, the capacity of the education system and student demand are taken into account. In the second stage, labour market is modelled by Human Resources Accounting. Testing based on past data proved to be satisfactory. Future oriented predictions however require that the existing model be updated by components allowing corrections for exogenous variables, and interventions. The major user of the existing outputs is the Ministry of Education itself. The forecasts are mainly employed for budgetary purposes in financial planning of education. Uncertainty concerning future institutional reform (especially of vocational education and tertiary education) makes medium term forecasts difficult. There is no forecasting done on a field level. A simple manpower planning is also done irregularly at ÚIV.

Matching of education and occupation for recent vocational-school graduates

The Research Institute of Technical and Vocational Education (J. Vojtěch, 1998) conducted an analysis based on the 1996 Labour Force Sample Survey to provide information on the labour market success of recent graduates. The study identifies recent graduates as those individuals with imputed potential labour market experience of less than 6 years and considers only vocational school graduates. The analysis focuses on a) the level and type of education they acquired, b) the match of the acquired education (qualification) and of the job performed. The major outputs of the study therefore are a) tabulations of educational field vs. occupation area for each level of vocational education, and b) a four-rank scale measuring the quality of the match between education and employment. The only drawback of the study is that the information on acquired field and type of education available from LFS is not very detailed. While occupations are described using a four-digit ISCO code, both education type and field are reported only for about 10–12 categories. Nevertheless, the study forms a good starting point for our efforts as it provides some evidence on a meaningful aggregation of occupations.

Macroeconomic forecasts

The five-sector macroeconomic model of the centrally planned economy used before 1990 was abandoned shortly after the breakdown of communism. Macroeconomic modelling of the market economy in the Czech Republic is still in its early stages. The major problems faced by all Czech teams involved in macromodel building include a short and inconsistent official time series of major economic indicators, such as GDP, industrial product, employment, etc. published and frequently revised by the Czech Statistical Office. The extent of necessary adjustments and modifications born by repeated revisions of the published time series does not allow the existing models to be fully operational. Further, the exceptionally high volatility of some key indicators (e.g. industrial production) reduces the predictive power of the existing models.

There are currently three institutions maintaining and further developing their own macroeconomic models, but none of these models includes sectoral employment structure. *The Czech Statistical Office* maintains a macro model within the international LINK framework. The model is based on tuning of foreign trade flows and is already rather complicated (with about 100 equations). The *Ministry of Finance* employs an aggregate economic model on regular basis, providing five-year forecasts. It was noted, however, that the forecasts are reliable only on a two-year horizon. Unemployment is modelled independently using one separate equation. Finally, the Czech National Bank has recently established a team focusing on macro-model building. Their model is still at a very preliminary stage. The primary source of the data for all macro modelling is the Czech Statistical Office, specifically its National Accounts series. The financial series are provided by the Czech National Bank. None of the three institutions is currently considering building of a sectoral model, at least within next two years.

There is however an ongoing research project (Kejak, 1999) aiming at building, tuning and testing a HERMIN type of a model. The model has been developed in close collaboration between CERGE-EI and the Czech National Bank with assistance from ESRI in Ireland. This is the only existing sectoral macro model in the country, which could possibly provide some data-input for the purposes of our modelling. Originally, HERMIN type of models have been designed and used to analyse the convergence and structural changes during the integration of EU-periphery countries (Greece, Ireland, Spain, Portugal). The model relies on the assumption that the transition economy being modelled is beyond a critical threshold of reform steps. This allows for a use of standard macroeconomic approaches and economic theories. The Czech Republic's version of the model has four sectors classified according to NACE classification (Manufacturing, Market Services, Agriculture, Non-market Services). The developments in the latter two are, however, treated mainly as exogenous or driven by a simple time trend. The model treats employment, and unemployment in Manufacturing and Market Services as endogenous. World output, and prices, exchange rates and interest rates represent the major external exogenous variables, while public expenditures and tax rates are the key domestic exogenous variables. The model has to be able to deal with the specific features of the Czech economy such as reallocation of labour toward services at the expense of manufacturing and the relatively unimportant role of agriculture. Despite the apparent slowdown in the last five years, the process of sector shifts in employment has not finished when compared to western standards (see Table 1 for the review of basic trends in four main economic sectors). For instance, there are clear indications that the process of market deregulation of Market Services is not yet finished. Price restrictions (ceilings) imposed on several commodities (e.g. housing, energy) still hinder the growth of some sub-sectors. The model has been calibrated using the data until the end of 1996 and its performance has not yet been checked against the current real development of the economy. The primary goal of the model is not regular forecasting but simulation of experimental scenarios contingent on the future development of the exogenous variables in the model driven by domestic or external (EU) fiscal and trade interventions.

Summing up, our findings implicate that in developing the methodology to forecast training needs, we cannot rely on sectoral forecasts supplied by standard macroeconomic models. For the moment, sectoral forecasts of employment have to be obtained in another, perhaps simplistic way (time trending), as even the most suitable model (HERMIN) only models employment in two broad sectors as endogenous. The methodology built in this project should nevertheless allow for use of standard sector employment forecasts, which are yet to be developed in the Czech Republic. In the future, it is likely that employment forecasts will only be made for broadly defined sectors, making further disaggregation necessary.

Table 1. Employment during 1993-1998 (LFS data)

Year	1993	1994	1995	1996	1997	1998
Employed	5044700	5027100	5111600	4958400	4881300	4852900
Annual change (%)	n.a.	-0,3	1,7	-3,0	-1,6	-0,6
Primary sector	353900	333000	325300	282000	276300	256200
Share (%)	7,0	6,6	6,4	5,7	5,7	5,3
Annual change (%)	n.a.	-5,9	-2,3	-13,3	-2,0	-7,3
Secondary sector	2180700	2108600	2150900	2045100	1996700	1971400
Share (%)	43,2	41,9	42,1	41,2	40,9	40,6
Annual change (%)	n.a.	-3,3	2,0	-4,9	-2,4	-1,3
Tertiary sector	1425500	1517000	1555500	1561100	1536900	1550300
Share (%)	28,3	30,2	30,4	31,5	31,5	31,9
Annual change (%)	n.a.	6,4	2,5	0,4	-1,6	0,9
Quartenary sector	1081400	1064600	1074500	1064400	1068000	1069200
Share (%)	21,4	21,2	21,0	21,5	21,9	22,0
Annual change (%)	n.a.	-1,6	0,9	-0,9	0,3	0,1

Source LFS, 4th quarter 1998, CSO, p. 54, Winter 1996/97, p.54, Winter 1994/95, p.44,Winter 1993/94, p.44

3. Sensitivity

Does not apply, see section 2.

4. Information dissemination

Activities in the field of information dissemination (see below) are rather plans for the time when the first forecasting information and data are available. The output of the project will ideally have several types of products, serving both decision-making bodies and end-clients (career and educational counsellors, students, etc.). It will be necessary to involve research institutes of the relevant ministries in the process of adaptation of the output of our research for the labour market and education administration at central, regional, and local level. The present institutional structures and modes of information flow must be fully utilised (see more Annex V). With the help of research institutes (the Research Institute for Labour and Social Affairs, Institute for Information on Education, Research Institute of Technical and Vocational Education) the final output will be adjusted to policy making needs with the provision of a wide-spectrum data analysis and main recommendations for policy making. It will be even more important to involve the Ministry of Labour (the Employment Services Department) and the Ministry of Education as well as their institutional structures in adapting the analytical document and subsequent dissemination of the ”soft“ conclusions to counselling and

guidance services at District Labour Offices, schools and Pedagogical Psychological Guidance Centres. The collaboration and involvement of all relevant institutions from both sectors will help in bridging the gap between research and administration, and respectively between analytical recommendations and implementation. We also plan to involve the National Resource Centre for Vocational Guidance (NTF, Leonardo da Vinci programme) from an early stage of the dissemination process.

5. Work Plan

Our intention is to follow the quantitative approach to forecasting used by ROA and ESRI. Our main source of information will be the Labour Force Survey as it is the only consistent major frequent database available. We will supplement the LFS evidence, however, with other information drawn from other data sources to paint a more detailed picture of developments on the Czech labour market. Our immediate plan is to proceed in the following four stages:

In the *first stage,* we will focus on the choice of suitable and operational methods of aggregation of educational and occupational characteristics. Specifically, this concerns matching available standard classifications (ISCO, educational classifications used in school accounts JKOV and KKOV) and education coding used in the LFS. We will cooperate with experts from the Ministry of Labour, Trexima and the Research Institute of Technical and Vocational Education both in terms of their existing studies and their current work on the information system for standardised working positions. The experience of the Employment Services of the Ministry of Labour, and especially specific Labour Offices, in bridging the data between employment and education sectors, will be applied. We will involve the Institute of Labour and Social Affairs into the project from this early stage to ensure consistency for the future data collection and adjustment.

In the *second stage,* we will collect, clean, standardise, and merge existing data structures (LFS, education accounts, unemployment data). Based on these, we will compute and inspect time series of basic indices of structural employment changes occurring during transition, with particular focus on education and occupation. Next, in the absence of a sufficiently detailed macroeconomic sector model of the Czech economy, we will use the quarterly sector employment statistics from the LFS data to form sector employment forecasts. We plan to rely on ESRI experience with trend-based sector employment forecasts to form a basis for more detailed trend-based forecasting. This stage will require the first intervention of expert estimations, using the knowledge of sector employment trends by human resource and personnel managers, labour offices and independent experts from selected sectors. Further, we will augment these forecasts with qualitative evidence on sector employment shifts in the EU states and draw on the relevant body of research. Additionally, for verification purposes we will use results of irregular

surveys on qualification structures of future demand/displacement among employers, and data on monitoring of employers conducted by labour offices. Finally, we will also rely on simulation scenarios from the HERMIT model of the Czech economy to adjust our employment forecasts.

Based on this work, we will embark on the most difficult part of the project and cooperate with ROA to identify individual modules of the whole complex model in the *third stage.* We plan to cooperate on specific modules with institutions/experts who already have experience or data background in the relevant specific areas. For instance, we anticipate that modelling the supply of school graduates would be done with the help of the Institute for Information on Education. Data on continuing training will have to be taken from irregular surveys and the database on re-qualification courses of the Ministry of Labour, producing an estimation of a marginal supply from CVT. The core modules, however, capturing labour demand and supply, will be developed at CERGE in close cooperation with ROA and ESRI. We will start with simpler versions of each module that can be feasibly built given the data availability and proceed in iterations to more complex alternatives. Finally, the one caveat to our work that has already become apparent is the non-existence of macroeconomic forecasts of sector employment in the Czech Republic. Since these are a necessary input for a ROA-type model, we will use alternative and simpler forecasts. While this will surely affect the quality of the actual forecasts built into this project, it will not limit the future usage of the methodology we plan to develop. Once there is a Czech macro model providing reliable sector employment forecasts, they can be used as input into the training needs forecasting methodology.

The final *fourth stage* of our work will involve more qualitative research and evaluation of the quantitative forecasts. We plan to use the expertise of the French project partners in amending the quantitative results with evidence from firm-level interviews focusing on qualitative aspects of job and occupational changes. Further, we are also in the process of getting local human resource specialists involved in our project and hope for an inspiring interaction with them which should prove useful in shedding qualitative light on our forecasts, especially at a regional level.

In our work we plan to rely on the advice and assistance of a team of external experts drawn from the research institutes in the field of labour and education, data collection agencies, and local labour market institutions. This is important not only because of the significance of their expertise for adjusting the methodology to the local conditions, but also for supporting further implementation of the methodology developed here, once the project ends.

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Annex I

Registered unemployment statistics

a) Monthly statistics provide fundamental information on many variables. Those we find important for forecasting are the following: stock variables on the number of unemployed by type (blue collar, white collar, others) and by educational attainment (7 school-type groups). Vacancies are reported as stocks by type (for blue collars, white collars, graduates, and women). Gross-flows variables describe
– inflow into unemployment,
– outflow from unemployment to jobs,
– outflow to jobs with assistance of District Labour Offices,
– outflow from unemployment to Active Labour Market Policy Programmes,
– outflow from unemployment – taken out of register for lack of cooperation,
– outflow out of the labour force.
Since 1997 gross flows of vacancies and gross flows by gender are also reported.

b) Quarterly statistics provide district level information as of the last day of a given quarter. It describes the pool of registered unemployed in terms of age (10 age groups), education (10 educational attainment groups), occupations (10 ISCO groups), duration of unemployment (6 duration groups), vacancies (10 ISCO groups, 10 educational groups). All of the above is available by gender. It is possible to calculate gross outflows from unemployment conditional on duration.

Annex II

Structure of the Business Survey Questionnaire

The Business survey data started to be published by CSO more or less quarterly in mid-1991. Since February 1993, they are published monthly in a printed form. There are three separate publications, containing three areas of business surveys: industrial sector, construction, and retailing. All business survey data are divided into two large groups: first, there are data about firms' evaluations of the past, and second, there are data about their expectations for the future. Evaluations correspond to the given month. These expectations, which are published monthly, correspond to the next three months. The less frequently published expectations correspond to the next 6 or 12 months. The structure of the data is briefly illustrated in Table 1.

Table 1. General structure of the business survey data

Evaluations of the past	Expectations for the future	
Industry	Monthly/quarterly	Monthly/quarterly
Construction	Monthly/quarterly	Monthly/quarterly
Retailing	Monthly	monthly/quarterly

For each single question under survey, four numbers are published: "increase" (e.g. 20 %, meaning that firms with 20 % share on the whole production/employment think there was/is going to be an increase), "decrease" (e.g. 30 %), "no change" (it must be 100-20-30=50 %), and "balance" (20 % – 30 % = -10 %). Business surveys have the form of a poll. The firms for the surveys are selected by CSO according to their characteristics (number of employees, ownership form, and products) in order to comply with the basic structure of the whole industry. The participation in the survey is voluntary, the proportion of answered questionnaires being relatively stable, 60–70 %. The sample covers about 50 % of the market in industry and construction, and about 18 % in retailing. The business survey data are decomposed according to several criteria. First, in the industrial sector, there is a two-level decomposition:
I) into the three main industrial sectors according to the OKEČ-NACE classification used by CSO:
C) extraction of raw materials
D) manufacturing
E) production and distribution of energy, gas and water
II) into 25 individual industries according to the OKEČ-NACE classification.

Each firm included in the panel gives a positive, negative, or neutral answer to each question in the questionnaire. Usually the answer says whether a given variable or condition will (did) increase, decrease, or not change, respectively (i.e. it can be encoded as -1,+1,0). In the so-called first weighting, answers of individual

firms are usually weighted according to their share of total production, but answers regarding employment are weighted according to shares on total employment. Then the so-called second weighting is employed, aimed at transforming the structure of the sample answers into the structure of the whole population of firms. The survey is always performed at the beginning of every month and published between the 15th and the 20th of the given month. It means that business surveys are available relatively quickly, frequently and easily and that they are up-to-date at the time they are published.

The set of questions has changed as the time passed by. For instance, the question concerning the evaluation of total demand related originally only to domestic demand. However, there seems to have developed a stable core set of questions, comparable with the standard methodology of business surveys (IFO, INSEE). Currently, there are 18 questions in the industrial sector, 18 questions in construction, and 12 questions in retailing

1 Detailed structure

A) Industrial sector
Aa) evaluations:

1. eval. of current economic situation of the firm (M)
2. eval. of current total demand (M)
3. eval. of current foreign demand (M)
4. eval. of current finished products in stock (M)
5. eval. of current corporate insolvency (M)
6. production activity trends in the past (M)
7. obstacles to production growth (Q)
8. utilisation of productive resources (Q)*)

Ab) expectations:

9. exp. economic situation within the next 3 months (M)
10. exp. production activity within the next 3 months (M)
11. exp. total demand within the next 3 months (M)
12. exp. exports within the next 3 months (M)
13. exp. exports to the Slovak Republic (M)
14. exp. imports from the Slovak republic (M)
15. exp. number of employees within the next 3 months (M)
16. exp. sale prices within the next 3 months (M)
17. exp. credits within the next 3 months (M)
18. exp. solvency within the next 3 months (M)
19. exp. economic situation within the next 6 months (M)
20. productive resources in the next 12 months (Q)
21. exp. trends in the investment activity (S)

B) Construction
Ba) evaluations:

1. eval. of the current economic situation of the firm (M)
2. eval. of total current demand (M)
3. eval. of current domestic and foreign demand (M)
4. eval. of current corporate insolvency (M)
5. eval. of clients' payment discipline (M)
6. obstacles to the production growth (M)
7. construction activity trends in the past (M)
8. utilization of productive resources (Q)*)

Bb) expectations:

9. exp. economic situation within the next 3 months (M)
10. exp. construction activity within the next 3 months (M)
11. exp. total demand within the next 3 months (M)
12. exp. domestic and foreign demand within the next 3 months (M)
13. exp. number of employees within the next 3 months (M)
14. exp. sale prices within the next 3 months (M)
15. exp. credits within the next 3 months (M)
16. exp. client payments within the maturity less than 3 months (M)
17. exp. development of new engineering activity, modernisation and reconstruction, repairs, etc. within the next 3 months (Q)
18. productive resources within the next 12 months (Q)

C) Retailing
Ca) evaluations:

1. eval. of the current economic situation of the firm (M)
2. eval. of goods currently in stock (M)
3. eval. of current corporate insolvency (M)
4. previous trends in the sale of goods (M)
5. previous trends in the market (M)
6. obstacles to the growth (Q)

Cb) expectations:

7. exp. total orders to suppliers within the next 3 months (M)
8. exp. orders to domestic and foreign suppliers within the next 3 months (M)
9. exp. sale of goods within the next 3 months (M)
10. exp. employment within the next 3 months (M)
11. exp. sale prices within the next 3 months (M)
12. exp. credits within the next 3 months (M)

Decomposition

The business survey data are decomposed according to several criteria. First, in the industrial sector, there is a two-level decomposition:
I) into the three main industrial sectors according to the OKEČ-NACE classification used by CSO:

C) extraction of raw materials
D) manufacturing
E) production and distribution of energy, gas and water

II) into 25 individual industries according to the OKEČ-NACE classification. The 25 OKEČ-NACE industries included in business surveys are the following:

CA) extraction of black and brown coal,
CB) extraction of other raw materials,
DA) production of foodstuffs,
DBa) textile industry,
DBb) clothing industry,
DC) leather industry,
DD) timber industry,
DEa) paper industry,
DEb) publishing and printing,
DF) coke and petrol processing,
DG) chemical and pharmaceutical industry,
DH) rubber and plastics,
DI) non-metal mineral products,
DJa) metal products,
DJb) metal constructions,
DK) machines and tools,
DLa) electric machines and tools,
DLb) production of radios and televisions,
DLc) health service and optical products,
DMa) production of automobiles,
DMb) production of other means of transport,
DNa) production of furniture,
DNb) recycling,
EA) production and distribution of electricity,
EB) production and distribution of water.

Second, in construction and retailing, the data are decomposed according to the number of employees in the firm. In construction, there are 8 groups (1–24, 25–49, 50–99, 100–199, 200–399, 400–599, 600–999, 1000–), while in retailing, there are 6 groups (1–24, 25–99, 100–299, 300–499, 500–999, 1000–).

Annex III

Firm level-individual employee data

Each quarter, participating firms report wages and other characteristics for all workers they employed (occasionally excepting top managers). Although collection of this data began in 1993, the first two years had small sample sizes and unrepresentative coverage. When observations that do not report education are have been dropped, this criterion results in excluding about 40 percent of the sample. Even so, the sample ranges from 4.3 to 6.2 percent of employed Czech men. The data set appears reasonably representative of employed men with respect to education and age, but not industry. As with most other data from transition economies, the highest degree obtained is the only measure of education reported. The wage variable is the "average hourly wage." Each quarter, employers are legally required to calculate this wage for each worker to determine unemployment and sickness benefits. It equals gross wages plus bonuses and other special payments for the given quarter divided by hours worked, but excludes severance pay, profit sharing, and payments in kind.[7] Hours worked are only available starting 1998. The characteristics of individuals are: occupation (ISCO 88), education, age, gender, industry, and wage tariffs. The record on each firm consists of: region, type of ownership, legal form, industry, employment.

[7] It is common in the Czech Republic for employers to pay 13th and 14th month salaries as bonuses in June and December. In calculating the average hourly wage these payments are spread over the following two quarters if the employer pays two extra salaries and over the following four quarters if the employer pays only one extra salary.

Annex IV

Main sources of information on labour market indicators in the Czech Republic

Source	Periodicity	Nature of data	Sample size / / Coverage	Sampling procedure	Selection (stratification) criteria	Global represen-tativeness	Possible bias in represen-tativeness	Start of Series	Monitored indicators
Labour Force Survey	Quarterly	Sample survey	≈20 ths. HH (60–70 ths.ind.)	Stratified quota	Region	After reweighting	Not representative on district level	Spring 1993	E, U, OLF ISCO (5) ISIC
Register of Labour Offices	Monthly and Quarterly	Administrative	All registered Unemployed	–	–	Yes	Not ILO definitions	1990	U ISCO (1)
Costs of Labour	Annually	Sample survey	>999empl. All <1000empl. Sample	–	>999empl. all <1000empl. Sample	Yes		1992	Wage structure Hours worked, Labour costs
Surveys of Economic Units	See details in the text								E, Wages
Population Register	Continuous	Administrative	All residents	–	–	Yes	Short-term residents not covered	Before 1989	Permanent and long-term residents
Population Census	10 years	Exhaustive survey	All residents	–	–	Yes	Short- and long-term res. not covered	Before 1989 (last in 1991)	Permanent residents
Household Budget Survey	Annually	Sample survey	≈3–4 ths. HH (6–10 ths. Individ.)	Stratified quota	District Social group[b] # children[C] Net PC income	No	Total Incomes and wages Not representative	Before 1989	Wages, Expenditures
Microcensus	4–5 years	Sample survey	≈27 ths. HH	Random	–	Yes	Relatively little on information expenditure	Before 1989 (last in 1989, 1992, 1996)	Incomes, Some expenditure ISCO

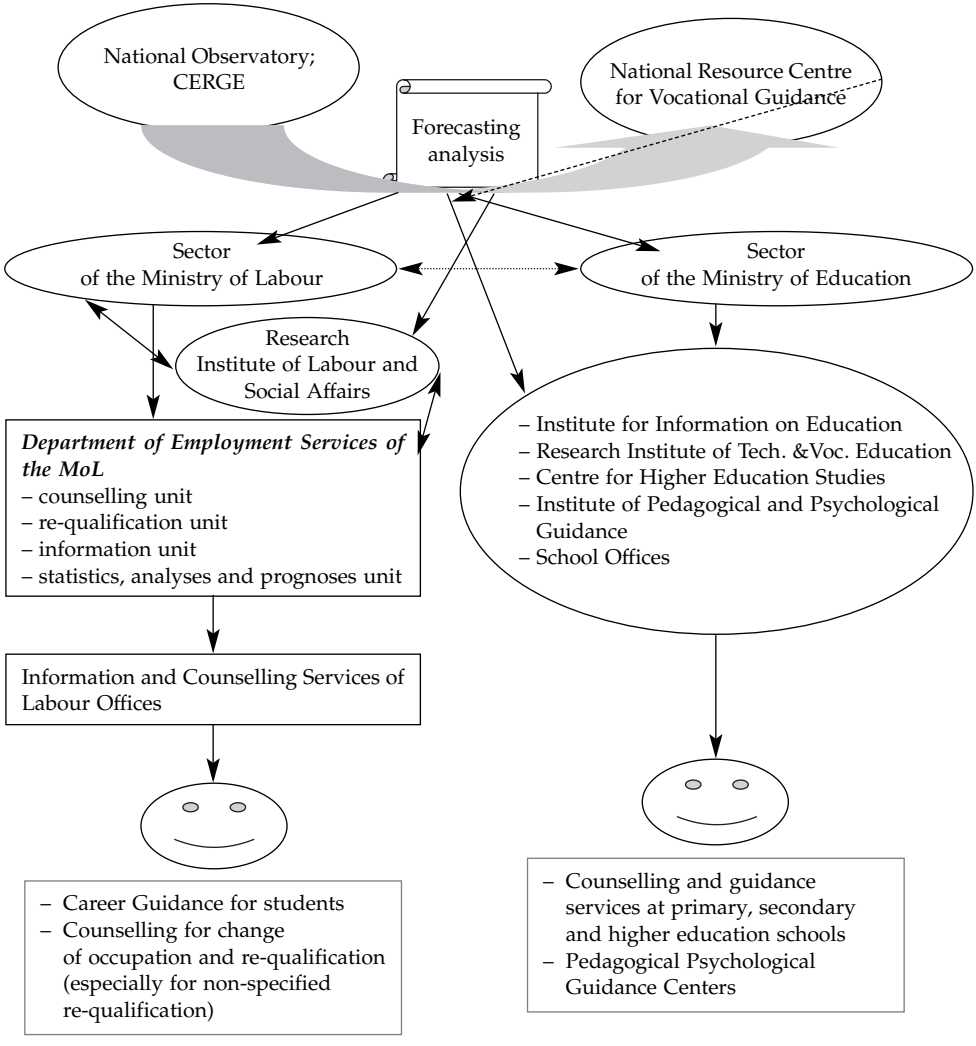
Notes: (b) Social group of household head
(c) Number of dependent children, for households of pensioners without economically active members – number of household members
Abbreviations: HH – Household, PC income – Per capita income, E – Employment, U – Unemployment, OLF – Out-of-labour-force

Main labour market indicators in the Czech Republic

Indicator Source	Employment	Unemployment	Population	Wages
Labour Force Survey	✓ (ILO definition)	✓ (ILO definition)	–	Main wage brackets until 1994 only
Register of Labour Offices	Only official employment of foreigners	✓ (Registered)	–	–
Costs of Labour	✓ (Hours worked)	–	–	✓
Surveys of Economic Units	✓	–	–	✓
Population Register	–	–	✓	–
Population Census	–	–	✓	–
Household Budget Survey	–	–	–	✓
Microcensus	–	–	–	✓

Annex V

Dissemination of the project results



Appendix VI

Initial Short Report on Methods, Used for Forecasting Training Needs on the Regional / Local Level in Slovenia

Dusanka Luzar, HRDF Maribor

Suzana Gerzina, National VET Observatory Slovenia

As will be evident from this report, until now only the Employment Service of Slovenia (further referred as ESS) has systematically recorded training needs, while the Chamber of Commerce and Industry and Chamber of Crafts have not been involved in any systematic assessment of education and training needs. This report thus presents two cases from Slovenia: an annual employment plan survey carried out by the Employment Service of Slovenia (ESS), and a regional survey on training needs in Podravje Region carried out by the Human Resource Development Fund (HRDF) in Maribor.

However, information collected by means of the ESS Employment plan questionnaire and data on registered education and training needs of employers within ESS often do not provide an effective mechanism for assessment of education and training needs. ESS analysis indicates future employment possibilities according to the required formal vocational and professional education of individuals. From the current analysis it is not clear which vacancies employers intend to fill and which basic and supplementary skills individuals should have in order to get a job. Formal vocational and professional education is only one of the factors in successful employment. Assessment of training needs of specific target groups in Slovenia and in the regions have so far been carried out unsystematically and for individual training programmes only. The identification of training needs has mostly been left to training providers themselves, although this has been more an estimation than a systematically performed training-needs analysis. For planning education and training programmes, stimulating the development of adequate programmes and for the incorporation of different target groups in these programmes, we should be better acquainted with requests and needs of employers.

The main task of the Human Resource Development Fund Maribor (further referred to as HRDF) is systematic study and recording of education and training needs, with the aim of planning and stimulating the development of modern, short-term, adaptable training programmes on the regional level. This will enable faster incorporation of manpower in the process of work in different economic circumstances. In cooperation with partner institutions (ESS, Chamber of Commerce

and Industry, Chamber of Crafts), HRDF annually systematically and regularly gathers information on the training needs of different target groups. The information gathered and systematically arranged in one place is used as a basis for designing a common and integrated strategy on training development for the needs of the region, as well as for designing annual training plans for different target groups.

1. DATA

1.1.

a) ESS Employment plan survey:
Inputs: The quantitative database on companies and organisations, data on registered employment and unemployment, previous employment plan surveys.
b) HRDF Survey

The quantitative database on companies that local Chamber of Commerce and Industry and local Chambers of Crafts have, are used as an important input into the analysis. A second important input is a quantitative database on the labour market and unemployment from the local Employment Service of Slovenia. Besides these databases, the Statistical Yearbook of Slovenia produced by the Statistical Office of the Republic of Slovenia is also an important input. As a qualitative input, expert reports on Regional development strategy are used. The most valuable information on companies training needs that are used as an input are collected by HRDF itself.

1.2.

a) ESS Employment plan survey

Employers provide data voluntarily and free of charge. The majority of employers consider the survey as a rather formal obligation (plus tradition).
b) HRDF survey

As Chambers, Employment Service of Slovenia and Development agencies are HRDF partner institutions they provide data free of charge. HRDF is collecting data directly from companies. The structure of data is described in the next item.

1.3.

- ***Data set collecting by the ESS Employment plan survey:***
  - data on employment in the preceding and following years by the level of education (national coding system used);
  - data on foreseen retirements and contractual and overtime work;
  - data on planned employments and workers and probationers by vocational qualifications (national coding system used);
  - data on employed disabled persons;
  - data on lack of workers with specific vocational qualifications;
  - number and structure of redundant workers and ways of solving the problem.

* ***Chamber of Commerce and Industry database (regular database) used as an input for the analysis consists of further referred data on companies*** *(their members):*
  – branch,
  – name of the company,
  – address,
  – telephone/fax,
  – responsible person,
  – number of employees.

* ***Chambers of Crafts database (regular database) used as an input for the analysis consists of further referred data on companies*** *(their members):*
  – branch,
  – name of the company,
  – address,
  – telephone/fax number,
  – responsible person.

* ***Data on companies in the region gathered by Statistical Office of the Republic of Slovenia (regular database) used for the analysis consists of the following data:***
  – total number of companies in the region,
  – structure of the regional economy by branches,
  – number of employees.

* ***Data on the labour market and unemployment gathered by the Employment Service (regular database) used as an input for the analysis consists of:***
  – employment,
  – registered unemployment,
  – structure of registered unemployment,
  – unemployment rates.

* ***Data on companies' training needs that HRDF is collecting (currently irregular database, will be regular in the future) consists of:***
  – basic information of company,
  – data on employees,
  – data on previous education and in-company training, data on existing training programmes,
  – planned vacancies,
  – investments in human resource development in the company,
  – education and training needs,
  – education and training programmes,
  – obstacles, opinions and suggestions considering HR development in the company,
  – opinion on ESS activities.

* ***Qualitative data on regional development strategy (irregular database).***

Sampling scheme:

From databases described above, the sample of companies included in analysis was designed according to the following criteria:

- branches evenly disposed within various local areas (municipalities) and according to the structure of the regional economy,
- companies that employ two and more employees.

1.4.

* ***Data sets from databases of the Chamber of Commerce and Industry and Chambers of Crafts*** used for the analysis are described in previous item.

* ***Data sets from database of Employment Service of Slovenia – Local Unit consist of:***

- structure of active population,
- unemployment rate,
- unemployment according to age, sex, level of education and duration of unemployment,
- the labour market demand and supply (job vacancies – according to level of education, the national coding keys are still used).

• ***Data set collected by the ESS Employment Plan survey:***
data on employment in the preceding and following years by the level of education;
data on foreseen retirements and contractual and overtime work;
data on planned employments, workers and probationers by vocational qualifications;
data on employed disabled persons;
data on shortages of workers with specific vocational qualifications;
number and structure of redundant workers and ways of solving the problem.

* ***Data set collecting by the HRDF and classification of the crucial variables:***

A. *Basic information about the company (by branches):*
location, name, address, telephone/fax, contact person, branch according to standard classification in Slovenia, legal form of company and size of the company according to the Companies Act.

B. *Data on employees (by branches):*
number of employees, structure of employees according to educational level reached (according to national coding key), age and sex, desired educational level, employees according to working period in the company.

C. *Data on previous education and training in company and data on existing training programmes (by branches):*
- number of employees that participated in education and training program-

mes in the previous two years, number of days devoted to training, training costs, Percentage of the company's total income spent on training and education,
- overview of training and educational programmes that employees participated in the last two years, estimation of each training or educational programme (satisfaction with effects of training on improvement of working process) and opinion about each training and educational programme and suggestions for improvement,

*(the above-mentioned data are collected **separately** for **management and other employees)***

- organisation of in-company training activities by training programmes/ /areas and share of each organisation scheme (in-company training, in-company with external provider, at external training providers),
- opinion of companies about cooperation between training providers and companies with the aim of developing and delivering tailor-made training programmes and the way they see such cooperation,
- knowledge and skills cannot be gained through the regular education system but are needed for qualitative and efficient work in the company,
- supply of relevant training programmes in the region that suit companies' needs,
- lack of training programmes that will assure acquiring suitable knowledge and skills.

D. Data on investment in human resource development in the company (by branch):
- presence of HR strategies in companies,
- presence of personal/training departments in companies and their role,
- motivation of employees for training and education.

E. Data on Education and training needs (by branch):
- lack of specific knowledge and skills and its influence on the company's development now and in the future and suggestions for overcoming those weaknesses,
- required knowledge and skills (coding designed by HRDF for this analysis) and formal education (qualifications and level of education according to national coding key) needed in different field of company's activities, number of employees that need to be trained to meet those requirements, separately for management and other employees.

F. Data on planned vacancies and redundant employees (by branch):
- planned new jobs/vacancies according to educational level and occupation for the period of 1999 to 2005,
- planned number of apprentices in the next two years according to occupation,
- required knowledge, skills, characteristics, level of education and occupation expected from new employees according to planned job,

- reasons and criteria why employees have been declared redundant, if the reason is level of education, lack of knowledge/skills should be described,
- presence of human resource restructuring programme if the company already has redundant employees.

G. Obstacles, opinions and suggestions concerning HR development in the company:
- obstacles to HRD in-company and in the environment, and companies' suggestions for overcoming those obstacles.

H. Opinion on ESS activities:
- satisfaction with ESS activities in the employment process and reasons for dissatisfaction,
- evaluation of ESS as an institution,
- company's participation in the active employment policy and suggested new programmes.

1.5.
both: ESS – Employment Plan survey and HRDF survey:
Periodicity of the data: annually.
Length of the time series: one year.
HRDF survey: it is planned as a regular annual analysis.

1.6.
a) ESS – Employment Plan survey
– regular annual survey

b) HRDF survey
In this analysis a large number of regular surveys/databases were used. In addition, HRDF gathered information on skills, knowledge, training needs, etc. directly in companies, which entailed high expenses (also including data processing and information dissemination).

2. METHODOLOGY

2.1.
a) ESS – Employment Plan survey
The Employment Plan survey is carried out by the Employment Service of Slovenia (ESS) in compliance with the Law on Employment and Unemployment Insurance.

The questionnaire is prepared by experts at the ESS. Questionnaires are sent to all social companies and organisations with at least 10 employees as well as companies with at least 3 employees. The addresses to whom the questionnaires are sent, are taken from the register of organisations and the register of self-employed persons at the Statistical office of the Republic of Slovenia. The questionnaire

are completed for all companies and organisations in Slovenia on a territorial basis by administrative unit level. The questionnaire also indicates aggregated data for all business or branch offices which are in the area of the same administrative unit as the headquarters of the parent organisation. For units outside the area of the parent organisation's headquarters another questionnaire is filled in; this is processed at the regional employment service where this report unit is located.

Preparations for the implementation of the survey last from mid-November and include both the determination of units and correction of the form, changes in application and preparations for print and distribution of the survey material. After completing the survey, regional units of the ESS enter the collected data into a serial computer application. They also assess the responses to the survey. This is followed by transmission of the database from regional units to the head office. After data processing special analysis are prepared at the head office and at the regional offices. These analyses are communicated to the experts of the ESS, to some other independent experts and social partners. The results are presented at a press conference. The whole action is usually completed in May with the preparation of analysis. This means that preparation, implementation and analysis of the survey results lasts approximately six months, which indicates the comprehensiveness and complexity of the project.

b) HRDF survey

It has a qualitative and quantitative methodology.

Several partner institutions are involved in the "TNA project": the Chamber of Commerce and Industry, Chambers of Crafts from the Podravje region, the National Employment Office-Local Unit Maribor, Local Accelerating Centres (7) and the Human Resource Development Fund (HRDF). HRDF designed the methodology of TNA and it also coordinates implementation of the project. All partner institutions have been involved in designing the questionnaire so we can gather information valuable for each of them. Only HRDF and Local Accelerating Centres are involved in the phase of gathering information with questionnaires and interviews, and in designing reports on TNA results. Other partner institutions provide a quality contribution for designing the sample of companies and other data important for designing the reports on TNA (e.g. data on unemployment – structure of unemployed,..).

Scheme of the model (methodology)

PHASE 1

Problem	***Hypothesis***	***Methods***
Database on companies in Podravje	A great quantity of data. At least two sources (Chamber of Commerce and Industry, Craft Chambers)	Designing of representative sample

❶ Sampling

- Gathering data on companies from 2 separate sources (Chamber of Commerce and Industry, Craft Chambers); more than 6000 companies with two or more employees
- Data on companies: name of the company, address, phone number, economic activity (branch), number of employees

❷ Classifying data

- According to the local areas "covered" by the various (7) Local Accelerating Centres in the Region
- Inside the areas – according to economic activities (branches)

❸ Preparing database of companies for various local areas (according to Local Accelerating Centres in the Region)

❹ Criteria for designing sample

- economic activities (branches) evenly disposed within various local areas and in the Region as a whole,
- companies with growth potential within economic activities (branches)

PHASE 2

Problem	***Hypothesis***	***Methods***
Information on: * Knowledge and skills needed in various companies, * Investments in HRD in companies in the past, * HR departments and their function * HR strategy in companies * Planned vacancies	* Lack of modern and necessary knowledge and skills, * Lack of investments in HRD in companies (lack of demand for training and education, lack of funds for HRD) * Administrative function of HR departments or absence of HR departments in the majority of companies	* Questionnaire * Interview

Gathering information:

❶ *Questionnaire*

- Sending letters with explanation of research to the companies
- Two days later – contacting companies by phone/getting agreement for cooperation
- Mailing questionnaire on statistical data to companies that agreed to cooperate with a request to return it within one week

- Reviewing returned questionnaire on statistical data and preparatory arrangement for an interview

❷ *Interview*

- Planning interviews and arranging visits in companies/meetings with responsible person
- Gathering information by interviewing responsible persons in companies

PHASE 3

Problem	***Hypothesis***	***Methods***
* Recognised training needs in companies, * Status of HRD in companies and suggestions for changes * Recognising demand for training and problems connected with this, * Planning development of appropriate training for the needs of different target groups (employed, unemployed, management, redundant workers)	* Cross-sector training needs * Specific training needs * The need to develop Training for Personnel Managers * The need of Train the Training Providers in the Region to be able to design modern, tailormade training programs, * Recognised future employment needs in companies	* Processing data * Designing TNA report for the whole region and for each of the local areas.

TNA results

❶ **Processing data**

- Coding and computer processing data regarding to different economic activities (branches) and various local areas as well as the whole region and the whole economy
- correlation with various data

❷ **Reading data, designing information and TNA report**

❸ **Important conclusions for various partner institutions in the region**

- Gaps in skills and knowledge needed in the companies
- Gaps in the supply of training programmes
- Companies' future strategies

- Companies' employment plans
- Identification of local employers' needs
- Recommendations for Regional development orientation

❹ **Results:**

- Designing annual plan of HRDF/plan of training programmes and other projects in the HRD field
- Initiation and implementation of tailor-made training programmes according to companies' needs (for different target groups)
- Basis for active labour policy in the region (training and other measures for the unemployed – NEO, Maribor Unit)
- First step in designing Human Resource Development Strategy in the region.

2.2. and 2.3.

a) ESS – Employment plan survey

Forecasts are up-dated once a year. The survey is normally carried out starting at the end of the year and at the beginning of the following year. Forecasts are made for a one-year period.

b) HRDF survey

Time frame of the forecast is from one to five years (some information will be annually updated, e.g.: training needs, skills, …).

2.4.

a) ESS – Employment Plan survey

The analysis is comprised mainly of quantitative measures. Forecasts are for:

– planned new vacancies for workers and probationers for an indefinite and definite period of employment by vocational qualification and formal education attainment (substitute employments due to retirement and extended absences from work, employments for definite period of time due to increased amount of work or seasonal work and additional/new extension of production and services).

b) HRDF survey

The analysis is comprised of quantitative and qualitative measures. Forecasts are for:

– planned new vacancies/job openings,
– new specific requirements due to the new technological development by occupation and by branches,
– required development of new tailor-made training programmes and other development projects on HR area for employed, unemployed, redundant workers and management.

On the regional level we forecast by branches.

2.5.
See item 2.2. and 2.3

3. SENSITIVITY (VALIDATION CHECKS)

a) ESS – Employment Plan survey

3.1., 3.2.
In general the reliability of data is checked by the response to the survey (size and structure of the response) and by discussing the results of the survey with social partners and companies.

3.3.
The reliability of data gathered is not checked as compared to the LFS. LFS in Slovenia is used only at the national level; since Slovenia is a small country with small regions data from LFS are inaccurate when applied at the regional level, due to the small sample. However, data collected could be checked by data on registered unemployment and on registered labour demand (according to the Slovenian law, every labour demand (job vacancy) should be reported to the Employment Service irrespective of whether employers wish the assistance of the ESS or not), however this is not always done.

3.4.
Data on qualification structure are primarily based on the formal education attainment levels (a national coding system is used) and vocational qualifications. However, collected education data are of a 'formal nature' and additional data on needed functional knowledge or special skills are not collected.

3.5.
To a certain extent the reliability of the forecast in the case of sizeable shocks and prolonged labour market adjustment periods is checked by the response to the survey and the structure of the response (by size of companies, type of company). Usually the response of smaller companies and self-employed persons is weak, as it is also for some companies in a difficult economic situation (for example those which are facing bankruptcy, in the process of reorganisation or compulsory settlement). The response to the survey. The response to the survey according to the number of employees in the companies varied up to around 80 %, with a higher percentage in the areas of smaller regional offices. Namely, the majority of employers consider the survey as a rather formal obligation (and not so much as a possibility to summarise their actual personnel plans).

3.6.
Adjusting the forecasts for regional variations/conditions is not particularly relevant since data are primarily collected at the regional level by regional employment services and they are then later aggregated at the national level.

b) HRDF survey

Discussing results with social partners and companies on "round-table" checks the reliability of our forecast. In addition, the increasing number of participants (different target groups) will act as a check on validity. Evaluation of training programmes supported by HRDF will give us validity of the results and forecasts.

4. INFORMATION DISSEMINATION

4.1.

a) ESS – Employment Plan survey

Final users are: national, regional and local employment services, national and regional offices of the Chamber of Craft and the Chamber of Commerce and Industry, Ministry of Education and Sport, Ministry of Labour, Family and Social Affairs, individual employers or their associations, some training providers, Centre of the RS for Vocational Education and Training, etc. However, until now the collected data mostly represent a framework for planning and carrying out the work of the employment service (for instance for planning and preparing active employment policy programmes for unemployed persons). Data serve as a tool for planning professional and operational work not only at the state (national) level but also at lower territorial units.

b) HRDF survey

Final users are HRDF, regional Chamber of Commerce and Industry, Chambers of Crafts, ESS, MOLFSA, Trade Unions, employers, local communities, development agencies, training providers and other institutions involved in HRD.

4.2.

a) ESS – Employment Plan survey

Channels of dissemination are: reports (national and regional ones), round tables, press conferences.

b) HRDF survey

Channels of dissemination are: round table, articles in newspapers, study report.

4.3.

a) ESS – Employment Plan survey

The ESS Employment Plan survey is prepared on annual basis and until 1999 most of the final users, with the exception of the ESS offices, had a predominantly passive role. From 1999 on, the procedure is that representatives of employers (Chamber of Craft, Chamber of Commerce and Industry) in particular have an active role both in checking the questionnaire itself and in discussing whether the results of the survey correspond to their actual daily experiences with the labour market.

b) HRDF survey
Most of the final users have an active role.

5. WORK PLAN

Some of the EU member states have developed employment forecasting methods for identifying future skill requirements which take into account the sectoral, occupational, educational and training factors that influence supply and demand for skills in the labour market. Slovenia (Human Resource Development Fund and N.O.) is interested in developing an employment forecasting model that would provide similar information related to skills and future training needs at a regional and sectoral level as in EU member states.

As Slovenia has already developed some mechanisms for forecasting educational and training needs at both a regional and a national level, it is deemed important to improve the existing methodologies based on cooperation with the EU member states. Quite a lot of information on manpower, the labour market itself, existing training needs at a regional levels, etc. is available. Unfortunately, the available information is not properly used for forecasting future training and educational needs in relation to the needs of the labour market and economy.

As a pilot we would like to improve the forecasting methodology of training and educational needs at a regional level. Forecasting training and educational needs at a regional level for specific branches is important for planning the development of "tailor-made" training programmes which will help to decrease structural discrepancies in the labour market.

The French approaches to forecasting educational and training needs at a local level seem to be appropriate for the forecasting of educational and training needs at a regional level in Slovenia. We would like to improve the existing methodology currently used by the Human Resource Development Fund, for short-term training and educational forecasts in relation to the labour market demands. It is particularly important to introduce inter-institutional cooperation that makes use of all available data (on the labour market, structure of employment, unemployment, school-leavers and other labour market entrants, etc.) which can be used for forecasting training and educational needs. In particular, it should provide a solution for the compatibility of data gathered by different institutions. This should also facilitate the activities of regional and local policy makers, especially by underlining insufficiencies as regards the initial and particularly continuing training offer.

Following steps:

1. We are proposing future close cooperation with the OREF of Burgundy. It is considered important to study the model of an inter-institutional network that

they are introducing for forecasting educational and training needs. We would like to highlight:

- how they managed to assure the compatibility of data collected by various institutions at a regional and national level,
- how they are collecting quantitative data, if there is a need to collect data on specific additional skills or any other data needed for qualitative forecasting of educational and training needs.

We would appreciate it if the exchange of experiences and knowledge could be organised in France so that we can see how various databases and other important information are organised and used for forecasting.

2. Studying the structure of different databases that can be used for the forecasting of training and educational needs at a regional level in Slovenia (regional level),

3. Improving the existing methodology for collecting and processing information important for qualitative forecasting, which are not available in the existing regular database in Slovenia. It is important to find a solution for the compatibility of data gathered by different institutions. Considering this phase we expect expert support from the French partner and if necessary also from other EU partners in the project.

Appendix VII

Country Overview of Data and Methods for Forecasting of Qualification and Training Needs of the Labour Market in Poland

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I. Labour market information system

1. During the transformation of the Polish economy a new information system on the labour market has been developed. There are two main reasons for this: (i) the introduction of market economy created new problems and processes on labour market which require a new information system, and (ii) unemployment increased dramatically during the transformation, reaching almost 3 million persons (16.4 %) in 1993. The level of unemployment has since fallen by about 1/3 to 2.1 million persons in February 1999 (11.9 percent of the economically active population). The high level of unemployment requires a comprehensive system of information concerning the factors responsible for unemployment, its structure and trends.

2. The present labour market information system in Poland is presented in Table 1. The basic elements of this system (labour force survey and registered unemployment) are based fully on international standards and ILO definitions.

3. Two elements of the labour market information system are particularly important for an analysis of training needs in Poland:

(i) Regular surveys of labour demand which cover 22,000 enterprises. The surveys include information on expected hirings and lay-offs in enterprises and branches of economic activities

(ii) A survey of employment of graduates (1989–94 and 1994–97), which is very useful for analysis of linking vocational education and labour market.

Table 1. Labour Market Information System in Poland

Source	Periodicit	Nature of data	Coverage	Global representativeness	Possible bias in representativeness	Start of Series	Producer of information	Remarks
Labour Force Survey	Quarterly	Sample survey	21,900 households 13,500 in towns (55,000 indiv.)	After reweighting	No representive on local and regional labour market	1992	Central Statistical Office (CSO)	The survey is based on ILO definitions
Registered Un-employment	Monthly and Quarterly	Administrative	All registered unemployed persons	Yes	ILO definitions	1990	CSO and National Labour Office	Based on ILO definitions
Survey of Labour Demand	Every second year	Sample survey	22,000 enterprises (4.4 mill. employees)	After reweighting	No representive on local and regional level	1994	CSO	
Survey of Employment of Graduales	1989-94	Sample survey	2793 indiv.	No	No representive on local and regional level	1989-94	CSO	
Population Census	1994-97 10 years	Exhaustive survey	All residents	Yes	No	Before 1989	CSO	

II. Methodology of forecasting training needs

4. No formal and accepted methodology of forecasting training needs (the future supply and demand for skills and occupations) is as yet available in Poland. There have however been many attempts to elaborate the methodology of forecasting; for example in 1993 an Interdepartmental Team for Labour Resources was created in order to coordinate vocational education and the labour market and to propose a draft of forecasting methodology. The team did not propose the forecasting methodology.[8] In 1998 a new high-level interdepartmental team of experts was set up by the Prime Minister of the Polish Government. The team is located at the Governmental Centre for Strategic Studies. It has been decided that the team should prepare the methology for long-term forecasting of training needs in the Polish economy, until 2010.

5. There have, of course, been many other attempts to prepare informal forecasting of training needs. Recently, a very comprehensive paper was published by the Committee of Research – Poland XXI Century.[9] The methodology is based on so-called **comparative extrapolation.** The authors studied the change in level and structure of employment in European Union countries, during the period 1984–1993. On this basis they calculated the coefficients of the increase of employment in different branches (sectors) and occupational groups as compared with the total increase in employment. Then, they applied these coefficients to forecasting the increase of employment in Poland until 2010 (by branches and occupational groups). Inevitably, the methodology based on comparative extrapolation is the subject of criticism and controversy.

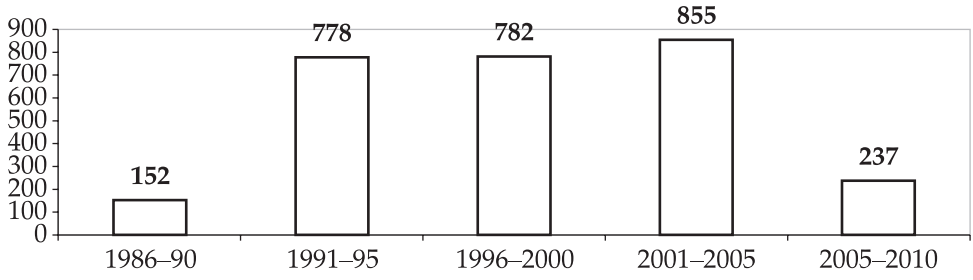
6. There is one element of long-term forecasting which is officially accepted. This is forecast of global labour supply until 2010. An increase in the net labour supply (1990–2010) will be determined by three basic factors: (a) a demographic increase of the population of productive age and a change in participation rates; (b) a reduction in mass unemployment and (c) a reduction of hidden unemployment (mainly in Polish agriculture).

(a) *The first element is a projected increase of the population of* working age and participation rates show the following demographic increase in labour force (see Figure 1).

[8] For futher details see: D. Możdżeńska-Mrozek, Linking Labour Market Analysis to Vocational Training, in: Linking Labour Market Analysis and Vocational Training, **European Training Foundation,** pp. 117–132.

[9] Studies on Changes in Level and Structure of Employment in Poland until 2010, Warsaw 1996, pp. 176.

Figure 1: Projection of the increase in the labour force in Poland, 1991–2010



(b) *The second element of the increase in the labour force supply is the actual level of unemployment* (2.1 million persons). It is assumed that so-called frictional unemployment should not exceed 0.7–1.0 million persons, or 4–5 % of the economically active population. In order to achieve this level it would be necessary to increase employment by about 1.1–1.4 million persons.

(c) *The third element is hidden unemployment* in the economy, estimated in 1999 at the level of 0.8–1.2 million persons, although it had decreased by about 2.5 million persons between 1993 and 1998. The enterprises operating on the competitive market showed a propensity to reduce hidden unemployment but it still should be treated as a potential labour supply in the future (especially in agriculture).

An estimate of the total potential net increment of the labour supply is as follows (1991–2010):

(a) demographic increment	2.7 million persons
(b) registered unemployment reduction	1.1–1.4 million persons
(c) hidden unemployment	0.8–1.2 million persons
Total increment in the labour supply	4.6–5.3 million persons

It follows from the projections and analysis that the total potential increment in the labour supply may be as much as 4.6–5.3 million persons (actual level of employment in the national economy is about 16 million). This increment creates a potential opportunity for acceleration of growth of the economy but this calls for a new economic policy of accelerated growth.

It should be added that the rate of increase in the labour force in Poland will be one of highest in Europe until 2010. Poland's share in the increase of the labour force in Europe (without Poland) may reach as much as 56 per cent.

The "labour force boom" reqiures new employment-oriented growth strategies.[10]

[10] The elements of this strategy have been elaborated in Ministry of Labour and Social Policy and in the Institute of Labour and Social Studies (for details see D. Możdżeńska-Mrozek, op. cit. and M. Kabaj, Programmes and Strategies for Counteracting Unemployment and Promotion of Productive Employment in Poland, ILO-CEET, Geneva-Budapest, 1996, pp. 52.

III. Four new methods of short-term monitoring training needs in Poland

7. There were two important reasons for searching for new methods of linking vocational education and training (VET) with the labour market. **First,** long-term forecasting of training needs would not be possible without a comprehensive diagnosis of the labour market situation, i.e. an analysis of shortages and surpluses of skills in the current period, prior to prognosis. **Long-term forecasting of training needs should not ignore the shortages or surpluses occupations existing in the base period.** If there are surpluses in certain occupation groups, the forecasting should be adjusted respectively. **Second,** in spite of special programmes to increase youth employment and reduce the general level of unemployment in Poland, the youth unemployment rate has consistently remained twice as high as the average (see table 2). Until recently one of the main reasons has been the lack of proper coordination between VET and the changing labour market demand for skills and qualifications.

Table 2. Youth Unemployment Rate in Poland (1992–1998)

Year	Unemployment rate (total)[1]	Youth unemployment rate[2]	Ratio
1992	13.7	31.3	2.3
1993	14.9	35.4	2.4
1996	13.2	29.5	2.2
1998	10.4	22.9	2.2

1. Percentage of economically active population.
2. Age 15–24.
Source: GUS, Statistical Bulletin, 1991–99.

8. The analysis revealed that many vocational schools and training (retraining) centres are "producing" graduates, for whom there is no demand on the rapidly changing labour market. It has been estimated that as much as 50 % of youth unemployment in Poland is due to a lack of coordination of VET with labour market demand. One of the reasons for the lack of coordination has been the lack of proper information on labour market needs for specific occupations. The available labour market statistics are very comprehensive but **too aggregated and largely useless for the adjustment of training structures by occupations and contents.**

9. For the reasons mentioned above, four new methods for linking vocational education and training (VET) have been developed and implemented in selected regions and training organisations:
1. Monitoring of shortage and surplus occupations (MSSO).
2. Tripartite and bilateral training agreements (TTA and BTA).
3. Bilateral agreements between schools and enterprises (BA).
4. Monitoring of employment and career of graduates of schools and training centres (MEC).

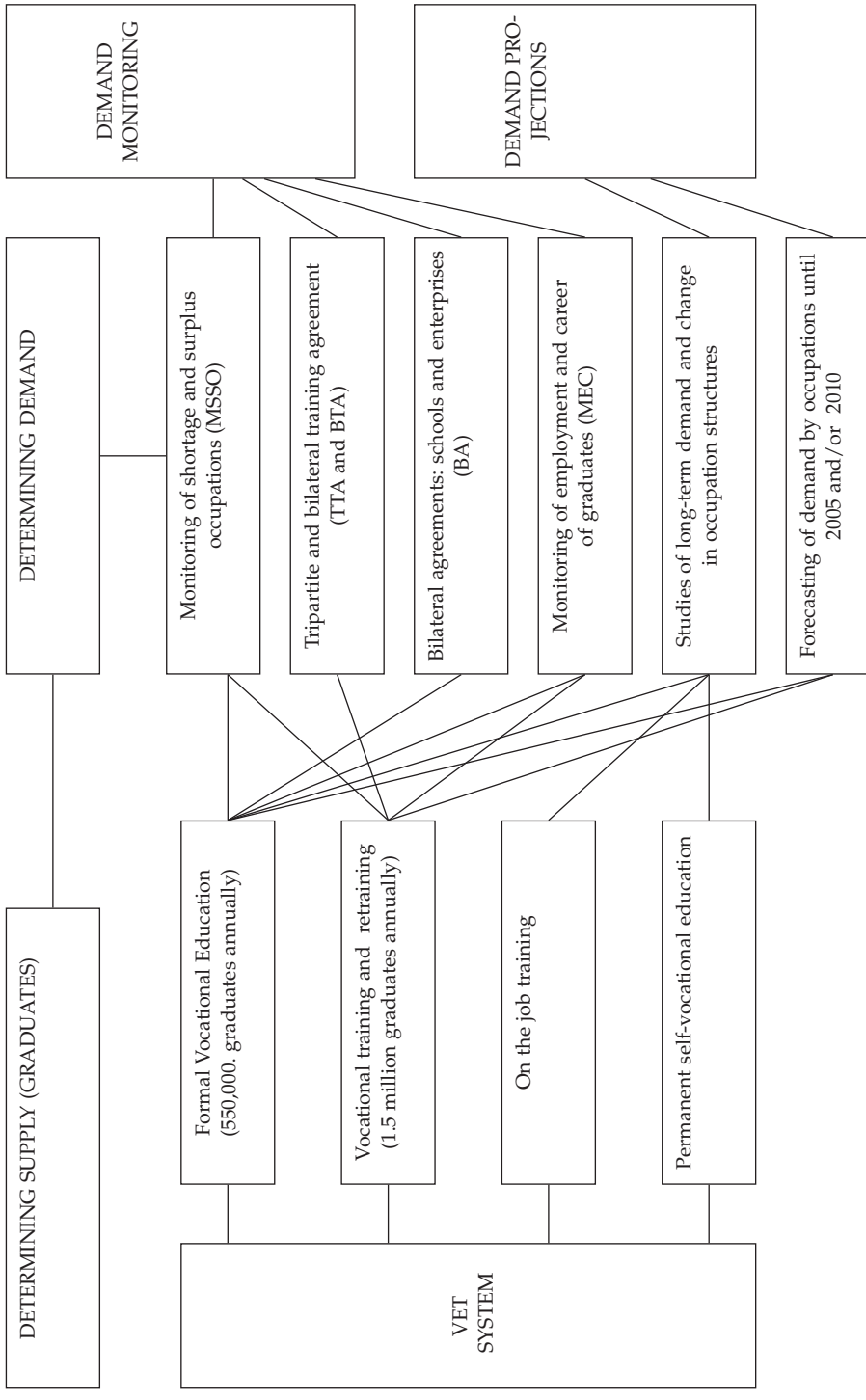
Occupations – aggregates of skills

A **skill** can be defined as the ability to perform a particular task well. An **occupation** is a line of work in which those employed use a particular combination of skills to contribute to the production of some marketable good or service. Some skills are useful in only one occupation… and may even be the principal requirement for following that occupation. We call these occupation-specific skills, and they result from **occupation-specific training.** Others, like the ability to write good prose, are useful in a wide variety of occupations, although they will be more important in some (such as journalism) than in others (such as sheet metal work). Students who have not yet developed a strong preference for a particular occupation or who are uncertain about their prospects in various occupations can hedge by investing in skills with several uses, (Economics of Work and Pay, Harper Collins College Publishers 1996).

10. These methods have been used for short and medium-term coordination and constitute one component of a broader system of linking VET with the labour market. The basic element of the coordination system is illustrated by Figure 2. The methods have been gradually implemented in selected regions and led to important changes in VET and labour market policies. In this paper only two methods (MSSO and TTA) will be examined. These methods are particularly important for reducing youth unemployment in Poland and are relevant to the elaboration of methodology for regular long-term forecasting of training needs.

Shortage occupations: number of job-offers is higher than number of job-seekers
Balanced occupations: number of job-offers is about equal to number of job-seekers
Surplus occupations: number of job-offers is lower than the number of job-seekers

Figure 2 Proposed system of linking labour market and vocational training in Poland



Monitoring Shortage and Surplus Occupations (MSSO)

11. The main aim of MSSO is to identify the occupations which are in shortage or in surplus on the **local and/or regional labour markets.** This information is vital for vocational schools, training organisations and publicly financed labour market training (Labour Fund).

Among the nine sources of information (See Figure 3), two are the most important:

(1) monitoring of job-seekers and job-offers by the Public Employment Services (PES) and collecting information on the careers of graduates by the VET schools and again the PES.

(2) annual surveys on expected job-creation and destruction in local/regional enterprises by PES in cooperation with the enterprises.

12. Thus, the monitoring of shortage and surplus occupation by PES is based on three variables per occupation:

– job-seekers,
– job-offers,
– graduates entering the labour market.

The survey in the enterprises covers also three variables per occupation:

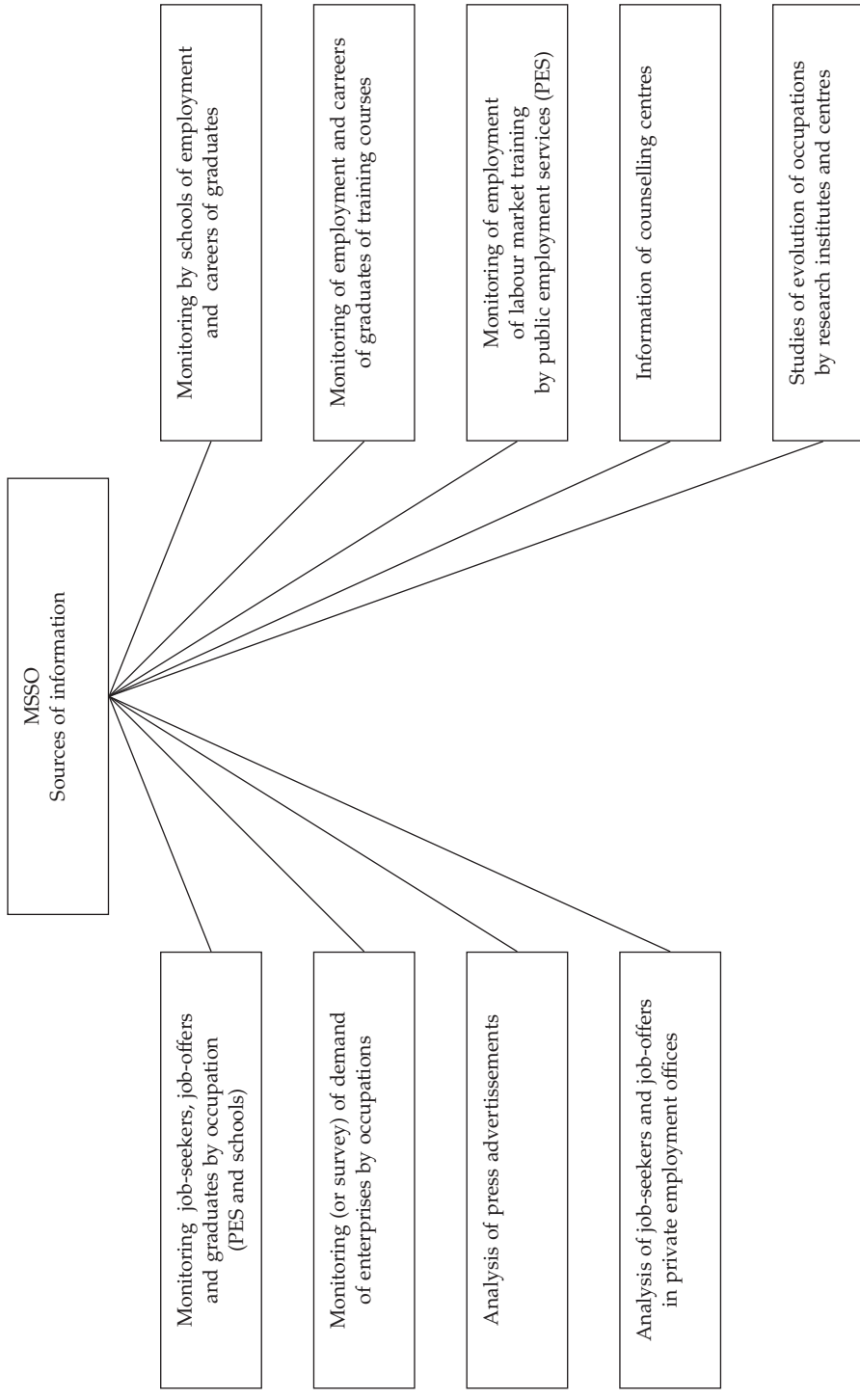
1. expected hiring,
2. expected lay-offs,
3. hiring of VET graduates.

Table 3 shows the information collecting method used in Poland (1996).

Table 3. Three basic variables used in MSSO

A. PES INFORMATION					
NSOC Code	Occupation	Job-seekers PES (a)	Job-offers PES (b)	Shortage/ Surplus (a-b)	Graduates entering labour market
.....	1				
.....	2				
.....	3				
.....	4				
B. ENTERPRISES INFORMATION					
NSOC Code	Occupation	Expected Hirings (a)	Expected Lay-offs (b)	Shortage/ Surplus (a-b)	Graduates entering labour market
.....	1				
.....	2				
.....	3				
.....	4				

Figure 3 Monitoring of shortage and surplus occupations (MSSO)



13. The monitoring of shortage and surplus occupations has been introduced on a pilot basis in four local and two regional labour markets. The results shown in Table 4 and Figure 4 were rather surprising. In shortage occupations there were 3,067 job-offers (according to the PES system) and only 146 graduates entering the labour market, i.e. 5 graduates per 100 job-offers. Adding the registered unemployed we have a total of 17 job-seekers per 100 job-offers. On the other hand, in surplus occupations there were 193 graduates per 100 job-offers and a total 594 job-seekers per 100 job-offers (see Table 2 and Figure 3).

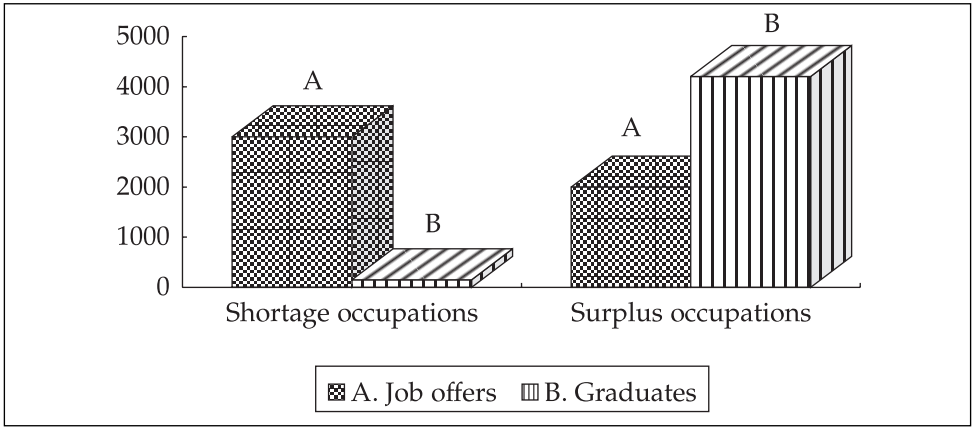
14. The analysis allows two conclusions: **firstly,** the vocational schools are "producing" too few graduates for shortage occupations and too many in surplus occupations; **secondly,** even under conditions of high unemployment there is still a shortage in certain occupations. At the same time, public and private vocational schools are producing potentially unemployable graduates. In other words, the VET, using public financial resources, is not acting fully in line with public interest.

Table 4. The Results of a Pilot Application of Monitoring of Shortage and Surplus Occupations in three Local Labour Market (Gliwice, Knurów and Pyskowice) 1996

Items	Shortge occupations	Surplus occupations
1. Registered unemployment (PES)	380	8743
2. Job-offers (PES)	3067	2175
3. Number of job-offers per 100 unemployed persons		
4. Graduates of vocational training school*	807	25
5. Number of graduates per 100 job-offers	146	4198
6. Number of registered unemployed and graduates per 100 job-offers	5	193
	17	594

* Entering the labour market.

Figure 4: Results of monitoring



So far, we have presented the static disparities between demand and supply in different occupations.

Evolution of labour markets

15. Monitoring shortage and surplus occupations has also a dynamic aspect. Our analysis covers a period of four years (1994–97). The results of this analysis are illustrated in Table 5 and Figure 5. Two observations can be made from these.

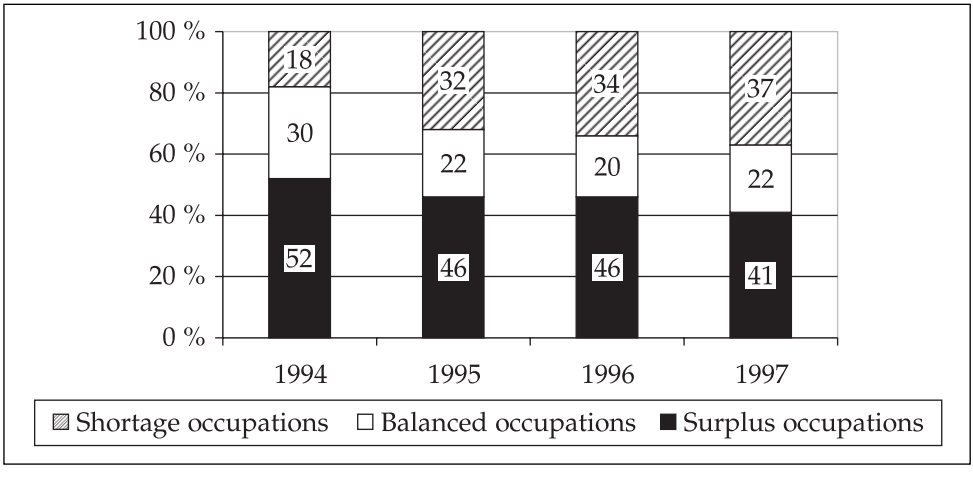
First, we see a gradual decline in surplus occupations and a dramatic increase in the number of shortage occupations (from 18 % in 1994 to 37 % in 1997).

Table 5. Evolution of Labour Markets in the Region of Gliwice (1994–1997)

Items	Total				Shortage occupations				Surplus occupations			
	1994	1995	1996	1997	1994	1995	1996	1997	1994	1995	1996	1997
Number of job offers per 100 unemployed persons	35	49	59	64	485	502	789	597	17	21	25	23
Number of unemployed persons per 100 job offers	289	203	170	157	21	20	13	17	580	487	406	435

Source: Monitoring Rynku Pracy (Monitoring of the Labour Market), Gliwice 1998, p. 26.

Figure 5: Evolution of the structure of occupations in the region of Gliwice (1994–1997)



Source: Monitoring Rynku Pracy (Monitoring of the Labour Market), Gliwice 1998, p. 23.

Secondly, it looks, so far, as if there has been **dual** labour market in Poland: shortage occupations and surplus occupations labour markets. It is surprising that the same occupations were in short supply in 1994 and in 1997.

16. In order to reduce the gap between two labour markets (shortage and surplus occupation markets, the VET occupational structure should be gradually changed, i.e. towards an increasing number of students in shortage occupations and a reduced number in surplus occupations, as this may contribute to a substantial reduction in youth unemployment.

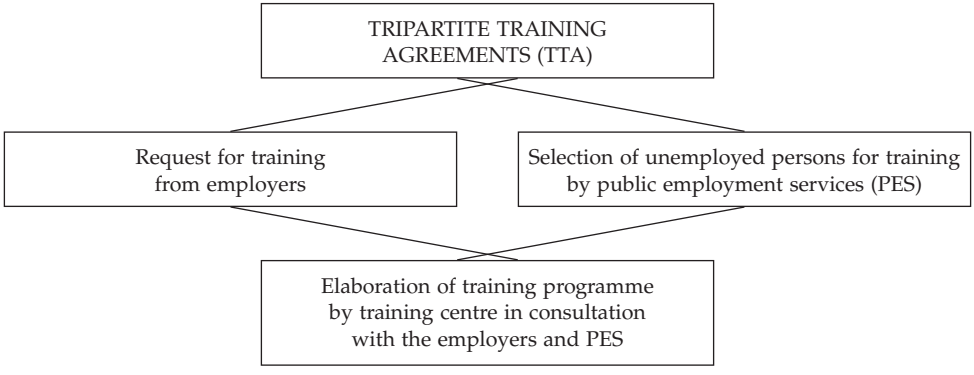
17. The VET system can gradually adjust to the labour market **if the schools (and other vocational training centres) regularly receive information on shortage and surplus occupations.** This requires the introduction of monitoring in local/regional labour markets. It is expected that the Minister of Labour and Social Policy will soon recommend the introduction of MSSO in all PES offices.

Tripartite and Bilateral Training Agreements (TTA and BTA))

18. The second method for linking vocational training and the labour market designed and implemented on a pilot basis in Poland was **tripartite training agreements** (TTA, see Fig. 6). These have been mainly used to improve the **efficiency of labour market training.** The efficiency, measured by the number of unemployed persons employed per one hundred trained, was relatively low: 36 % in 1993 % and 53.7 % in 1997.[11]

19. The training courses were organised by PES in cooperation with training centres. **The most important partners – the employers – were almost entirely ignored and this was the main reason for low efficiency of labour market training.** As the employers are the decisive partners in TTA they should determine the training programmes (based on the requirements for vacant jobs) and cooperate in the practical component (on-the-job-training).

Figure 6



[11] Efficiency of labour market training is measured as follows:

$$e = \frac{\text{Number of unemployed persons imployed during six months after completion of training}}{\text{Number of unemployed persons trained}} \times 100$$

20. These tripartite agreements have been applied in 36 regions (out of the 49 in Poland in 1997) on a pilot basis. The results are shown in Table 6. The efficency of training courses for the unemployed reached 84.7 % overall and 93 % in 20 out of the 36 regions. The efficiency of training without applying TTA was only 53.7 %. This means that the efficiency of training with TTA was almost 60 % higher than for with conventional organisation of labour market training. Thus, TTA may lead to a substantial reduction of the costs of training and employment of unemployed persons, particularly the long-term unemployed. It has been estimated that if only one third of training courses were organised on the basis of TTA about 15,000 additional unemployed persons trained would find productive jobs. It seems that TTA is one of the best methods for linking vocational training to the labour market and may result in improved efficency and reduced costs (total training cost divided by number of trainees finding employment).

Table 6. Results of Experimental Application of Tripartite Training Agreements (TTA) in 36 Regions in 1997

	Number of unemployed trained	Employed after training	Efficiency
Without TTA	129,263	69,474	53.7 %
With TTA	4,557	3,860	84.7 %
Improvement of efficiency	x	x	58 %

Source: Estimated from "Labour Market" No 2, 1999, pp. 24–31.

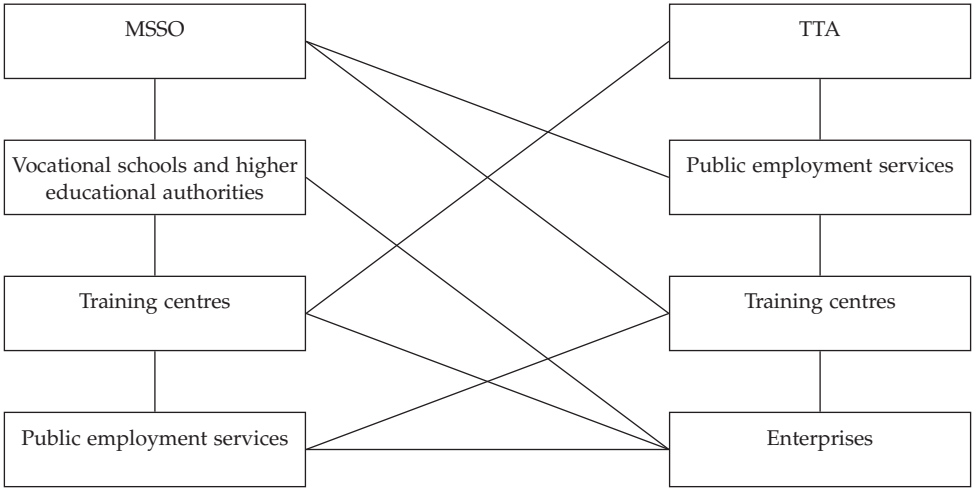
BTA

21. The method of bilateral training agreements (BTA) should be widely used by vocational training centres. The method covers consultations and agreement between enterprises and training centres concerning structure, contents and pattern of training, which should be fully in line with skills needs.

USERS

22. Two methods of linking VET with labour market are inter-related. Both should be applied by PES at the same time. It has been proved by practical application that these methods may dramatically improve the external efficiency of VET and labour market training, lead to a reduction in youth unemployment and at the same time may reduce shortage occupations and contribute to the growth of output and productivity. The users of MSSO and TTA are presented in Figure 7.

Figure 7: Users of MSSO and TTA



It is important that these methods should be widely used by vocational schools, training and retraining centres, education authorities, public employment services and labour administration for gradual adjustment of structure and quality of VET to the changing needs of the economy and labour market.

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