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Projections of qualifications and occupations in Austria – short-termism, macro perspective and emphasis on the supply side[1]

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Abstract

The contribution gives an overview of various activities in connection with the forecasting of future developments in the field of employment, occupations and qualifications in Austria. The main focus is placed on a selection of more recent studies. However, to provide a more detailed understanding of the Austrian case the report on recent studies is embedded in the broader context of the main forecasting activities performed since the 1960s.

A general conclusion refers to the paradox that in an education and training system, which is heavily built on specialized qualifications, a corresponding formal system of forecasting the future demand for these qualifications does not exist. Thus there must be informal mechanisms and processes at work, which are substituting for these kinds of formal forecasting. The assessment of the extent to which the supply of education matches the demand for qualifications depends on informal knowledge. This conclusion points out the importance of a communication process among the various stakeholders in which any kind of forecasting is embedded. Two more practical issues concerning the methodology have been underlined in this context: The first one concerns the necessity of a commonly available database, which can be widely used by a broad community of stakeholders for forecasting as well as for the check against reality and for the test of competing assumptions. The second issue concerns the choice of methodologies. Big and complex 'one shot' methodologies might be less useful than periodically updated simple models. The utilisation of simple models can probably induce policy learning better than impressive complex models. The assessment of forecasting results against reality may also be easier on the basis of simple models. However, this may be not the main concern of forecasters.

Content

Introduction

The contribution gives an overview of various activities in connection with the forecasting of future developments in the field of employment, occupations and qualifications in Austria. The main focus is placed on a selection of more recent studies. However, to provide a more detailed understanding of the Austrian case the report on recent studies is embedded in the broader context of the main forecasting activities performed since the 1960s. First an overview of the main activities in Austria is given, providing basic information about the regularly performed forecasting activities of economic development, the labour market, and the supply from education and training, and about large-scale forecasting activities in the field of education and the labour market since the 1960s. The second section focuses on the results of recent studies about occupations and qualifications, in order to depict the basic structural traits of the Austrian employment and qualification nexus, and to discuss the main shortcomings in terms of the information basis. With regard to the more short-term economic forecasting activities only some basic points are mentioned, as they are used as an input to the more detailed forecasts. The third section about data and methodology gives an overview of the basic features of the regular forecasting activities, followed by a more detailed description of the methodology used in the recent projections of occupations and qualifications. In the last two sections the utilisation and implementation of the results in the policy process is discussed and some conclusions are given.

1. Overview of the main activities in Austria

Various activities forecasting the future development of employment and qualification structures have been performed in the sector of applied research, in most cases commissioned by the labour market board and the social partners. Overall, these forecast and projection methods and techniques have been applied to the field of employment and the labour market in Austria on several distinct levels:
(a) Short-term and medium-term regular macroeconomic forecasting and micro-prognosis of the labour market. Since the early 1970s the two main institutes of economic research have performed a quarterly update of economic forecasts on a macro level that includes, besides the main economic indicators, forecasts of the overall figures of employment and unemployment. Five years' medium-term forecasts about these macroeconomic indicators are provided once a year. However, these exercises do not include figures about economic sectors or industries, occupations, or qualifications. Based on the data from the social security records and the data from the unemployment security agency and the labour exchange, and taking into account the macroeconomic forecast procedures, a micro-prognosis of the labour market has been developed since the mid 1990s, which provides short-term (the following year) and medium-term (five years) prognoses for employment and unemployment. This activity is based on a very rich database and includes disaggregated estimations by regions, sectors, gender, age groups, formal qualification levels, different socio-economic traits and characteristics of enterprises. Since the mid 1970s an annual short-term forecast of the apprenticeship market is performed by the Austrian labour market service (AMS). This forecast includes some longer-term projections of the inflow into apprenticeship and of the supply of trained workers, taking into account gross economic figures on the demand

side and the demographic change and participation rates in upper secondary education on the supply side.

(b) <u>Long-term and medium-term forecasts and projections of sectorial, occupational and qualification developments.</u> Comprehensive exercises on that level have not been performed regularly, on neither time-scale. Some specific large-scale research projects have been performed to forecast the medium- to long-term development, one or two projects per decade, with a tendency to decreasing time scales and decreasing ambition. These projects have been grossly isolated from each other, employing different methodologies, and learning little from past experience. Systematic follow-ups to earlier studies have also been rather sparse. Since the 1980s two kernels of forecasting activities at the level of qualifications and occupations have emerged – one of them at the Austrian Academy of Science, which is grouped around a regular forecast of the higher education system and mainly oriented on the supply side, and the other one is grouped around the economic forecasting activities at WIFO and IHS. An update of the forecast of higher education studies has been commissioned every three years by the (now former) Ministry for Science and Research. However, that study concentrates on the supply side, providing a break-down of university studies by study subjects and very gross categories of other educational levels (but not distinguishing apprenticeship from the unqualified), and adding supply-oriented projections of the population's educational structure from time to time. Since the late 1980s some institutes for economic research have broken down the macroeconomic forecasts to economic sectors at a medium-term time scale in order to depict the demand side of the employment figures in more specific economic sectors and industries. These demand figures from economic forecasts have been mechanically combined with the supply figures from the model about higher education. Another step was taken in the end of the 1990s by developing projections of occupations and qualification categories beyond the mere formal levels – this study will be described in more detail below.

(c) <u>Research and development in specific areas.</u> Since the late 1980s, more qualitative approaches, making use of figures in an interpretive way rather than in ways of rigorous modelling, have flourished for the purpose of planning and evaluation in specific qualification and occupational fields, and in some regions as well. An overall expert study was published by the advisory committee of the Austrian social partners in 1989, denying the sustainability of forecasting in the area of qualifications on grounds of accelerating change and fluidity of demand. At the beginning of the 1990s the <u>Fachhochschule (FH)</u> framework was established as a new sector of the Austrian education and training system with a professional accreditation model at its core. The accreditation procedure for each programme requires – besides several other items – an independently performed study about the labour market demand for the qualification profile projected in the new programme, and about the acceptance of the profile by the prospective student population. Thus, since the mid 1990s several specific studies about the qualification areas proposed for FH programmes have been performed, which have, however, lacked an inclusion into an overall framework of statistical information. More recently, due to a broad reform process at universities, the implementation of similar mechanisms for the assessment of the usefulness of study programmes in terms of the demand at the employment side has been started (Mayer/Lassnigg/Unger M 2000). Another strand of development of foresight activities, mainly on a qualitative level, has evolved since the mid 1990s in the course of various policies supported by the European Social Fund (ESF), using round tables of stakeholders and prospective surveys among

enterprises as methods for foresight. A big technology foresight study employing the Delphi method has been provided in the mid 1990s in order to identify the main fields capable of rapid innovation and technological change in Austria (BMWV 1998). One of the areas included in that study was the field of life-long learning.

1.1. The main regular forecasting activities

As outlined above, the main forecasting activities in Austria are performed at the overall level of economic development and provide the main indicators of the labour market. The following activities are performed on a regular basis: [2]

- Quarterly revisions of the macroeconomic forecasts by the two main economic research institutes (Institute for Advanced Studies – IHS; Austrian Institute for Economic Research – WIFO), estimating the main economic indicators at an aggregate national level. These forecasts do not provide information about sectors, regions or other levels of break-down. In view of human resources, only the overall figures of employment and unemployment are calculated by these activities.[3]
- In addition to the quarterly revisions, each of these institutes provides a medium-term forecast (spanning a time period of five years) in a yearly rhythm. The main cornerstones of the medium-term forecasts are similar to the quarterly forecasts. The IHS forecast is mainly based on its macroeconomic model, whereas the WIFO forecasts contain a stronger element of expert assessment, which is implemented into the quantitative model.
- The micro-prognosis of the labour market (AMS 2001a) has been developed as a model that combines information about the behaviour of enterprises and individuals at the micro level on the one hand with the macroeconomic forecasts on the other hand. This activity has been in progress since the mid 1990s. So far, its main focus is on the short-term and medium-term perspective to support the policy of the labour market service. Its potential for being used in a longer-term perspective cannot be foreseen at the moment.
- The research unit of the labour market service produces an annually updated forecast about the short-term development of the apprenticeship market and the long-term development of the supply of skilled workers qualified by the apprenticeship system (AMS 2001b). These forecasts are disaggregated by gender, regions, and some highly aggregated economic spheres. However, the apprenticeship occupations, as the key variable guiding the apprenticeship market, are not included in the forecast.

The short-term dynamics on the Austrian labour market are well analysed and understood by those activities, but the perspective is mainly on an aggregate level. Thus the variables that are of interest for education and training policy, namely qualifications and occupations, have been more or less neglected in these procedures. Only recently have there been some slight improvements in terms of disaggregated information:

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[2] For a detailed overview and analysis see Mayer K./Lassnigg L. (1998). The field is in flux, however, as other institutions and organizations (for instance, the Austrian National Bank and one of the main credit institutes; more recently the Chamber of Commerce is planning to found an institute for economic research on its own) have developed their own forecasts, which do, however, not receive the same amount of public attention as the two longstanding forecasts described above.

[3] The Ministry for Economic Affairs and Labour produces and publishes internal projections to complement the economic forecasts of the research institutes; cf. BMWA (2001).

- the formal qualification levels and economic sectors are forecast in the micro-prognosis of the labour market,
- and the apprenticeship forecast provides information about the broad administrative regions, and about the broad administrative categories of economic organisation (manufacturing industry, the crafts, and some break-down of services: trade, tourism, others).

Occupational categories and a classification of the content of education and training are not included in the forecasting procedures.

1.2. Forecasts and projections of sectorial, occupational and qualification developments

The production and utilisation of forecasting and projection techniques for qualifications and occupations in Austria evolved in a specific pattern during the last four decades. This was especially guided by the availability – respective non-availability – of the necessary data. The only database to provide large-scale information about occupations and detailed formal qualifications has been the population census performed at ten-years intervals. Accordingly, those data were used for 'one-shot' projections of occupations and qualifications in each decade. The first forecasting study was based on the 1961 census data and induced by the participation in the international OECD exercise that was guided by the manpower requirement approach.[4] This project was then enthusiastically expected to bring a new rationality into Austrian education and training policy, which had been highly contested by conflicting political and ideological debates in the past. The large-scale study (OECD 1967; extended version Steindl 1967) was jointly performed by a newly established planning unit in educational administration and the Austrian Institute for Economic Research (WIFO). Figures were produced about the medium-term to long-term demand for qualifications at different levels, strongly emphasizing the field of scientists and engineers at the university level, and several planning figures about the supply side as well, including projections of the desired numbers of upper secondary graduates (who have acquired the mandatory right to university access in Austria) and several figures about the demand for infrastructure and financial means. The rationale for the blueprint of the expansionary educational policy of the late 1960s and early 1970s was built up by the forecasts of the OECD study, underlined by the authority of international organisation. However, there were some striking flaws in that exercise, which may be seen as elements setting the stage for the later demise of projection methods and their implementation in Austria.

- The estimates of the highly skilled manpower demand figures were inferred from the assumption, that the past development with regard to the Austrian data could not continue into the future, thus the change depicted from the USA in the preceding period was mechanically inferred to the Austrian forecast.[5]
- A second flaw was found in the time periods involved in the forecast. Data about qualifications were available from 1961 in a project that had started in the second half of the 1960s. When the results from the forecast were available, a certain amount of time had already gone by, and thus the projections, especially those concerning the

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[4] As an overview of these activities from an OECD perspective see Papadopoulos, George S. (1994).
[5] This idea has continued to influence Austrian forecasting activities until today: 'Österreich hinkt in bezug auf den sektoralen Strukturwandel den USA um mehr als zehn Jahre nach', Biffl G. (2001).

supply, were in fact about a time period that had already passed in terms of the main decisions guiding that variable.

- A third flaw concerned the development of the supply side of the education and training system. On the one hand the propensity to enrol into higher education was implicitly assumed to remain stable in the future and to be guided mainly by demographic change (an assumption which turned out to be fallacious later on). On the other hand the long time periods involved in the dynamics of the education system were heavily underestimated, so that the desired supply from the universities that was forecast to be necessary could be provided markedly after the end of the projection period for the demand side.

Thus, the study, which had promised to mark the beginning of a truly technocratic period in future education policy that would be 'based on figures instead of ideology', had in fact been based on a set of highly arbitrary assumptions and fallacious conclusions. In the mid 1970s, when the results from the 1971 population census were available, several descriptive comparisons by the main author of the demand study fundamentally questioned the basic assumptions of the manpower requirement approach and pointed out that the Austrian economy would rely on medium-level qualifications rather than on higher education. The specific form of Austrian upper secondary level technical colleges received international attention in that period (Steindl 1976, 1980).

During the early 1970s, as a reaction to the student rebellions of the late 1960s and to the oil-shocks, the expansionary view on education policies, which had been supported by the OECD study and was taken over by the new social democratic government, was questioned at the level of policy debates by the conservative side. A second 'big-shot' study (Clement/Ahammer/Kaluza 1980), was performed by a group of academics, who drew on the 'second generation' forecasting methodology of projecting supply and demand separately and providing estimates of corridors that may result as a balance of the development on the demand side as compared to the supply side. This study seriously questioned the expansionary view and provided figures that strongly emphasized the demand for employees with low-level qualifications or without any formal qualifications.

Another exercise, which originally set out in the early 1970s to develop an all-inclusive simulation model of the Austrian education-employment nexus (Landler et al. 1981), provided the core model for the above-mentioned forecast of higher education. This model is built up on the rich time series data about the education system and provides detailed forecasts of stocks, inflows and outflows of university studies broken down by subject categories. In addition, as a prerequisite for the estimations at the postsecondary level, this model also forecasts the development at the secondary level, with a special focus on the upper-level schools and colleges which provide the inflow to the university studies. However, as the apprenticeship qualifications, which have been the most important category in the labour force in quantitative terms, are left out by that model, the utilisation of these forecasts beyond higher education policy is severely limited. In view of the demand side, the study strongly implied that the statistical information base was deeply inappropriate to perform projections about occupations and qualifications on a more detailed level. The reason for this is the fact that the population census as the only database including the necessary data was collected only every ten years, and moreover, that about six additional years had passed in order to make that information available for research. In the late 1970s the regularly produced Hochschulplanungsprognose (Prognosis for the Planning of Higher Education), which

has been followed up every three years up to now, emerged from that model, providing important data about the main quantitative parameters of the higher education system.[6] An updated version of the overall model was published at the end of the 1990s (Landler 1997; Dell'Mour/Landler 2000).

During the late 1980s an exercise by the expert advisory committee of the social partners (Beirat für Wirtschafts- und Sozialfragen 1989) provided the above-mentioned paradigm shift concerning the use of projections in Austrian education and training policy. They did so, firstly, by pointing to the accelerating pace of change in qualifications and, secondly, to the contingency inherent in the utilisation of qualifications due to the variability of enterprise strategies and practices concerning the modes of work organisation and the use of new technology. In terms of quantitative analysis the study relied on mechanical projections guided by the trends at the supply side of the labour force, without separately analysing the driving factors on the demand side. Projection models now became more and more diverse, but the main emphasis was still placed on modelling the education and training system and the supply side (Dell'Mour/Landler 1987; Biffl 1988; Holzinger et al. 1991). In the early 1990s, at the advent of the integration of Austria into the European Community, a debate about the diversification of the university-dominated higher education sector came up as a main issue of education and training policy. Alternative strategies for the development of a new Fachhochschule (FH) were evaluated by an OECD review, followed by the successful set-up of an innovative structure that substantially diverges from the basic structure of the Austrian education and training system. The Austrian background study for the OECD review mainly provided qualitatively and structurally based arguments in favour of the development of the new FH sector. However, the reviewers have criticised the provided information because of the lacking forecast or projection of the demand for new qualifications (BMWF/BMUK 1992; OECD 1993).

During the late 1990s a series of studies has been carried out which analysed more deeply the longer-term development until the 1991 population census and provided detailed projections for the period of 1995-2000. These studies will be described in more detail in the following sections.

1.3. The studies for the __Fachhochschule__ accreditation process

As indicated above, the accreditation procedure for a new programme in the Fachhochschule framework requires an independent study demonstrating the demand for the proposed new qualifications and the acceptance of the programme by prospective students. The accrediting council responsible for the quality of that sector (the Fachhochschulrat) has published a set of guidelines that should be met by these studies. These guidelines do not prescribe the actual methodology applied in a study, but they should give an outline of the main dimensions that have to be included. Grossly, the guidelines include two main areas: first the environment of the programme should be made clear (the industries which would employ the graduates, their employment figures, existing programmes providing qualifications that will be able to compete with the new programmes, etc.); secondly, a more specific assessment of a sustainable demand for the proposed qualifications as well as a credible assessment of

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[6] See Dell'Mour 1978, 1981, 1984, 1987, 1990, 1993, 1996, 1999 (A summary of the latest version is provided at: www.bmbwk.gv.at/3uniwes/2001/berichte.htm - 8k).

the study motivations of prospective students (which may be either at the level of initial education and training or at the level of continuing part-time education and training of adults) needs to be made. As specific programmes at a specific location are accredited, the regional dimension also needs to be covered by the studies about demand and acceptance.

A rationale for that requirement has been to guide the providers who want to submit proposals for FH programmes and the respective teams developing these proposals towards a systematic assessment of the labour market and the occupational field they try to access by means of new qualifications. Another rationale has been to give the council proof of the medium-term demand for these qualifications. An evaluation of the first wave of these studies[7] has indicated a conflict between these kinds of rationales, as the requirement of 'proofing' precludes to some extent a more open exploration of the field. Instead of inducing a communication process for mutual learning between the providers and their programme team on the one hand and the researchers on the other hand, a certain bias towards the production of the 'crucial numbers' has arisen. However, given the fact that the proofing required in many cases merely concerned the sustainable 'proofing' of the demand for a number of only 50-100 graduates in a specific occupational field (often within an environment with an overall tendency towards excess demand) an accurate methodology can hardly be envisaged. As the studies are commissioned by the submitting organisations, the available resources are often scarce – especially if we take into account the risk of not being accepted in the end. As to the relationships between the researchers and the principal, the desired result is given from the beginning, thus an open research process is not very likely. The big challenge remains – how to structure the research in order to increase the incentives for learning rather than legitimising in the overall process.

In order to embed the bottom-up accreditation process of FH study programmes into the broader policy process a linkage to overall projections from a comprehensive database would be desirable. Some regions have taken steps to monitor the development of the Fachhochschule framework in a more comprehensive way. An example is given by a project that has combined quantitative projections of the occupational and qualification structures with a communication process based on the scenario technique to involve the main actors into the foresight process (Steiner et al. 2001; Steiner/Lassnigg/Unger 2001).

2. Results of recent studies about qualification and employment

2.1. Overview of the results of short-term regular forecasts

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[7] About 40 studies were commissioned between 1993 and 1998; Lassnigg/Stöger (1998). The studies about the demand side have mostly been based on surveys among enterprises envisaged to be potential employers for the graduates; in many cases severe problems concerning the definition of the population and the construction of an accurate sample arise; another problem concerns the formulation of a clear statement of the profile of the proposed programme to be communicated in the survey. The studies about acceptance frequently give an overview of the gross potential of prospective students by analysing existing programmes in similar fields. In a number of cases students about to finish upper secondary school were asked for their preferred fields of study.

The short-term and medium-term economic forecasts provide results about the main economic indicators on an aggregate level[8] (e.g. GDP, exports, imports, inflation, interest, public household figures, employment, unemployment, see Table 1 for illustration). These figures give an assessment of the expected overall economic and social development. In a small open economy the embeddedness in the international context is a main issue. Austria has for a long time been connected to the German economy by the fixed exchange relationship with the D-Mark. Qualitative evaluations of political trends and decisions in relation to the technical results form an important element in the forecasting process. Qualitative assessments are part of the WIFO forecast procedure. The recent debates are strongly influenced by the governments' overarching aim to reduce public debt figures to zero within a short time period. The respective austerity measures (most of them well-known from other countries: downsizing the public sector; privatising public industries; reforms of pension and public security systems; tax reforms, changes in labour market regulations, etc.) are meant to negatively influence employment growth, at least on a short-term basis. It needs not be said that at the moment of writing this chapter (November 2001) economic forecasts for Austria are in a difficult situation, as everywhere else in the world.

Table 1: Results of the Austrian macroeconomic forecasts 2001-2005
a) Results of the current IHS medium-term forecast (July 2001)

	% average change per year (*absolute values)	
	1996-2000	2001-2005
GDP, real	2.5	2.3
Private consumption, real	2.6	2.1
Gross fixed capital formation, real	1.7	2.5
Machinery and equipment, real	5.3	3.8
Construction, real	0.5	1.5
Domestic demand, real	2.0	1.8
Exports, real	7.9	5.9
Goods, real (acc. to NIA)	9.8	6.4
Tourism, real (acc. to NIA)	0.3	2.6
Imports, real	6.7	5.1
Goods, real (acc. to NIA)	7.3	5.7
Tourism, real (acc. to NIA)	0.0	2.3
Dependent employment	0.6	0.6
Unemployment rate: National Definition*)	6.8	5.2
Unemployment rate: Eurostat-Definition*)	4.2	3.5
Gross expenditure on wages per employed person	2.1	3.1
Price index GDP	1.1	1.6
Consumer price index	1.4	1.8
Balance of current account (Billions ATS)*)	-73.5	-47.8
*) absolute values		
Source: http://www.ihs.ac.at/index.php3?id=925		

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[8] IHS website: short-term September 2001 http://www.ihs.ac.at/index.php3?id=933; long-term July 2001 http://www.ihs.ac.at/index.php3?id=925; WIFO website short-term September 2001 http://www.wifo.ac.at/cgi-bin/tabellen/transtb2_eng.cgi?3++netkonj_o+++++0+19498; WIFO medium-term abstract:
http://titan.wsr.ac.at:8880/wifosite/wifosite.wwv_media.show?p_type=plsql&p_id=685&p_currcornerid=38&p_language=us

b) Results of the current WIFO medium-term forecast (July 2001)

	% average change per year							
	1995 - 2000	2000 - 2005	2000	2001	2001	2003	2004	2005
GDP								
Real	+ 2.5	+ 2.4	+ 3.3	+ 1.7	+ 2.2	+ 2.4	+ 2.8	+ 3.0
Nominal	+ 3.6	+ 3.9	+ 4.5	+ 3.3	+ 4.0	+ 3.6	+ 4.1	+ 4.6
Consumer prices 1)	+ 1.3	+ 1.8	+ 1.9	+ 2.6	+ 1.9	+ 1.3	+ 1.5	+ 1.6
Dependent employment 2)	+ 0.6	+ 0.8	+ 1.0	+ 0.4	+ 0.5	+ 0.8	+ 1.0	+ 1.1
Unemployment % of labour force 3)	4.2	3.4	3.7	3.6	3.6	3.4	3.4	3.2
Unemployment % of dependent labour force 4)	6.8	5.5	5.8	5.7	5.7	5.5	5.4	5.2
Foreign trade (exports-imports)	- 0.9	- 0.7	- 0.5	- 0.6	- 0.4	- 0.6	- 0.8	- 0.9
Public income - expenditure 5)	- 2.2	- 0.1	- 1.1	- 0.5	0.0	0.0	0.0	0.0
1) consumer price deflator – 2) military service and maternal leave excluded – 3) Eurostat. – 4) AMS – 5) technical assumption: growth of total expenditure = growth of total income								
Source: http://titan.wsr.ac.at:8880/wifosite/wifosite.wwv_media.show?p_type=plsql&p_id=685&p_currcornerid=38&p_language=us								

The more detailed labour market results of the macroeconomic forecasts focus on labour supply, the labour market participation rate, the figures of employment, self-employment, unemployment, and the unemployment rate (the WIFO employment forecast includes figures for employment broken down by the public-private sectors, and by native-immigration status). The WIFO medium-term forecast has regularly been broken down by economic sectors[9] in a separate forecasting procedure commissioned by the labour market service. This procedure estimates figures about the yearly change of employment, the absolute employment figures, the dynamic of change compared to the past period, etc.

While the macroeconomic forecasts operate with the stock figures of employment, the more recently developed micro-prognosis by the Synthesis research company has included the information about flows from the social security records. The short-term development on the labour market can be analysed more deeply by that forecast (see Table 2 for illustration). The results of this study include additional information about the effects of active labour market policy, non-traditional employment, job creation and job destruction (newly contracted employment, newly quit employment), and unemployment. These figures are broken down by gender, administrative regions, different configurations of economic sectors.[10] Based on the flow information the companies are classified in terms of growth (creation), stagnation, and decline (shut-down) to depict the development in these kinds of companies.

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[9] The current version distinguishes 21 industries (ten in manufacturing and construction, ten in services, one in agriculture and forestry); Biffl (2001).

[10] The 17 one-digit ÖNACE sectors and a selection of 28 two-digit sectors (23 in manufacturing and five in services) are currently distinguished.

Table 2: Results of the current Austrian short-term forecast based on the micro-prognosis

	2001		2002	
	Change compared to the year before			
Economic Indicators	lower limit	upper limit	lower limit	upper limit
GDP, real	+ 1.6%	+ 2.2%	+ 1.8%	+ 2.6%
Private consumption	+ 1.5%	+ 2.0%	+ 1.6%	+ 2.4%
Investment	+ 1.7%	+ 2.2%	+ 2.0%	+ 3.0%
Balance of current account (% GDP)	- 2.1%	- 2.5%	- 1.4%	- 2.2%
Consumer price index	+ 2.3%	+ 2.7%	+ 1.4%	- 2.2%
	Change compared to the year before (absolute)			
Persons	2001		2002	
Population, age groups due to retirement regulation 1)	+ 5100		+ 8300	
Population, age groups due to retirement customs 2)	+ 100		- 2200	
Labour force	+ 14300		+ 1000	
Self-employed persons	+ 1100		+ 1600	
Labour supply	+ 13 200		- 600	
Productivity (GDP/standard employment)	+ 1.5%		+ 1.8%	
Dependent employment	+ 12 700		- 3100	
Maternal leave, military service	+ 700		+ 800	
Supply effect of active labour market policy measures	+/- 0		+/- 0	
Registered unemployment	+ 500		+ 2500	
1) men 15-64 years; women 15-59 years; 2) age span reduced by 5 years according to actual retirement				
Source: AMS (2001a) Beschäftigung und Arbeitslosigkeit in Österreich im Jahr 2002. Mikrovorschau. Produced by Synthesis Forschung. Vienna, Table 1, p.30 and Table 2, p.32.				

In a recent study about short-term bottlenecks on the Austrian labour market the micro-prognosis has been utilised by estimating changing parameters of direct job mobility: incidence of direct mobility between enterprises as a proportion of transactions at two points in time; increase of income attached to these transactions; application of qualification levels to these transactions. Some estimates about the potentials for additional employment are derived from the simulation of potential transactions, taking into account the trend of expanding enterprises with respect to their employment figures. (Cf. Wagner-Pinter 2001; Alteneder et al. 2001).

The most important results of the apprenticeship forecast provide estimates of the supply and demand figures on the market for apprentices. They are reported regularly in a specific section of the labour market statistics. (Cf. Lassnigg 1999; Lassnigg/Schneeberger 1997).

2.2. Results of a comprehensive study about the development of occupations and qualifications

A more detailed presentation of a major research effort, which tried to analyse the structural features of the Austrian employment system from a long-term perspective and to develop specific projections from that analysis, is given in the following. The research was carried out from 1995 to 1997. Based on the information from the population censuses it has analysed the development of employment by sectors, occupational categories, formal qualification levels and gender for the period of 1971 - 1991 (Lassnigg 1998a). The study asked how the formally upgraded population has

been absorbed by the employment system. A shift-share analysis attributed about two thirds of structural change to the change of the formal qualification structure, about one fifth to the change of sectoral distribution, and about one tenth to the change of the occupational distribution (Lassnigg/Prenner 1997b). The mechanical procedure of shift-share analysis, however, does not answer the question as to what extent the formal upgrading process might have precluded bottlenecks in the demand for qualifications, and as to what extent it might have merely led to 'overqualification'.

To get an impression about the relationship of formal 'overqualification' (measured by persons employed in low-skilled occupations, who have acquired some formal qualification) and formal 'underqualification' (measured by persons employed in highly skilled occupations, who have not acquired that level of formal qualification), a rather simple procedure was used. Occupations were classified in five occupational categories according to their dominant formal qualification level. This classification allowed for an estimate of the proportion of employed persons with lower, respective higher qualification levels in these categories as compared to the dominant qualification level. The proportion of 'underqualified' to 'overqualified' amounted to about 5:1, albeit with a tendency towards an increase of the proportion of 'overqualified' people during the 1980s (Lassnigg 1998a, 1998b).

This rather crude analysis, based on the two decades from 1971 to 1991 was refined by the analysis of a newly constructed database[11] for the period between 1982 and 1995 (Lassnigg/Prenner/Steiner 1999). Quarterly data from the Austrian population census sample (Mikrozensus) were used to exploit the information about occupations and formal qualifications. They were matched with data from the social security records, which are judged to be more accurate concerning economic sectors (however, they do not include data about occupations and qualifications). A projection for the period of 1996-2000 was built on that analysis, using the macro-forecast from the Austrian Institute for Economic Research for the projection of total employment, which was also disaggregated to economic sectors. Based on that sectorial forecast, the occupational distribution and the formal qualification levels were projected in accordance with the shift-share-analysis developed by Meagher (1995).

The results of these projection procedures include:
- The development of the number of persons employed, and the respective change rate, by 58 occupational groups (two in agriculture and forestry, 20 in manufacturing, 36 in the service sector), and by six formal qualification levels
- For each of the occupational groups, the composition effects of sectoral and occupational change, estimated by the shift-share analysis
- For each of the formal qualification levels, the composition effects of occupational change and of qualification change
- For each occupation, the effects of the development of each of the ten most important economic sectors on its development were estimated and presented
- The development of the employment figures in the basic period (1982-1995) and in the projection period (1996-2000) as well as the composition effects from the shift-share analysis were also shown in a graph.

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[11] For more information about the database see section 3.1.

The development of employment opportunities in the individual occupational groups, which are at the centre of the labour exchange procedures, as well as the connection of that development of occupational groups to sectoral change, can easily be seen from the results of that study. On top of these detailed results about 58 occupations, which cannot be presented here for lack of space, some more general and structural evidence has been obtained. This will be presented and shortly discussed below:

1. Within almost stagnating overall employment (+0.12 per cent p.a.) agriculture and forestry (-4.91 per cent p.a.), as well as manufacturing (-1.16 per cent p.a.) was projected to decline, whereas services were projected to grow (+0.93 per cent p.a.). Within manufacturing none of the 20 occupational groups shows positive growth, six of them (e.g. electricians, mechanical engineers, but also unskilled occupations) were estimated to stagnate, five occupational groups were estimated to decline by more than 5 per cent per year (occupations in the textile and clothing sectors, and in primary production), the strongest decline was estimated in construction. The decline of employment in the manufacturing sector was mostly based on negative sectoral and occupational effects, indicating the concentration of occupations to sectors. Within services most occupations were projected to expand, however, four out of 36 were estimated to decline (home services, book keepers, transport occupations, retailers), all of them based on strong occupational effects. The most marked growth was estimated for five categories of knowledge-intensive occupations (communication, two groups of technicians, administrators, business services). The growth in these occupations is based on high occupational effects, and, in addition, the growth of service occupations was mostly based on positive sectoral effects as well.

2. The estimates for the formal qualification levels have brought about clear results indicating the upgrading of the work force (see Table 3). Higher education graduates and those from the technical colleges at the upper secondary level show high growth rates (+4.40 per cent and +3.25 per cent p.a.), medium-level qualifications are estimated to grow slowly (+0.01 per cent to +0.57 per cent p.a.), and the unskilled are in marked decline (-3.56 per cent p.a.). The composition effects that are due to the change of occupational vs. qualification structures give some important information for a better understanding of the development. The high-level qualifications have strong positive effects on both variables (the employment field is expanding and the weight of these qualifications within the employment field is rising) while the unskilled category has strong negative effects on both variables. The medium-level qualifications show different patterns: In apprenticeship the employment field is shrinking, whereas this qualification level has a rising impact within that field – in medium-level schooling the opposite pattern is estimated, meaning that the qualification level is loosing weight in an expanding employment field.

Table 3: Projection of employment by qualification levels

Qualification levels	Employment (1000)		Estimated growth/decline (per cent)			Estimated effects (per cent)	
	1995	2000	1995 - 2000	p.a.[1]		Occ.[2]	Qualif.[3]
No qualification above compulsory education	830.0	692.3	-16.59	-3.56	∗	-0.92	-2.64
Apprenticeship completed	1357.7	1391.0	2.45	0.49	∗	-0.43	0.92
Medium-level vocational schools (BMS)	374.8	374.9	0.03	0.01		0.30	-0.29
Academic track (AHS)	203.5	209.3	2.87	0.57	∗	1.42	-0.85
Upper level technical colleges (BHS)	308.1	361.6	17.36	3.25	∗	1.11	2.15
Higher education	269.4	334.1	24.03	4.40	∗	1.89	2.51
Total	3343.6	3.363.3	0.59	0.12			
1) sum of occupational effect and qualification effect– 2) contribution of occupational change to employment growth– 3) contribution of the change of the distribution of qualifications on occupations to employment growth							
Source: Lassnigg, L / Prenner P / Steiner P (1999) Die Zukunft der österreichischen Qualifikations- und Berufslandschaft. AMS report 9. Vienna: Wissenschaftsverlag, Table I.4, p. 47.							

The analysis and projection of the development in the employment system was complemented by another part of the project, which projected the development of the future supply from the education and training system and compared the results of that projection procedure to indicators from employment. The basic units for this comparison consisted of ten occupational categories (specialisations) for each of the four levels of specialised programmes at the upper secondary or higher education level (see section 3.3. for a description of that procedure). The results were based on the following indicators, which have been calculated for the two periods 1991-1995 (past) and 1996-2000 (projection; see Table 4 as an illustration):

- The proportion of the estimated yearly supply (flow) from education and training to the stock of employment in each specialisation (ET-supply/EMPL-stock) gives an indication about the overall quantitative potentials for the employment of graduates, and indirectly about the magnitude of growth or decline in specific specialisations (this indicator has ranged from about 1 per cent to about 40 per cent in specific categories).
- The proportion of the growth/decline of the estimated yearly supply to the stock of employment in each specialisation (values ranging from –3 per cent to +2 per cent in specific categories), as compared to the overall growth/decline of employment in this specialisation (values ranging from –10 per cent to +20 per cent in specific categories; ET/EMPL and EMPL growth) gives a more sharpened indication about the dynamics involved (allowing the comparison of the direction of the signs, and the orders of magnitude given by the values).
- The growth of the estimated yearly supply (values ranging from –10 per cent to + 10 per cent in specific categories) as compared to the overall growth of employment (values ranging from –10 per cent to +20 per cent in specific categories) in each specialisation gives a picture of whether change in education and training as compared to net change in employment (implicitly discounting for outflow and inflow) is pointing to the same direction or to opposite directions.
- The cross-sectional distribution of qualification levels within occupational specialisations and vice versa (occupational specialisations within qualification levels) gives a picture of certain concentrations of these variables in specific categories, and about the structural homology of the education and training system as compared to employment structures.

Table 4: Indicators for the comparison of education/training supply and employment

	ET supply/EMPL stock			ET/EMPL and EMPL growth		CROSS-SECTIONAL distribution (col.=100%)	
	1991-1995	1996-2000		1991-1995	1996-2000	1991-1995	1996-2000
Agriculture and forestry	4.3	3.6	ET	-0.1	-0.2	4.4	3.7
			EMPL	-0.6	-0.5	3.8	3.4
Textiles 1)	4.1	2.8	ET	-0.7	-0.5	1.5	0.7
			EMPL	-6.9	-4.9	1.3	0.8
Metals, engineering	5.3	5.1	ET	-0.2	0	14.3	13.6
			EMPL	-2.6	0.1	10.0	8.9
Construction, wood processing	4	3.7	ET	0.1	-0.1	11.3	11.6
			EMPL	-0.1	0.9	10.5	10.5
Electricity, electronics, chemicals	8.1	9	ET	-0.2	0.3	9.8	11.1
			EMPL	-1.9	1.1	4.5	4.1
Retailing, transport, office work, administration	2.6	2.3	ET	0	0	32.9	32
			EMPL	1.6	1.3	46.4	47.3
Tourism	4.4	3.5	ET	-0.2	-0.2	7.5	6.4
			EMPL	0.4	1.3	6.3	6.2
Social and health services	6	5.3	ET	0	0.2	7.6	8.8
			EMPL	4.8	2.9	4.7	5.5
Education and Science	5.6	5.1	ET	-0.1	0.1	7.8	8.6
			EMPL	3.3	1.6	5.2	5.7
Miscellaneous (graphic arts, optics, arts and crafts, etc.)	1.5	1.6	ET	0	0.1	2.9	3.5
			EMPL	2.2	2.9	7.2	7.6
Total	3.7	3.4	ET	-0.1	0	100	100
			EMPL	0.8	1.3	100	100

ET = Figures for students; EMPL = Figures for the employed.
1) not very reliable because of small sample size
Source: Lassnigg, L / Prenner P / Steiner P (1999) Die Zukunft der österreichischen Qualifikations- und Berufslandschaft. AMS report 9. Vienna: Wissenschaftsverlag, Table I.6, I.7a, I.9, pp. 61-65.

The results have indicated some structural traits of the system, and some more specific features that were partly unexpected, at least in terms of the conventional views and debates in Austria.

1. In terms of the structural homology of education and training structures as compared to employment, these indicators point to a low level of correspondence between the two systems, especially if the speed of change is at stake. In relation to the dynamics of shrinking employment in specialisations in the primary sector or in manufacturing the decrease at the supply side was in most cases estimated at a considerably slower rate. The employment growth in service specialisations is not complemented by corresponding growth in education and training, but the supply is rather shrinking as well or remaining constant. Moreover, the indicator patterns point to a quite marked variability among the vocational specialisations, and also to quite marked discontinuities with respect to the comparison of the time periods. Thus the structure of the education and training system appears less stable than

expected. However, the changes and discontinuities in both systems are diverging rather than corresponding.

2. Another structural phenomenon, which has been made visible by the results of the indicators, reflects the overall demographic development of an increasing relative scarcity of younger cohorts as compared to the medium-aged and higher-aged cohorts. Generally, positive signs of growth rates are markedly more frequent at the employment side, as compared to the education and training supply side. There are only two occupational categories which do not indicate at least small growth on the employment side in both time periods: the occupations on all levels in the textile field in both periods, and the projected development of occupations in the education and science field in the second half of the 1990s. At the supply side only one occupational category (occupations in the field of social and health services) does show growth in both periods, and two additional ones (electricity/electronics/chemicals and the miscellaneous category) show growth in the second time period. The most frequent pattern at the supply side indicates a decline (agriculture/forestry, tourism, retailing and office work, textile) or constancy (construction, metals, education/science) during the second (projected) time period, following an actual decline during the first half of the 1990s.

3. A third structural result – which, however, might be to some extent artificially reinforced by the classification procedure – is pointing to markedly different relations in magnitudes between the supply from education and training on the one hand, and the employment figures on the other hand. The first indicator (supply as compared to the stock) is rather high in the overall field of electricity-electronics-chemicals (8.1 per cent)[12], and very high especially on the upper qualification levels (technical colleges: 40.4 per cent; university: 41.8 per cent). In some other partly shrinking vocational fields, or at least on certain qualification levels within that fields, this indicator has also shown high supply figures as compared to stocks of employment, ranging from 10 per cent to 35 per cent (agriculture/forestry, metals, education/science, textiles). In some other vocational fields, partly those which are estimated to grow (the miscellaneous category, tourism, retail and office work), the magnitude of supply is small as compared to employment (ranging from 1.5 per cent to about 4 per cent).

4. At the more specific level of vocational specialisations the pattern of estimated indicators points to rather distorted structural relationships between the supply side as compared to the demand side. The fields of metalworking and electricity-electronics-chemicals show corresponding developments at the supply and the employment side, the supply showing partly very high values as compared to the employment figures. As these fields are critical in terms of economic innovation, those figures point to a favourable relationship of qualification and employment, which, however, did not preclude heavy complaints about bottlenecks in the field of ICT recently.[13] In the service-oriented vocational fields (retailing and transport,

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[12] As very crude orders of magnitude for a 'normal' replacement rate, based on the (of course more or less unrealistic) assumptions of stable employment and an even age distribution, we might refer to figures between 2.5 per cent (40 years life-time employment) and 2.8 per cent (35 years life-time employment).

[13] In the field of wood processing and construction the indicators seem to be in line with each other, albeit the estimates for that field are to some extent artificial and also contradictory because of classification problems. Some growing occupational groups from the cleaning sector have been added to this field, thus changing the shrinking pattern in the original occupations to slight expansion.

office work and administration; tourism, social and health services) the indicators suggest that the supply side is considerably lagging behind the development of employment. In the vocational fields of agriculture/forestry and textiles the opposite seems to be the case, as the education and training system produces a high amount of qualifications as compared to the shrinking employment.

The detailed study report has not been updated so far. A new forecast about the period 2000-2005 on the basis of the WIFO medium-term forecast provides estimates for industries and occupational groups (Biffl 2001). Unfortunately the estimated figures are neither comparable to the past nor to the future development, because the classifications of industries and of occupations have been changed between those studies (see section 3.1.).[14]

3. Data and methodology

3.1. Data

The effectiveness of any methodology applied to forecasting and projecting activities depends on the available data. We can see that there has been an interaction between the development of statistical data sets and their regular use in applied research activities, which in turn has been related to some basic patterns of policy making. Grossly, the availability of time series data is diminishing step by step, as we move away from short-term regular macroeconomic research activities towards lower levels of aggregation (sectorial and regional), and towards the more specialised variables about occupations and qualification. The more recent changes in the classification of most of the involved variables have even worsened the situation, as backward comparisons would require a reshuffling of the past data bodies.

At the level of the quarterly macroeconomic forecasts the grossly standardised data set of the National Income Account (NIA, Volkswirtschaftliche Gesamtrechnung), including the input-output tables of economic exchanges, has been provided regularly by the Austrian statistical office. In addition, the Austrian Institute for Economic Research has regularly updated a database about the main economic indicators (including the basic overall figures about employment and unemployment, etc.). In sum, the macroeconomic data have been made available regularly and have been updated according to their utilization in macroeconomic analysis and forecasting activities.[15]

Data about employment and unemployment have been made available monthly by two different agencies which have put a lot of effort in developing large scale data and information systems. The employment figures are documented regularly on the basis of the statistical information system of the Austrian social security agency, the unemployment figures are reported by the Austrian labour market service agency (using

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[14] As an example, about 100 000 managers have been forecast for 2000. However, about 250 000 are employed in 1999 according to the other study; in construction 140 000 workers have been forecast, but 220 000 are employed; more than 500 000 have been forecast in administration, whereas only less than 100 000 are employed. Such huge differences in classification cannot be resolved by a secondary analysis.

[15] Cf. the WIFO Information System for Economic Statistics http://www.wifo.ac.at/db/index.html; WIFO Economic Data Service: http://www.wifo.ac.at/cgi-bin/tabellen/tabhome_eng.cgi

two different data bases: the unemployment register and the unemployment security records). Due to the included variables specific differences must be mentioned in connection with employment and unemployment. Employment figures are available per economic sectors, whereas the reporting system of unemployment figures has focused more strongly on occupational categories, also including the formal qualification levels of the unemployed. The available information base about the unemployed is substantially richer (allowing for the combination of industries, occupations, and qualification levels) than that about the employed (which are mainly documented in terms of industries). Consequently, the unemployment rates for occupations and qualifications cannot be calculated and are not reported regularly in the main databases about employment and unemployment. The calculation of unemployment rates by age groups is also limited by these sources. Another consequence is that the combination and interrelation of economic sectors, occupations, and qualifications of the employed cannot be analysed from the mainly used statistical database about employment (thus the database about unemployment is more developed than the database about employment).

The only database, which has combined these dimensions of information, allowing for a break-down by sectors, occupations, and qualifications, has been the census data collected by the Austrian statistical office (which was recently outsourced from the public service). Every ten years a population census (Volkszählung) has been performed to collect data about the total population. Since the 1960s a quarterly collected 1-per cent sample survey of the population has been developed incrementally by the statistical office (the Mikrozensus), which is divided into a regular section (collecting basic information, including among others employment status and sectors, occupation and qualification levels) and a flexible section (collecting information about specific topics, which have sometimes also been related to employment, but may just as well be about health, child care, holidays, etc.). For reasons that are not easy to understand this database has only been included marginally into a comprehensive and regularly used socio-economic database. A consequence of that flaw has been the emergence of different and uncoordinated classifications in the various databases. Unfortunately, the clearing-up of the data in a commissioned research project about a specific topic would have required a rather large amount of resources. The implementation of the European Labour Force Survey as a regularly performed variable section of the spring Mikrozensus, and the utilisation of that database as the main source of employment and unemployment data at the European level has put more emphasis on that kind of information.

In connection with the analysis and forecasting of qualifications the Mikrozensus poses some serious problems. One is that the sample size in a small country creates certain limitations for more detailed analyses (e.g. a break-down procedure by basic variables as employment status, qualification levels, gender, age groups, occupations and sectors would lead to numbers of observations too small to be reliable). Another problem is that the Mikrozensus does not collect information about qualifications that would go beyond the formal levels. Information about content or occupational destinations, for instance, can only be derived from the population census every ten years.

The regular databases about employment and unemployment cannot be linked to the structure of the education and training system, and thus to the statistics about education and training. This is actually a paradox, as the Austrian education and training

system is one of the systems in the world that is most strongly developed in terms of vocational education and training. Moreover, also paradoxically, this linkage is not due to the development of additional activities (e.g. the accomplishment of methodically proper large-scale surveys about the utilisation of qualifications, or about the transition from education and training to employment).[16] Interestingly, the German solution to bridge the gap by collecting regular data about the main categories of work activities (Tätigkeiten) has not been chosen in Austria either. The newly developed micro-prognosis, which is based on the total employment transactions, also leaves out occupational categories or the content of qualifications. The formal qualification levels are reported more recently. However, they must be imputed by statistical procedures because they are not directly observed in the information basis.

In views of a long-term backward analysis of the combinations of economic sectors, occupations, qualifications, and other key variables (gender, age, region, etc.) the utility of the data base from the census is limited because of subsequent changes of the main variables. Among these changes were the implementation of a new variable about economic sectors in 1968 (which impeded the comparability of this variable up to the 1971 population census), the implementation of the new ISCO classification of occupations in the population census 1981 (which has impeded the long-term comparability of the occupational variable and, moreover, has led to a temporary divergence of that variable between the population census and the Mikrozensus), and a second change of the variable about economic sectors to the NACE classification beginning with the 1994 Mikrozensus. In addition, the revision of the ISCED classification will bring about some changes concerning educational levels. The implementation of a regional NUTS classification also brings about an improvement of that variable, which up to then had been grossly restricted to the administrative regions unless used in specialised regional research. During the 1990s the basic information of the NIA has also been updated to European standards, causing short-term problems for economic forecasts. The requirements of comparability have only been met partially, thus detailed analyses of long-term changes, especially those based on time series data, are not possible without a serious attempt to build up a database for that purpose.

Another variable, which has chronically lacked information in the Austrian statistical system about employment, has been the individual income. The regularly used statistical information about income is mainly based on aggregate data from the tax system. More recently, individual data from the social security records have become available, which, however, only include the calculation base (Bemessungsgrundlage) for social security payments, which are cut at a certain level (that information is thus reliable only for lower- and medium-level incomes), rather than the actual income. In addition, information about the individual incomes has sometimes been collected in the variable sections of the Mikrozensus (that information was collected voluntarily, and for the wage-earners only). Cost-benefit analyses and studies about returns of education and training have been carried out only recently on very basic levels (Fersterer/Winter-Ebmer 1999; Lassnigg/Steiner 2001).

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[16] The data about transition from education to work give a rather indirect and incomplete picture (cf. Lassnigg/Schneeberger 1997). This might be improved by the recent survey on behalf of EUROSTAT; at the level of university graduates a series of surveys has been conducted which provide information about the long-term changes, although the data only allow for reliable information on the aggregate level; cf. Lassnigg et al. (2000)

A new development in terms of the building-up of a database about employment and unemployment has been started in the late 1980s with the subsequent availability of the administratively produced micro-data from unemployment insurance and from the social security system. This process was originally linked to various attempts to evaluate labour market policy measures. A next step was the start of the labour market micro-prognosis in the early 1990s by a private research company commissioned by the labour market service. The combination of the register data from the labour exchange with the information from unemployment insurance allows for a detailed analysis of the flows in and out of unemployment. Until 2000 the analysis of the unemployment data was combined with the WIFO forecasts about employment. The next step has been the integration of the social security data base into the study that includes the information about the totality of transactions and employment relationships covered by the social security system on the individuals' side and – as a separate interlinked database – on the companies' side as well. As to unemployment spells, the information can be linked in principle to the employment transactions, thus complete individual and enterprise histories can be reconstructed and interlinked on the basis of that data. The new micro-model for the forecasting of short- and medium-term labour market development is based on that comprehensive data. The big missing link, however, concerns qualifications and occupations that are only partly available to the unemployed. Moreover, a kind of duality of employment databases seems to arise, as these comprehensive data have been developed by a private company with a kind of monopoly in that field (using at the same time the extensive economic data base provided by WIFO in large parts as a public good easily to be gathered from the internet), whereas the survey data from the Austrian statistics are developed separately.[17]

3.2. Overview of the methodology of forecasts at the macro level

IHS short- and medium-term macroeconomic forecasting

The IHS forecasts are estimated by a large-scale standard econometric model based on behavioural relations for the demand side and the supply side of the Austrian economy. The results are adjusted by adding judgmental elements, that is respective factors, to the residuals. The first – prototype – version of the model was created in the early 1970s and has been continuously adapted and updated to produce the forecasts for the Austrian economy on a regular basis. The thorough revisions of the model, including newly incorporated sub-models of the labour market and the public sector, date back to the 1990s. The data from the national accounts and several other national and international data sources are utilized. Variables such as the development of the world economy, foreign prices, and public spending are considered exogenous. In the course of the forecasting procedure, the interest rate and the exchange rate are derived as exogenous variables from a separate assessment of the monetary sector. Building on forecasts of imports of the main Austrian trading partners, exports are estimated by a separate model

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[17] Comparisons of the stock data from the Austrian statistical office with the stock data from the social security records show marked differences even on an aggregate level (for instance. the data bases imply different employment trends in the first half of the 1990s in the primary sector; and even more markedly in the secondary sector, where the social security data implies a decline whereas the *Mikrozensus* implies a slight increase; see Lassnigg/Prenner/Steiner (1999).

and fit into the macroeconomic model. Consumption is estimated by an error-correction equation, depending primarily on disposable income. Accelerator type investment functions are estimated for equipment and construction. A further block consists of price equations for the main demand aggregates, where prices depend mainly on the development of unit labour costs, capacity utilization and import prices. In the labour market block labour demand, wages and unemployment are calculated. The definite forecasting data are provided as an output of the subsequent iterative process of modelling.

WIFO short-term forecasting

The WIFO short-term forecast comprises a four-stage process, using a broad range of econometric methods and implementing an iterative and discussion-intensive process. (1) The 'preliminary meeting' as a 'backward-casting' of the last quarter, includes the discussion of exogenous variables (internal development, fiscal and monetary policies) and a qualitative assessment of developments in the trades and industries. (2) The 'internal meeting' discusses the specific forecasts concerning economic issues (public sector, inflation, external influence, employment, etc.) and the provisional overall forecast from the forecasting department at an expert level. (3) The 'economic policy group' comprises a presentation and discussion of the draft forecast with a group of highly ranked experts from economic policy institutions. (4) The forecast is presented and debated by the forecasting group from the 'Advisory Committee of Economic and Social Affairs' (the expert institution from the Austrian social partners), and finally presented to the public in a press conference. The main macroeconomic indicators – GDP, labour market, prices, balance of payments, public sector, monetary aggregates and interest rates – are forecast. As to the GDP forecast on the output side, nine different sectors are distinguished: industry and craft, energy, construction, trade, traffic, financial services, other private services, public services, agriculture. As far as the employment forecast is concerned a break-down by industries is not provided. The method comprises a mixture of qualitative aspects (an iterative and discussion-intensive process among the experts) and quantitative aspects (time series analyses, consistency check by SNA spread sheet, macroeconomic model). Overall, the short-term forecast is neither an econometric model nor a simple trend extrapolation. It is rather an array of separate assessments by the expert departments which are using their own techniques and expert knowledge to gather their results. Finally, the separate results concerning prices, inflation, employment, etc. are matched.

WIFO medium-term forecasting

The WIFO medium-term forecast is presented in two separate parts. The first part deals with the world economy and is based on an extended consistent data system. The second part is devoted to the domestic economy. Forecast results for the world economy are important exogenous variables in the WIFO macroeconometric model. The model has been developed since the mid 1970s as an aggregated, mainly demand-orientated annual model that is used for medium-term forecasts and policy simulations. Corresponding to the fact that Austria has a small open economy, the economic development (production, foreign demand, foreign trade, foreign prices) in the main trading partners' countries is essential in this model. Domestic governmental policy and

regulations are also taken into account. Exogenous variables (determined either by expected domestic government policy or by the outlook on the world economy) are implemented into the model. Relying on discussions among the institute's experts (e.g. for public finance, labour market, private consumption, foreign trade), the results from modelling are supplemented by judgmental elements, that is by adding respective factors to the residuals. Simultaneously, an econometric model is mainly utilised from the point of view of examination and control. This model is a demand-oriented Keynesian model. The 159 endogenous variables are explained by 218 exogenous variables, the most important of which are the GDP of European countries, prices of world markets, the dollar exchange rates, public consumption and interest rates. The model encompasses seven parts: product markets, labour markets, financial markets, prices, wages, other incomes and the state. According to the structure of the model the results are presented on an aggregated level within the framework of national accounts. The set of tables covers components of demand (in nominal and real terms), items of the balance of current account, prices (deflators of the components of demand), data on the labour market, income taxes, contributions to social security, and public expenditures. The generated labour market data comprise the development of dependent employment, self-employment, employment in the public and in the private sector, the total number of unemployment and the unemployment rate. These labour market data are the basis for a more detailed labour market forecast broken down by industries. This is carried out separately by the WIFO. However, the more detailed figures are not a direct result of the macroeconomic model.[18]

Synthesis short-term and medium-term micro-prognosis of the labour market

The model has been developed and subsequently modified since the early 1990s. It is used to forecast the various components of employment and unemployment. The main objective has been to combine the macroeconomic forecasts about the business cycle with the information about the micro-behaviour of employees and employers. It is mainly based on the assumption that the influence of the macroeconomic conditions on the labour market should not be considered as a direct and deterministic one, but that there are several behavioural options available for both employers and employees, which are reflected for example by the marked yearly changes of the added value of enterprises per employee. The model comprises three main parts: The macroeconomic parameters are taken from the available forecasts, the micro-behaviour is analysed on the basis of social security records, and a micro-macro bridge models the interaction of these two areas at the level of industries and administrative regions, using a macro-interface (especially focusing on the relationship between labour productivity and the labour market relations) and a micro-interface that aggregates the transactions of persons and companies. The micro-model is based on the population of employers' companies (300 000) that were observed by industries, regions, number of employees, growth/shrinking and foundation/extinction on the one hand, and on the movements of the employee population (3.5 million) among various employment and career positions (continued job, changed job, newly employed, unemployment, re-entering the labour market, leaving the labour market) on the other hand, thereby considering gender, age,

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[18] Concerning the disaggregated input-output model see Kratena/Wüger (1995); Kratena (1994, 2001), Kratena/Zakarias (2001).

nationality, location of living/employment, employment status, and so on. The micro-prognosis is built on individual matches of companies, persons and job characteristics. The main labour market figures (labour force, employment, self-employment, labour supply, dependent employment, unemployment) are forecast by gender. The forecast of employment is broken down by the average stock per year, and by the main flows (beginnings and endings of jobs), taking into account the different regions, industries, companies' employment dynamics, qualification levels, social characteristics (age, nationality, types of jobs, including non-regular employment). The forecast of unemployment is broken down by unemployed persons and spells of unemployment, taking into account gender, age, regions, qualification levels, occupations and nationality. As a third dimension of the labour market the main flows at the interface between employment and unemployment are forecast, including stable and mobile employment and a break-down of the flows in and out of employment/unemployment by the main categories (regular employment, non-regular employment, self-employment, unemployment, out of labour force).

AMS short-term and long-term forecast of apprentices and trained workers

The model has originally been developed in the mid 1970s by a research institute related to the trade unions (Austrian Institute for Research about Vocational Education – ÖIBF). Since the mid 1990s the model is regularly updated by the Labour Market Service (AMS). The overall model consists of four steps: (1) forecast of the demand of apprentices, (2) forecast of the supply of apprentices, (3) forecast of the increase of skilled workers broken down by administrative economic categories and by gender, (4) forecast of the supply of skilled workers at a regional level. The demand for apprentices is estimated by means of a path-model using GDP growth, investment and productivity as explanatory variables.[19] The demographic development and the trend concerning the choice of training tracks among the 15-year-old leavers of compulsory schools are used as explanatory variables for the supply of apprentices. The average increase/decrease of male and female apprentices in their first year is calculated by a linear regression for each administrative category. Then the numbers of apprentices in their second, third and fourth year are calculated by adding the estimated trends of retention and success at final examinations. The number of new skilled workers is derived from the forecast of the supply side, and broken down by administrative regions using the population forecasts. The data used for the forecast of the supply side are: the monthly and yearly AMS labour market statistics, the population statistics from the Austrian statistical office, the WIFO economic forecasting data, and the statistics about apprentices from the Federal Chamber of Economy. The model provides a short-term (2 years) quantitative prognosis of the apprentices' market, taking into account demand and supply factors and a long-term (14 years) projection of the supply of skilled workers based on supply factors alone.

3.3. Methodology of selected forecasts and projections at occupational and qualification levels

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[19] In sum the model is supposed to explain 50 per cent of the variations in demand for apprentices. The other 50 per cent are deemed to be the effect of other variables that are not integrated in the model.

The overall study was performed in three steps. First, the past development of industries (1971-1981-1991) and occupational groups (1981-1991) was analysed. Secondly, projections for the period of 1995-2000 were performed for qualification levels and detailed occupational groups. They were based on the WIFO medium-term economic forecast of the employment figures for industries. Finally, the development of the supply from the education and training system broken down by occupational categories was projected and compared to the projected development of employment.

A basic assumption at the core of this study was that the education and training system, as well as the operation of the labour exchange, is based on occupational categories in Austria, whereas the analysis and the forecasting of the demand side is based on the disaggregation on the level of industries. In terms of the market metaphor, we can say that the education and training market functions on the basis of occupation-oriented specialisations, and moreover, the supply side on the labour market is also specialised in that dimension.[20] However, the observation and analysis of the demand side at the labour market, and also of the employment structures, is based on the industry specialisations. To relate the development on the supply side to the development on the demand side, the three-way relationship between industries, occupational categories and educational specialisations was modelled as follows:

- The development of the employment demand by industries was taken as an input from the disaggregated WIFO forecasting.
- The development of employment by occupational categories was analysed and projected by a model resting on a shift-share analysis originally developed by Meagher (1995) for similar projections in Australia.
- The relationship between occupational categories and educational specialisations was analysed on the basis of the comparison of separate projections of corresponding categories within the education and training system on the one hand and within employment on the other hand.

In order to perform the projections it was necessary to develop a consistent data basis for the analysis of the past development. The quarterly data 1982-1996 from of the Mikrozensus (occupations and formal education levels) were combined with the data about employment by industries from the social security records (the latter were taken to be more reliable than the Mikrozensus data; see above 3.1). An analysis and documentation of these data was performed in such detail for the first time in Austria.

Projection of occupational categories and education and training levels

The model has estimated the contributions of overall growth (growth effect), changes of the employment figures by 47 industries (industry effect), and changes of employment by occupations within industries (occupation effect) to the observed employment

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[20] It must be said, however, that the validity and predictability of the system of occupations and formal qualifications is fundamentally questioned by the main stakeholders in the field of employment and training policies. As an example, the head of the research group of the Labour Market Service is seriously questioning the significance of occupational categories: 'Die meisten QualifikationsforscherInnen differenzieren nicht mehr nach Branchen oder einzelnen Berufen. Die Branchenzugehörigkeit, die Produkte, aber auch die zahlreichen neuen Jobs (früher Berufe) ändern sich so schnell, dass seriöse Aussagen kaum möglich sind. Sieht man jedoch auf die Ebene der Qualifikationen und Tätigkeiten, sind längerfristige Vorhersagen sehr wohl möglich.' Hofstätter (2000, 134).

figures. The parameters of this analysis were used to make the projections for a medium-term period (1995-2000), the growth and industry effects being mainly determined by the WIFO forecast, whereas the occupation effects were estimated by the model. The development was projected for 58 occupational categories (two in the primary sector, 20 in the secondary sector and 36 in the tertiary sector). For each of these categories a detailed map was produced, which obtains the development of absolute employment figures during the past period of 1982-1996 and the projection (linear) from 1995-2000, the relative yearly growth (or decline) figures, with the decomposition of effects by industries and occupations (a 95-per cent confidence interval based on the standard errors of the <u>Mikrozensus</u> sampling method is included). In addition to that, the concentration of each occupational category in different industries was estimated and documented by showing the distribution among the top ten industries where the respective occupational group had the highest proportions (the cumulated share of the 37 remaining industries gives a quick and simple measure for this concentration, the values being between zero and about 33 per cent).

     A similar analysis was performed for the development of the employment at the formal levels of education and training and occupational groups (the industries being implicit in that procedure). Six levels were distinguished (compulsory school without any additional formal credential; apprenticeship qualification, medium-level vocational school, upper-level academic school providing access to universities, upper-level technical college with academic and vocational credential; and university education). The distribution among occupational groups and their individual contribution to employment growth at the educational levels were also estimated (analogous to the industries).

<u>Projection of supply from the education and training system as compared to employment by occupational groups</u>

In order to relate the education and training system to the employment structures, corresponding occupational classifications of education and training on the one hand and of employment on the other hand had to be constructed. These kinds of classifications have not been developed systematically so far in the Austrian statistical information system, even though a lack of these classifications has been demonstrated one decade before in a widely discussed project jointly commissioned by four federal ministers.[21] This means that the Austrian system, despite its high proportion of vocational education and training, does not have an instrument to continuously monitor the match between employment and vocational education and training.

     As it was already mentioned, the supply of qualifications is highly specialised in terms of vocationally oriented programmes (at least about 600 specialisations may be estimated, including study programmes in higher education; cf. Lassnigg 1998b), although the continuously reported statistical information system does not include a variable about vocational or study specialisations on the education and training side or on the employment side. Statistical information about the distribution of these vocational specialisations in the population, and about the employment of graduates by the content of their studies, is not available on an overall level for any kind of time series analyses.

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[21] Cf. Lassnigg (1989); so far, this classification has not been included into official statistics.

To analyse the correspondence between the supply from the education and training system on the one hand and the employment system on the other hand, the specialisations on each level of the education and training system (apprenticeship, medium-level vocational schools, upper-level technical colleges, university) have been classified to ten broad occupational groups, which could be in turn reproduced from the employment statistics by the comprehensive data base in the project described above. Altogether, a number of 40 specialisations (ten occupational groups multiplied by four levels of education and training) resulted from that classification procedure (see Table 4 as an illustration for the classification and for the results on an aggregate level).

On that basis, projections of the supply from the education and training system were estimated at the upper secondary level, taking into account demography and the distribution of education and training choices at the transition point from compulsory school to upper secondary level for apprenticeship, medium-level vocational schools and technical colleges at age 15/16 (in sum: 30 from the total of 40 specialisations). The projection of the student figures at the upper secondary level was based on the data about enrolment in these specialisations between 1985 and 1995. Two versions were estimated, a status-quo version based on the choices from 1994/1995, mainly to demonstrate the influence of the demography, and a second one based on a linear trend regression of the choices between 1985 and 1995, combined with the forecast of demographic change. The potential supply figures were derived from the projected intake taking into account the average expected drop out figures, and the figures for the technical colleges by the estimated rate of university entrants. At the university level the figures about the supply of graduates from the forecast of higher education 1996 were utilised. (Dell'Mour/Landler 1996). On the employment side the projection described above was regrouped analogous to the specialisations of education and training, and the indicators described in Table 4 were calculated.

The method that was used was rather crude, but in view of the poor data situation and the lack of a lot of information necessary for a more accurate modelling of the relationship between supply and demand the procedure gave an overall insight into the structural matching between the two systems in question for the first time on that level of specialisations. Due to the changes of occupational categories during the 1990s and the resulting lack of time series information this exercise has not been continued in the mentioned update of the forecast for the period of 2000-2005 (Biffl 2001).

4. Policy and implementation

In general, the practice of forecasting is paralleled by an impressive catching-up process in terms of the economic figures and can be linked to the system of policy making in Austria, the so-called Austrian 'social partnership', which has had its flourishing period mainly from the 1970s to the early 1980s,. This system is currently attributed to be in decline for several reasons. Nevertheless, the past practice of policy making has contributed to the structuring of the institutional framework of applied economic research and of research in related fields, as for example employment, qualifications, (vocational) education and labour market policy. Economic policy was a core area in that model. The 'hard currency policy' in combination with the focus of the social partners on a growth- and productivity-oriented income policy via the collective

bargaining process, sheltered by a comparatively well developed social welfare system, may be seen as the hard core of the Austrian policy strategy.[22]

The process of short-term economic forecasting complemented that system of policy making by fuelling important information into the policy discourse. The quarterly joint presentation by the IHS and WIFO of the update of the short-term forecast to a group of experts including the social partners and state officials, and the yearly joint presentation of the medium-term forecast have been important events in the policy discourse. The summer estimates about inflation have been of special interest to the subsequent round of collective bargaining in autumn.[23] Especially since the integration of Austria into the European Union, and even more since the implementation of the monetary union, the domestic forecasts have lost significance. The trans-national observations are gaining interest, and at the same time the discretion of the national government about economic policy is in decline.

However, the other policy and research areas in question have been rather separate from the economic policy process. Regional policy has emerged as a separate policy area that increasingly focuses on the development of the qualification structure as a part of the support of innovations. The support from the European regional policy has given positive impulses to several programmes at that level which have been developed from the bottom up. Strategies for the support of innovation have been developed in several regions of Austria, including the main local stakeholders. These strategies function on a decentralised basis, and the initiatives are loosely coordinated by various framework programmes. (Cf. OECD 1995; Tödtling 1998; Österreichisches Institut für Raumplanung 1999). Projections and forecasts on that level are provided by national institutions mainly on the supply side – for example about demography, the labour force, educational resources, and so on (Cf. Holzinger et al. 1991). The Synthesis micro-prognosis of the development on the labour market is fuelled into that policy to some extent.

Since the 1980s active labour market policy has been developed to include a set of well-established and diversified measures to support the integration of unemployed persons into employment. More recently, a process of programme planning has been established by the Austrian labour market service. As a complement to the high priority on aggregate economic policy and incomes policy the amount of funding for active labour market policy has remained comparatively low in Austria. The implementation of training measures, organised within the framework of continuing and adult education, has always been a main concern. These measures have been clearly separated from the initial education and training system. Even the main part of training measures favouring young people has been complementary rather than integrated into the formal system of initial education. One exception to that rule have been measures supporting the provision of apprenticeship training when unemployment at the apprenticeship market went up. This policy has been well informed by the statistical information system about the apprenticeship market within labour market statistics, supported by the forecast of the apprenticeship market. So far, the main rationale of youth labour market policy has been the short-term fight against unemployment, without being embedded in a more long-term strategy of education and training policy. The participation in the European

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[22] For a condensed overview of the long-term development from 1970 to the end of the 1990s see Pichelmann et al. (1998); Pichelmann/Hofer (1999).

[23] WIFO and IHS have even been assessed as being part of the Austrian system of social partnership; cf. Neck (1985).

employment strategy has induced some steps towards a more integrated policy by emphasizing the issues of early school leavers and young people without formal qualifications. More recently, the European strategy of developing life-long learning has brought the questions of policy co-ordination onto the policy agenda.

The link of education and training policy to employment and labour market objectives has always been rather general and indirect at the aggregate level. During the 1960s, when the focus on investment in education as a contribution to economic objectives was strongest for the first time in the international policy discourse, Austria followed these arguments and started a long-term oriented policy in favour of the expansion of higher education and the increase of the regional density of the system of academic secondary education. In the beginning of the 1970s a programme for the expansion of upper secondary education was developed by the new reform-oriented social democratic government, which set long-term cornerstones for the overall participation in the various tracks of upper secondary education (defining targets, for instance, for the individual proportions of apprenticeship and full-time schools or of different tracks of full-time schooling). This programme supported an expansionary policy for schooling and higher education in parallel to a long-term demographic upswing of the young age cohorts. As a consequence, a broad-scale infrastructure in the sector of full-time schooling has been built up, which was able to integrate broader proportions of the young age cohorts into post-compulsory full-time schools during the 1980s. A process of upgrading qualifications by moving apprenticeship to the technical colleges was started, and thus gave rise to competition between apprenticeship and full-time schooling. Simultaneously, the access to the universities was also broadened, leading to various debates about the economic value of the university-dominated higher education system. In the beginning of the 1990s the diversification of higher education was reinforced by the set-up of the new system of the Fachhochschule, which should provide higher-level qualifications that would be more applicable to the economy as compared to the long-lasting and inward-driven university studies.

Altogether, education and training were given long-term and basic priority in the Austrian policy system (like in most countries, this was impeded to some extent by financial constraints), and education and training policy in Austria could now rely on a well-established system of vocational and technical education. However, within that general frame the specific structure of the system has emerged incrementally, being largely guided by the dynamics of education and training demand exerted by the young people and their households. Steering measures that would guide education and training choices towards the economic demand have not been integrated as a systematic element of policy, but the interested actors have exerted their influence informally and locally in various specific areas of the system, without gaining predictable outcomes on the structural dynamics of the education and training system at more aggregate levels. Diverging interests concerning the demand for specific qualifications in specific small-scale trades and industries having their stakes in the system on the one hand and the proposals for broadening the structure of qualifications on the other hand have been a driving force for a long time, without finding solutions on a broader scale. Forecasting procedures did not fit into that policy rationale, as their results were considered to be too uncertain and too abstract to resolve these disputes. The actors preferred to rely on their local and informal knowledge instead of trying to invest in the development of more formal and systematic knowledge. The above-mentioned 1998 expert study carried out by the social partners represented a milestone in the provision of a cognitive

map for the rejection of forecasting in the field of educational planning. The model of the demand and acceptance studies in the <u>Fachhochschule</u> framework, which is strongly geared to the production of seemingly objective knowledge about very specific qualification fields, might be interpreted as a kind of indirect proofing for overall assessment.

The process of matching the supply from the education and training system with the demand for qualifications from employment and the economy has clearly been performed by informal mechanisms at local and disaggregated levels, including the micro-processes of teaching and learning within the education and training organisations (Cf. Lassnigg 2001). The overall functioning of these mechanisms is based on the informal knowledge of the various actors involved at the different levels of the co-ordination process, and it is still poorly understood in terms of the codified knowledge at the research level. So far, there are no means to observe the quality of structural matching. Consequently, quality assessment is periodically debated by experts and by the public on the basis of the informal knowledge and connoisseurship of practitioners. The actual demand for systematic research has been weak so far, and as far as it has been commenced, the implementation of results has been weak, independently from the scope and methodology of the studies at stake.

5. Conclusions

A first conclusion refers to the paradox that in an education and training system which is heavily built on specialized qualifications a corresponding formal system of forecasting the future demand for these qualifications does not exist, and moreover, that there does not even seem to be a high demand for such a system: There must be mechanisms and processes at work which are substituting for these kinds of formal forecasting. These existing mechanisms must be mainly informal, communicating informal knowledge among the various stakeholders involved. It seems to be crucial for an understanding of the system to analyse channels for these communication processes. This may in turn give important insights into the working of actual co-ordination mechanisms.[24]

The other side of the coin is that the lack of formal mechanisms implicitly means that there are no mechanisms to formally assess the extent to which the supply of education matches the demand for qualifications. Thus the assessment depends on informal knowledge. Therefore it could be that the development of forecasting mechanisms should take into account the flows of informal knowledge and try to capitalise on them. The concept of knowledge management refers to that idea. A related issue is that any forecasting includes an element of a 'production of reality', and thus in fact transcends the role of research as a production of information based on the 'analysis of reality'. Many times the relationship between these elements is not clarified among the producers and users of forecasts, and there is an inclination for users to shift the task of 'producing reality' to the researchers. The procedures and mechanisms in connection with the production of reality should be made explicit in any kind of forecasting procedure.

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[24] Markowitsch (2000) has provided a similar analysis in his contribution to the project 'European trends in the development of occupations and qualifications'.

This rather general conclusion ought to point out the importance of a communication process among the various stakeholders in which any kind of forecasting is embedded. Appropriate structures for these flows of communication at the edge of informal and formal knowledge are crucial for an appropriate utilisation of forecasting. There are two more practical issues concerning the methodology that need to be underlined in this context: The first one concerns the available data that will be necessary for any kind of forecasting. A common database, which can be utilised for the application of methods, must be available and systematically developed, especially when resources are low. A database that can be widely used by a broad community of stakeholders is a necessary condition for a check against reality as well as for the test of competing assumptions. If projects are burdened with the construction of their own databases the necessary resources for the research tasks are automatically reduced, and monopolies might arise on the basis of those data obstructing the application and development of competing approaches and methodologies. The availability of a database also goes hand in hand with a certain consensus about the definition of the variables and the use of indicators. Forecasting results should be in a condition, that a check against the actual figures could easily be employed, at best by the involved stakeholders themselves. In any case a continuous procedure is a necessary condition for the utilisation of results and for policy learning. The Austrian experience can be taken as a proof against that assertion. The second issue concerns the choice of methodologies. Big and complex 'one shot' methodologies might be less useful than periodically updated simple models. The results of the former cannot be easily assessed against the assumptions, therefore transparency might be reduced and the illusion of the truth of the 'reality produced' might be reinforced. The utilisation of simple models with transparent relations between assumptions and results, the communication of results among the involved actors, and their comparison and balancing with the informal knowledge from the practical field can probably induce policy learning much better than impressive complex models. The assessment of forecasting results against reality may also be easier on the basis of simple models. However, this may be not the main concern of forecasters.

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