Labour market forecasting in the Netherlands: a top-down approach

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To uphold consistency between aggregated and disaggregated labour market forecasts, it is important to use both a fitting general forecasting model and national databases which distinguish between various occupational groups and types of education. The answer is a top-down approach to labour market forecasting, such as that mainly used by ROA. It can adequately deal with interaction between different labour market segments and substitution processes between occupational groups and types of education. The opposite is the so-called bottom-up approach, in which partial models of labour market forecasting are used, for example for just a selection of sectors or occupational classes, with input from specific (ad hoc) data sources. The bottom-up approach can be complementary to the top-down approach. The paper gives examples of both approaches by reviewing some ROA research.

1. Introduction

The Dutch Research Centre for Education and the Labour Market's (ROA) forecasts aim to increase transparency of the match between education and the labour market. The more transparent a labour market, the better the opportunities and risks resulting from future labour supply and demand developments can be signalled. To anticipate mismatches, suitable labour market forecasts are required. In this paper, it is argued that ROA uses first a top-down approach for making labour market forecasts. In this approach a general - as distinct from partial - forecasting model for the whole labour market and data from national sources are combined to serve two main functions of labour market forecasts: policy and information (see Van Eijs, 1994). The policy function refers to the usefulness of labour market forecasts
for government policy-makers, public employment services and employment agencies, employers' organisations, unions and educational organisations. Policy-makers want to be informed of supply and demand developments. By taking account of future employment trends of broadly defined educational classes and occupational groups, they are able to invest correctly in the educational infrastructure. For the Netherlands, ROA biennially publishes the report *The labour market by education and occupation to 200x*, (1) which includes analyses of expected labour market developments in the light of particular policy issues. Although the information on which this report is based originally focused mainly on study and career guidance, today the report is aimed more at those involved in policy-making on the match between education and the labour market.

The information function is primarily intended to assist with vocational and educational guidance. This improves the functioning of the labour market, since individuals are better able to adjust their human capital investment decisions to labour market prospects of types of education (see Borghans, 1993). Also, firms may use labour market forecasts as 'early warnings' on future recruitment problems to anticipate human resources policies. The ROA report is based on information providing a detailed insight into the current and future labour market position of 104 types of education, 127 occupational groups and 34 economic sectors (2). The information focuses on medium-term labour market forecasts, to give those making choices on further studies, the best possible information on the state of the labour market when they complete their studies. The National Careers Guidance Information Centre (LDC) incorporates ROA's labour market information in various information products for vocational and educational guidance. Besides civil servants from many different ministries (e.g. education, social affairs, economic affairs, agriculture) and public employment services, educational institutes, personnel managers, advisory councils, etc. all use different parts of the information system for their decision-making.

Labour market information serves as vocational and educational guidance, and usually requires much more detail than the information used by policy-makers. Therefore the level of aggregation at which labour market forecasts are disseminated, needs to be higher for the policy than for the information function. The ROA information system covers the whole spectrum of occupational groups and types of education on the labour market, and is designed to meet both functions. To preserve consistency between

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(2) The forecasts on expansion demand (see the next section) are presented for 13 economic sectors.
aggregated labour market information (e.g. employment trends at sector level, increase in the level of education) and the detailed information, it is important to use both a fitting general forecasting model and national databases which distinguish between the various occupational groups and types of education. The answer is a top-down approach to labour market forecasting, which can adequately deal with interaction between different labour market segments and substitution processes between occupational groups and types of education. The opposite is the so-called bottom-up approach, in which partial models of labour market forecasting are used, for example for just a selection of sectors or broad occupational classes, with input from specific (ad hoc) data sources.

The next section presents the top-down approach of the ROA forecasting model. (*) Section 3 discusses the features of the top-down and bottom-up approaches as well as their complementarities. Section 4 concludes the paper.

2. ROA’s labour market forecasting model

Figure 1 gives a schematic review of the labour market forecasting model. (†)

One flow volume important for the demand side of the labour market is expansion demand, which reflects the movement in employment levels in a particular occupational class or for a particular type of education. Forecast of expansion demand are based on employment level forecasts for economic sectors produced by the Netherlands Bureau for Economic Policy Analysis (CPB). Because particular occupational classes within an economic sector grow more rapidly than others, ROA translates these changes in economic sectors into expansion demand per occupational class. Then the implication of predicted growth in various occupational classes for expansion demand for each type of education are determined. Allowance is made at this point for any shifts occurring in the educational structure of occupational classes. Expansion demand per type of education refers to the number of people with a particular educational background that employers would like to be able to employ. The actual change in employment levels per type of educational generally differs with this because changes on the supply side affect relative scarcities and lead to substitution.

(*) Large parts of this section have been published before in, for example, De Grip, Borghans, Smits, 1998.

(†) A comprehensive explanation can be found in Cévers, De Grip and Heijke, 2002. See also Elts et al., 1999, and De Grip, Borghans and Williams, 1995.
Labour market demand consists not only of expansion but also of replacement demand, which arises when workers retire, leave the labour force under an early retirement scheme or because of a disability, withdraw from the labour market temporarily, or switch to another occupation, etc. However, replacement demand only arises if the departure of an employee
actually leads to a vacancy for a new entrant. If the departure of a worker is taken as an opportunity to cut employment levels, no replacement demand results. These flows out of the labour market are irrelevant for newcomers.

Thus, only parts of the flow leaving the market create replacement demand. There is also an important difference between replacement demand per occupational class and per type of education, because occupational mobility has an influence on replacement demand per occupational class, but not on replacement demand per type of education. Switching occupations has no effect on the educational structure of employment. However, when workers complete part-time studies for a higher level or different qualification, this represents an outflow of workers to another educational category (type of education). In these cases, replacement demand does arise in the educational category under which a worker's previous education was counted.

If employment levels rise, expansion demand and replacement demand together compose the job openings for newcomers to the labour market. If they fall, job openings can only arise because of replacement demand.

To be able to show future labour market prospects for newcomers to the labour market, we have to compare job openings for newcomers with the expected supply of newcomers. The latter consists of the future flow of school-leavers entering the labour market and the outflow from post-initial training courses during the forecast period, plus the supply of short-term unemployed persons waiting to enter the market at the start of this period. It is assumed the long-term unemployed, who have been looking for work for longer than a year, no longer constitute serious competition for school-leavers.

Forecasts of the flows of school-leavers entering the labour market match the Referentieramingen (reference forecasts) compiled by the Ministry of Education, Culture and Science for courses in the 'regular' (full-time initial) education system. ROA disaggregates these forecasts by using supplementary data from education matrices of Statistics Netherlands and its own school-leavers information (see the next section). Supplementary data from Statistics Netherlands are also used to estimate the effects of flows from continuous (vocational) education on the educational makeup of the flows entering the labour market.

An indication of future labour market prospects for newcomers to the labour market is calculated, for each type of education, by comparing the expected flows of demand and supply with each other. This indicator shows any expected discrepancy between demand and supply for each type of education. Excess supply does not necessarily imply the group in question,
will automatically become unemployed, or a supply shortfall automatically leads to unfilled vacancies. In practice, school-leavers with a type of education for which supply exceeds demand suffer from a worsening of their position. They are more likely to have to accept work below their level, get less favourable contracts, be paid less and more likely to work part-time involuntarily (Wieling and Borghans, 2001). In such situations, employers normally adjust their demands and recruit people with a higher educational background. On the other hand, if there is a supply shortage, school-leavers will not have to accept a job at a lower level, for lower wages, etc.

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

3. The top-down versus the bottom-up approach

In general, ROA uses national data sources for the forecasting model discussed in the last section. Both use of national data sources and forecasting with a general - as distinct from partial - model, represent the top-down approach by ROA. Use of national data applies especially to changes in employment in various sectors of industry, which ROA takes from the CPB Netherlands Bureau for Economic Policy Analysis, and to flows from education onto the labour market, which are largely taken from forecasts of the Ministry of Education, Culture and Science. By using these, ROA ensures its labour market forecasts are consistent with authoritative forecasts which provide the basis for policy decisions on important social and economic issues in the Netherlands. ROA makes as much use as possible of regular forecasts on future growth of employment and flows from education onto the labour market. This enables ROA to concentrate on developing its own authoritative expertise within the specialised field of the match between education and the labour market.

Another pillar on which labour market forecasting and the information system are built, is the Labour force survey (LFS) of Statistics Netherlands (CBS). The LFS provides information on the number of working people,

(*) See Borghans and Heijke, 1996, and De Grip, Borghans and Smits, 1998, for further explanation.
analysed by economic sector, occupation, training, age, sex and working hours. Information from Statistics Netherlands on the number of students in various types of education is also used. Data are used to estimate the models with which developments in the labour market are forecast. Labour market indicators giving a picture of the employment position linked to the choice of a particular occupation or type of education, are also determined based on these data. These indicators concern alternative employment options, competing types of education, and sensitivity to cyclical variations in employment levels.

Existing statistical data from Statistics Netherlands offer only limited information on specific matching problems in the labour market for newcomers (i.e. school-leavers). ROA has put much effort into developing instruments for monitoring the labour market entry of school-leavers regularly and coherently. ROA is coordinating several extensive surveys on the match between initial education and first destinations of school-leavers on the labour market. (*) These include all flows from secondary and tertiary education onto the labour market, using an integrated model, with measurements taken simultaneously and using one list of key questions. This means that representative information is available on graduates across the full range of full-time education. Information on flows from education to the labour market is used as a valuable supplement to disaggregate forecasts made by the Ministry of Education, Culture and Science.

The upper part of Figure 2 shows the role of data sources in a top-down approach. The figure refers to the use of data sources covering all segments of the labour market, consistent with other important national economic developments, e.g. GDP growth, employment growth, demographic trends which can be consistently differentiated to lower levels of aggregation. These data sources are often available nationally on a regular and coherent basis. This implies data can be used in time series analyses, which is important for forecasting models.

(*) On monitoring school-leavers in the Netherlands is the Cheers study of graduates of higher education in 11 EU countries. On behalf of the Netherlands, ROA participates in the project, which is funded by the European Commission in the framework of the TSER programme.
Figure 2. Use of data sources for labour market forecasting in the top-down and bottom-up approaches

The lower part of Figure 2 points to the bottom-up approach to the use of data sources for labour market forecasting. The various text boxes are different in size and shape. This refers to the features of data sources in the bottom-up approach, which are incompatible with one another and provide partial, often specific but inconsistent and ad hoc information on overlapping labour market segments. Besides, not all data requirements to cover the whole labour market are met, while not all data can be adequately used when sources are too inconsistent with one another. Obviously, it is difficult to integrate data from various sources in one or several consistent and regular data sets. Another disadvantage of the bottom-up approach is using specific data as input for a partial model of the labour market, thereby excluding substitution processes between occupations and types of education.

Nevertheless, partial models of labour market forecasting are useful for a deeper insight into the mechanisms and problems of specific labour market segments, in particular if substitution processes and interactions with other economic sectors are less important (e.g., health care, teachers labour market). Therefore use of partial and ad hoc information may be complementary to the top-down approach. As discussed in Borghans, De Grip and Hoevenberg (1994), partial information of particular labour market segments can be used to differentiate further labour market forecasts.
generated in the top-down approach. Specific expert knowledge can be used to detect valuable partial data sources, or to judge the plausibility of specific labour market forecasts. In particular, for short-term forecasts it may be useful to incorporate, for example, consensus of judgements of sector experts on particular forecasts (see Batchelor, 2001). However, for medium-term forecasts experts may give too much weight to recent developments on the labour market.

ROA has conducted much research for which the bottom-up was a useful complement to the top-down approach. Below are three examples.

For chemists’ assistants in public pharmacies, ROA made forecasts of expected problems (De Grijp and Vlasblom, 1999). The problems relate to this rather protected labour market, because of which labour market shortages can hardly be solved in the short term. It is therefore important to have insight of developments of supply and demand at an early stage. Based on administrative sector-specific data on personnel flows and data on destinations of graduates drawn from the above-mentioned school-leaver surveys, a flow model was used to make a long-term forecast. This forecast was complemented by several sensitivity analyses.

For the Science, Research and Development Directorate of the European Commission, ROA developed a model to analyse whether higher education in Member States provides enough science graduates to meet the demand for R&D personnel up to 2002 (see Marey, De Grijp and Cörvers, 2001). The model largely follows the forecasting model described in the last section. On the demand side, three sectors are distinguished: business, community, public sector, and higher education. The expansion demand per sector per Member State is based on an error correction mechanism that explains the sectoral employment of scientific researchers by sectoral R&D expenses. Data are mostly drawn from Eurostat, although replacement demand is derived from an ad hoc survey of R&D establishments. The model has been used to forecast the supply and demand of scientific researchers by discipline (i.e. natural sciences, technology, agriculture, and medical sciences) for each Member State. To provide for uncertainties about economic growth and technology and education policies, four scenarios up to 2002 were calculated.

For health care, ROA developed a model in which the flow of workers leaving the sector is explained at institute level (Borghans et al., 1998). The model addresses in particular the effects on this outflow resulting from increasing or decreasing employment levels in an institute. The model was estimated from administrative data from the social insurance organisation for health care. From simulations and scenario analyses of the flow model, it i
shown how the sector manages to adapt to changing supply and demand. Although the model does not produce labour market forecasts, it is useful for analysing the impact of future growth and decline (of subsectors) of the health care sector on the flow of workers.

4. Conclusions

ROA uses first a top-down approach for making labour market forecasts. In this approach a general - as distinct from partial - forecasting model for the whole labour market and data from national sources are combined to serve two main functions. The policy function refers to the usefulness of labour market forecasts for policy-makers of government, public employment services and employment agencies, employers' organisations, unions and organisations in education. The information function is primarily intended to assist with vocational and educational guidance. The paper has given a schematic review of the labour market forecasting model used by ROA by discussing three components: expansion demand, replacement demand and the flow of newcomers onto the labour market.

In a top-down approach the data sources cover all segments of the labour market, are consistent with other important national economic developments, e.g. GDP growth, employment growth, demographic trends, and can be consistently differentiated to lower levels of aggregation. These data sources are often available nationally on a regular and coherent basis. In a bottom-up approach the data sources are incompatible with one another and provide partial, often specific but inconsistent and ad hoc information on overlapping labour market segments. Besides, not all data requirements to cover the whole labour market are met, while not all data can be adequately used when sources are too inconsistent with one another.

Nevertheless, partial models of labour market forecasting are useful for a deeper insight into the mechanisms and problems of specific labour market segments, in particular if substitution processes and interactions with other economic sectors are less important (e.g. health care, teachers labour market). Therefore use of partial models and ad hoc information may be complementary to modelling in the top-down approach. ROA has conducted much research for which the bottom-up was a useful complement to the top-down approach.
References


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