Best practices for employment forecasting

Literature survey

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Databases: Google Scholar, SAGE, Science Direct, Taylor & Francis, EBSCO, First (LMS), Springer Link, Wiley Online, Proquest.

Search Terms: Employment forecasting, trend analysis, ratio analysis, nominal group technique, delphi technique, statistical forecasts, computer modelling, business prediction, labour market, time series forecast.

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

Neugart, M., Schömann, K.

This essay argues that experience from more than three decades of labour market forecasting shows that forecasting helps greasing the wheels of labour markets.

2. Forecasting in the labour market

Ramaratnam, R. S., Zhang, K., Whiteford, A.

An assessment of future labour market outcomes is of considerable interest to policy makers and for those making operational decisions with respect to training. These could take the form of forecasts of employment by occupations and skill levels or needs at the national, sectoral or regional level. Often forecasts are make of the demand for labour, both additional and replacement demand, the latter often surpassing the former due to the present demographic composition of the labour force. In order to assess likely future shortages (or surplus) of labour, knowledge of the current supply (not always known with certainty as in the case of seasonal labour) and an understanding of future supply is required, all of which pose considerable challenges. In this paper, an overview of the forecasting needs of the Department of Labour, approaches and methodology likely to be applicable and the required level of accuracy and relevance of forecasts are discussed in relation to national, sectoral, regional and seasonal labour market outcomes. Some preliminary and provisional results are presented as an illustration of likely outcomes. In summary, the total employment level is expected to show an annual average growth of 1.8% from 2005 to 2010, following a higher annual average growth of 2.8% from 2001 to
2005. However, for the Primary and Manufacturing Sectors, the employment is likely to transform to a positive growth at an average rate of 1.0% and 0.3% respectively from 2005 to 2010 after having experienced a decline from 2001 to 2005. However, for the Private and Public sectors services, employment is expected to increase at an average rate of 1.7% and 2.8% respectively from 2005 to 2010 following a higher growth rate of 3.3% and 4.8% respectively from 2001 to 2005. The consequences of a number of variations in GDP growth and employment ratios by industry are explored in terms of occupational forecasts.

3. Forecasting labour markets in OECD countries measuring and tackling mismatches

Neugart, M., 2002, p. 360

This book offers a wide-ranging overview of the state of labour market forecasting in selected OECD countries. Besides presenting forecasting models, the contributions provide an introduction to past experiences of forecasting, highlight the requirements for building appropriate data sets and present the most up-to-date forecasts available. In most cases the forecasts project mismatches in the labour market as they are likely to occur in the coming years with respect to occupational groups, qualifications and employment in specific sectors. The authors demonstrate how these insights might be used to help reduce employment risks both for the individual worker and the national labour market as a whole. The country examples also show how information on labour market trends is disseminated and used by various actors, such as policymakers, firms and individuals. In a world of rapid structural change, the results of the research presented in this book could help cushion the impact of potential shocks from future mismatches and skill shortages in the job market. Policymakers at the supranational, national and regional level, and academics in the fields of labour market theory and policy can all draw valuable information from this insightful study.

4. Forecasting skill requirements at national and company levels

Descy, P., Tessaring, M.


The document reviews recent work on demand and supply forecasts at national level, broken down by sector, occupation and qualification, covering both European and other countries. This includes an assessment of forecasting approaches and results at regional and local levels. A review of the methods used and the results obtained at company level is also presented. Labour market forecasts can be seen as having two prime roles: first to guide policy decisions made by the government and its representatives; and second, as a general aid to the individual actors operating within the labour market, providing them with information which can aid their own decision making. The fact that considerable efforts to conduct such forecast are going on all over the world suggests that, on balance, such activities are regarded as very useful and worth substantial investment by the public sector.

It is concluded, therefore, that forecasting of the labour market is inevitable. The only real question is how this should be done. There appear to be two main possibilities:

a) centrally, in a transparent, logical, consistent and systematic fashion, recognising the 'public good' aspects of such work;
b) or in a decentralised, often ad hoc fashion, by individual actors or groups, frequently based on implicit rather than explicit assumptions.

A number of different approaches have been adopted to anticipate changing skill needs. The traditional approach has usually involved formal, quantitative methods, focusing mainly on occupations. More recently, other, rather less formal methods have been developed which have a strong qualitative emphasis. However, many exercises nowadays involve a mixture of both quantitative and qualitative methods, which are regarded as complementary. Increasingly, the focus is moving away from occupations to consider more general aspects of skill requirements.

5. Labour market forecasting by using data mining

Alsultanny, Y. A.
Procedia Computer Science, 2013, Vol. 18, pp. 1700-1709

Data mining approach was used in this paper to predict labour market needs, by implementing Naïve Bayes Classifiers, Decision Trees, and Decision Rules techniques. Naïve Bayes technique implemented by creating tables of training; the sets of these tables were generated by using four factors that affect employee's continuity in their jobs. The training tables used to predict the classification of other (unclassified) instances, and tabulate the results of conditional and prior probabilities to test unknown instance for classification. The information obtained can classify unknown instances for employment in the labour market. In Decision Tree technique, a model was constructed from a dataset in the form of a tree, created by a process known as splitting on the value of attributes. The Decision Rules, which was constructed from Decision Trees of IF-THEN rules gave the best results, therefore we recommended using this method in predicting labour market. (Science Direct)

6. New neural network methods for forecasting regional employment: an analysis of German labour markets

Patuelli, R., Reggiani, A., Nijkamp, P. & Blien, U.

In this paper, a set of neural network (NN) models is developed to compute short-term forecasts of regional employment patterns in Germany. Neural networks are modern statistical tools based on learning algorithms that are able to process large amounts of data. Neural networks are enjoying increasing interest in several fields because of their effectiveness in handling complex data sets when the functional relationship between dependent and independent variables is not specified explicitly. The present paper compares two NN methodologies. First, it uses NNs to forecast regional employment in both the former West and East Germany. Each model implemented computes single estimates of employment growth rates for each German district, with a 2-year forecasting range. Next, additional forecasts are computed, by combining the NN methodology with shift-share analysis (SSA). Since SSA aims to identify variations observed among the labour districts, its results are used as further explanatory variables in the NN models. The data set used in our experiments consists of a panel of 439 German (NUTS 3) districts. Because of differences in the size and time horizons of the data, the forecasts for West and East Germany are computed separately. The out-of-sample forecasting ability of the models is evaluated by means of several appropriate statistical indicators. (Taylor & Francis)
7. Time series forecasts of the construction labour market in Hong Kong: the Box-Jenkins approach

Wong, J. M. W., Chan, A. P. C., Chiang, Y. H.

Labour resources are invaluable assets in the construction industry. Nurturing a quality workforce and promoting stable employment for construction personnel have often been advocated as part and parcel of an industrial policy. Yet, the future labour market of the industry is always uncertain, and there is a need for estimating future labour market conditions as an aid to policy formulation and implementation. The Box-Jenkins approach has been applied to develop Autoregressive Integrated Moving Average (ARIMA) models to analyse and forecast five key indicators in the construction labour market of Hong Kong: employment level, productivity, unemployment rate, underemployment rate and real wage. This approach can be adopted in more complex and diverse labour markets subject to the properties of the utilized data series. Quarterly time-series statistics over the period 1983–2002 are used in this study. The predictive adequacy of the models derived is evaluated with out-of-sample forecasts in comparison with actual data, based on the mean absolute percentage error (MAPE) and the Theil’s U statistics. The results indicate that except for construction employment, the proposed forecasting models have reasonably good predictive performance. Among the five case studies, the most accurate is the construction real wages model. In addition, we conclude that univariate projection is not an appropriate method for forecasting construction employment in Hong Kong. Multivariate structural forecasting analysis should be adopted in order to obtain more accurate estimates. The developed models can be used to provide benchmark estimates for further analysis of the construction labour market and the projections offer valuable information and early signals to training providers and employment policy makers. (Taylor & Francis)

8. Using the assortment forecasting method to enable sales force involvement in forecasting: A case study

Smáros, J., Hellström, M.

The paper presents how a European pick-and-mix confectionery company has employed a new forecasting approach – assortment forecasting – to reduce significantly time spent on forecasting by working with an entire assortment at a time instead of producing a forecast for each product individually. The implementation of a less time-consuming forecasting method has enabled the company to involve its salespeople in forecasting and in this way gain access to their product and market knowledge. The case company's implementation of the new forecasting method is described and its forecasting accuracy and time spent on forecasting before and after the implementation are measured. The results demonstrate a remarkable increase in forecasting efficiency as well as improved communication within the company. (Emerald)

9. OECD Employment Outlook
OECD's annual report on jobs and employment in OECD countries. Each edition reviews recent trends, policy developments, and prospects. A statistical annex provides data on unemployment rates, incidence of part-time employment, employment/population ratios, and activity rates. Also included are data on expenditure on labour market programmes, average annual wages, and earnings dispersion. Special Chapters examine issues of topical interest. (OECD)

10. Labour force statistics by sex and age: indicators 1960 onwards

This dataset contains annual labour market statistics on standard labour market indicators - labour force participation rates, employment/population ratios and unemployment rates - by sex and by age groups (detailed and standardised). Data are expressed as percentages. (OECD)

11. Statistical Annex

pp. 249-282

These references, which include information on definitions, notes and sources used by member countries, contain longer time series and more detailed data by age group, gender, part-time employment, duration of unemployment, and other series than are shown in this annex, such as, temporary employment, employee job tenure, involuntary part-time employment, distribution of employment by weekly usual hours worked intervals, etc.

Please note that the data on employment, unemployment and the labour force are not necessarily the same as the series used for analyses and forecasting by the OECD Economics Department that are reported in the OECD Economic Outlook and shown in some charts and tables of Chapter 1 of this publication. (OECD)

12. Forecast Evaluation of European Commission Survey

Gayer, C., 2005, p. 27

This study examines the contribution of several survey indicators published by the European Commission to forecasting overall economic activity in the euro area. It entails a quantitative evaluation of the information content of seven composite indicators with regard to GDP growth. A preliminary analysis looks at the stationarity and correlation properties of the variables. Based on bivariate VAR-models and the notion of forecast improvement, the methodological approach is two-fold: In a first step, the focussed relations are studied from an ex post perspective. Employing standard and individual Granger-causality tests, an initial assessment of the mean predictive content of the indicators is provided. (OECD)

13. Labour force participation rate

14. Labour force statistics by sex and age: indicators

15. LFS by sex and age: indicators