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EMPLOYMENT RESEARCH



HSRC

Developing a National Skills Forecasting Tool for South Africa

Annex C: A Critical Review of Sectoral Forecasting and Employment Projections in South Africa

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June 2004

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TABLE OF CONTENTS

CONTENTS	PAGES
1. BACKGROUND	2
2. SECTORAL MACROECONOMIC MODELLING	2
2.1 Econometric models	2
2.1.1 Single equation and partial equilibrium time series analysis	3
2.1.2 Economy-wide econometric modelling	3
2.2 General equilibrium modelling in South Africa	4
2.2.1 First generation SAM based modelling	6
2.2.2 Second generation SAM based models in South Africa	6
2.3 CGE Modelling in South Africa	7
2.4 The use of CGE modelling to forecast labour demand in South Africa	9
3. PREVIOUS WORK ON OCCUPATION FORECASTING	9
3.1 HSRC projections of “work force needs” (1999)	9
3.1.1 How good was the HSRC (1999) forecast?	11
3.2 HSRC (2003)	12
3.2.1 Baseline estimates	12
3.2.2 Sectoral forecasts	13
3.2.3 Demand forecasts	13
3.2.4 Replacement demand	14
3.2.5 Validation of model results	15
3.3 Van Aardt (BMR) Projections (2001)	15
4. CONCLUSION	16
REFERENCES	17
Separate annexes and reports connected to the present document	23

1. BACKGROUND

In Annex A and B, a “top down” methodology for employment forecasting is set out, in which sectoral forecasts are fed down into an occupational model. This Annex documents some of the existing sectoral modelling work already in existence in South Africa and assesses to what extent these models could be used or adapted to meet the specific requirements of the occupational forecasting envisaged.

In addition, this Annex discusses some of the recent work that has been done on employment forecasting in South Africa, namely the work of Whiteford *et al.* (1999), van Aardt (2001) and Woolard *et al.* (2003).

2. SECTORAL MACROECONOMIC MODELLING

A wide variety of economic actors – most obviously private sector firms, government and labour – have a strong need for information about the future macroeconomic environment and the consequences for production and demand in specific sectors or sub-sectors. Consequently, a large number of macroeconomic and sectoral models already exist in South Africa.

The existing South African models can be broadly divided into “econometric” and “general equilibrium” approaches and these are discussed here in turn. “Econometric” modelling is used here to refer to models in which the parameters are estimated using standard econometric techniques. These are typically time series models where data over a reasonably long period are required in order to provide parameter estimates. In “general equilibrium” modelling, on the other hand, the parameters are often obtained by calibrating rather than estimating.

2.1 Econometric models

Econometric models have a much richer tradition in South Africa than general equilibrium modelling (van Seventer, 2003). For ease of exposition, within the rubric “econometric models” it is possible to distinguish (rather artificially) between two approaches, namely partial equilibrium time series analysis and economy-wide modelling.

2.1.1. Single equation and partial equilibrium time series analysis

Partial equilibrium models focus on a particular issue, such as economic growth or investment behaviour or money supply, without worrying much about other aspects of economy-wide adjustment. Based on time series data, past behaviour is analysed and policy conclusions are drawn. For example, Fedderke, Shin & Vaze (2003) investigated the relationship between trade and labour usage in South Africa and found that the “growth of real wage rates are a plausible explanation of the high and sustained levels of unemployment in South African labour markets”. From this, one might conclude that the appropriate policy response to the unemployment crisis would be to deregulate the labour market and abandon minimum wages. These recommendations might, however, impose side effects, which may or may not counter-balance the reduction in unemployment anticipated by the lowering of wages. These general equilibrium feedback effects are typically ignored in partial equilibrium analysis.

This type of analysis remains imperative, however, since it can describe the behaviour of important economic variables, such as pricing, wage setting, import and export behaviour, substitution in production, household consumption and others. Moreover, single equation econometric modelling is very much complementary to general equilibrium analysis in that the estimated parameters of this kind of analysis provide the necessary elasticity's and coefficients needed for successful economy-wide policy modelling.

2.1.2. Economy-wide econometric modelling

Economy-wide econometric modelling entails the comprehensive representation of an economy in which the behavioural relationships are all fully estimated and then often (but not always) re-estimated on a regular basis.

The South African Reserve Bank (SARB) and the National Treasury (NT) both run quarterly models that focus on the aggregate macroeconomic variables without going into much sectoral (industrial) detail. The focus of the SARB's model is on forecasting the typical macroeconomic variables (such as output and productivity) as well as the monetary policy variables that the SARB is obviously most interested in. The Treasury on the other hand focuses on the broad macro variables needed for medium-term fiscal budgeting. While these macroeconomic forecasts are published

regularly, the detailed specifications of the SARB and NT models are not in the public domain.

Some aspects of the SARB macro econometric model have been made public sporadically (e.g. Pretorius & Smal, 1994; Pretorius & Knox, 1995; Pretorius, 1998; Smith & van den Heever, 1995; Smal, 1995 & 1996 and de Jager 1998). Both the SARB and NT models can be summarized as conventional Keynesian demand-oriented model with explicit supply elements (van Seventer, 2003). These supply elements consist of a measure of potential output which, in conjunction with the expenditure-determined actual output, provides an estimate of economy-wide capacity utilization. This also generates an estimate of the potential rate of growth. The latter then serves as a variable supply constraint in the determination of imports, investment, prices and wages. Cyclical movements are captured for a range of macroeconomic variables up to 5 years ahead.

The Bureau for Economic Research (BER) at the University of Stellenbosch has arguably the longest history of econometric forecasting outside of the SARB. Indeed, early versions of the National Treasury model were based loosely on the BER macro model (although the two models have since developed quite separately).

In addition, a range of private sector research companies also maintains large economy-wide models. The best known of these is the Global Insight econometric model, which is used by, *inter alia*, ABSA Bank (ABSA, 2004). The Global Insight macro econometric model is not desegregated to a sectoral level but rather feeds down into a detailed general equilibrium model (discussed in section 2.3 below). This is similar to the methodology used by Monash (as discussed in Appendix B).

2.2 General equilibrium modelling in South Africa

General equilibrium modelling allows one to step away from the traditional “holding everything else constant” (*ceteris paribus*) assumptions that are inherent in partial equilibrium models. By doing so, a general equilibrium model helps to represent a much more real world situation, where almost all critical macroeconomic variables have many interactions and feedback cycles in their determination. This ability to model the second round effects and interrelations between different markets greatly enhances the predictive capability of the forecasts.

Computable General equilibrium (CGE) models are economy-wide models based on a Social Accounting Matrix (SAM). A SAM is “... the presentation of SNA [System of

National accounts] accounts in a matrix which elaborates the linkages between Supply and Use tables and institutional sector accounts” (SNA, 1993). The input-output framework is a widely used matrix framework to provide detailed and coherently arranged information on the flow of goods and services and on the structure of production costs.

Desegregated linkages between the accounts for goods and services, the production and generation of income are further developed in the 1993 SNA’s Supply and Use (SU-) tables, through a specification of output of categories of goods and services by industry. However, those matrices do not incorporate the interrelationships between value added and final expenditures. By extending SU-tables to show the entire circular flow of income at a meso-level, one captures an essential feature of a social accounting matrix (SAM). In many instances SAMs have been applied to an analysis of interrelationships between structural features of an economy and the distribution of income and expenditure among household groups. Evidently, SAMs are closely related to national accounts, in that their typical focus on the role of people in the economy is reflected by, among other things, extra breakdowns of the household sector and a desegregated representation of labour markets e.g., distinguishing various categories of employed persons. On the other hand, SAMs usually encompass somewhat less detailed SU-tables. The design and construction method of SAMs are not standardised according to the SNA, in order to give countries the flexibility to design a SAM according to their specific situations.

Although Input-Output tables are available from Stats SA for selected years going back as far as the early 1970s, the SAM history in South Africa is more recent. SAMs have been compiled on an *ad hoc* basis for South Africa starting with an effort by the former Central Economic Advisory Service (CEAS, 1986) for the year 1978, van Seventer et al (1992), Central Statistical Services (CSS, 1992 & 1993) for the year 1998, van der Merwe & van Seventer (1995) for the year 1993 and WEFA (1997, 1999) for the years 1995 and 1997 respectively.

The most recent offering is a SAM for the year 2000 compiled by Thurlow & van Seventer (2002), which is based on a Supply-Use Table for 1998 and institutional details from the WEFA (1999) SAM for 1997. This SAM incorporates the latest input-output and household income and expenditure available and is tailored to the specific needs of an economy-wide modelling framework.

2.2.1 First generation SAM based modelling

First generation SAM-based modelling attempts to quantify the backward linkages of any impulse or shock to the economy. Such first generation models only focus on demand-side effects and assume that production technologies as well as prices remain constant.

An important assumption of first-generation SAM based modelling is that the production structure remains constant. Thus, this kind of analysis is comparative static by nature and ignores any dynamic effects, such as substitution between production factors (labour and capital) and between domestic and imported intermediates. This kind of SAM-based modelling therefore has relatively modest aims, in that it can answer “what if” type questions while holding all other economic conditions constant.

Like standard input-output analysis, SAM analysis also assumes that there is sufficient capacity available in the backward linkages to satisfy the demand of the stimulus at hand and that prices will therefore remain constant. This may be true for most secondary and tertiary sectors, but not necessarily for primary sectors. For example, it is possible that agriculture or the coal sector will *not* expand their production to meet additional demand for those products that are directly or indirectly related to, say, a public sector infrastructure investment or any other injection into the economy. It is conceivable that those sectors will, for example, divert exports to an expanding domestic market. This can be addressed by imposing supply side constraints on the multipliers (Lewis & Thorbecke, 1992: 887). In a SAM modelling context, the same principle can be expanded to apply to all endogenous variables.

A number of first-generation SAM based modelling applications have been undertaken in the South African context (see for example Dryer & Brand (1986), van Seventer (1987), Wang & Mullins (1988), Roukens de Lange (1989) and McDonald & Punt (2002)). In general, these applications have focused on the economy-wide impact of exogenous shocks, macro-policies and income redistribution.

2.2.2 Second generation SAM based models in South Africa

Although the behavioural specifications in a first-generation SAM based multiplier model emphasize important linkages in the economy, the models are demand driven and are awkward in dealing with issues such as resource allocation, productivity and

price changes and factor utilization. Fixed coefficients mean that substitution possibilities in consumption, production, imports and exports are ignored as well as supply-demand interactions of institutions operating across markets in response to shifts in market signals. Various macroeconomic adjustments or “closure rules” allow for different macro theoretical perspectives or major macro policy levers to be identified as the drivers of the economy. The most contentious one is whether the South African economy is savings or investment driven.

Neoclassical economists would argue that it is *prior saving* that matters for investment. The policy recommendations are then clear-cut: efforts should be focused on maintaining high levels of national saving to finance investment spending. Specifically, fiscal policy should actively promote national saving through cuts in government spending and subsequent increases in government saving while monetary policy should keep real interest rates positive and high to encourage saving through the financial sector

By contrast, Keynesian or Post-Keynesian economists would argue that investment causes saving and thus cuts in government spending and high real interest rates suppress investment output and therefore investment growth. The Keynesian policy prescriptions focus on the incentives to invest and how government policies can create a favourable environment for sustained increases in private investment expenditure and income and therefore savings. A recurrent policy prescription in Keynesian writings is the emphasis on the complementary relationship between public investment and private investment (the so called “crowding-in” effect), and how low real interest rates impact positively on private investment by lowering the cost of capital.

2.3 CGE Modelling in South Africa

There is now a well-established tradition of using CGE models in South Africa. Gelb, Gibson, Taylor and van Seventer (1992) developed the first dynamic one sector computable general equilibrium (CGE) model of the South African economy, based on an aggregate SAM extended with financial variables for the year 1990.

Naudé and Brixen (1993), using a modelling template previously developed at the World Bank, examined the impact of an increase in government expenditure, export demand, world price and a lowering of import tariffs under various sets of “closure rules”.

Tarp & Brixen (1996) took the IMF's financial programming model and the World Bank revised minimum standard model and applied it to the South African economy. With this framework they then investigated exchange rate devaluations, external borrowing by the government and higher international reserves.

Subsequently, several large scale multisectoral CGE models of the South African economy were developed by the Industrial Development Corporation (Coetzee *et al*, 1997), the World Bank/OECD (van der Mensbrugge, 1995) and the Development Bank of Southern Africa (Gibson & van Seventer, 1996a) which resulted in a number of applications such as investigations in trade liberalisation, green trade restrictions, devaluation and government expenditure and restructuring (see for example Cameron 1994, Gibson & van Seventer (1996b, 1997a, 1997b, 2000a, 2000b, Gibson, 2000a).

There are several CGE models currently in use – and regularly maintained – in South Africa. For example, Global Insight maintains a 36 (industrial) sector CGE model, which provides the sectoral detail for their forecasts. (As mentioned previously, they have an economy-wide econometric model that feeds into this CGE). Some of these models are run using GEM (e.g. Global Insight and University of Pretoria) while others use GAMS (e.g. IFPRI/TIPS, World Bank and HSRC).

However, the focus here is on the CGE that is publicly available, namely the IFPRI/TIPS model. James Thurlow at the International Food Policy Research Institute (IFPRI) and Dirk van Seventer at the Trade and Industry Policy Strategies (TIPS) have carefully documented a standardized CGE model for South Africa and the model can be downloaded from the TIPS website (Thurlow and van Seventer, 2002). The IFPRI/TIPS model for the South African economy is an adaptation of the standard IFPRI model described by Lofgren, Harris and Robinson (2001). It is based on a SAM for 1998 which Thurlow compiled using national accounts information and recently released supply-use tables. By updating to a recent year, and by distinguishing between producers and commodities, this SAM is an improvement on the existing SAM databases for South Africa. Furthermore, this SAM is made consistent with the requirements of IFPRI's standard comparative static CGE model.

Given that the CGE model is an attempt to express the flows represented in the South African SAM as a set of simultaneous linear and non-linear equations, the model therefore follows the SAM desegregation of factors, activities, commodities and institutions. The equations describe the behaviour and interactions of these

factors using rules captured by both fixed coefficients and non-linear first-order optimality conditions. Furthermore, the equations ensure that a set of both micro and macroeconomic constraints are satisfied, such that factor and commodity markets, savings and investment, and government and current account balance requirements are met.

2.4 The use of CGE modelling to forecast labour demand in South Africa

In 2003, the Human Sciences Research Council (HSRC) commissioned an international expert, Prof. Robert Davies of the University of Zimbabwe, to extend the dynamic CGE model developed by Thurlow so as to make forecasts of labour demand over the medium term under a range of plausible scenarios. This project is nearing completion and promises to be a useful starting point for the type of multi-sectoral modelling required for this project.

3. PREVIOUS WORK ON OCCUPATION FORECASTING

3.1 HSRC projections of “work force needs” (1999)

In 1999 the Human Sciences Research Council (HSRC) undertook a study of South African labour market trends and workforce needs in respect of formal employment for the period 1998 to 2003 (Whiteford, *et al.* 1999). The study incorporated eight of the nine economic sectors of the South African economy. (The agricultural sector was excluded.) Detailed forecasts of future demand were made at sub-sector level of the 68 professional and 10 artisan occupational categories. From the outset, the authors were aware of some of the limitations of this type of research:

They acknowledged at the outset that “human resources forecasting, better known as ‘manpower forecasting’ has always been and still is a controversial activity. Criticism against forecasting relates to certain labour market analysts beliefs about the need for such efforts, the accuracy with which forecasts can be made, the context within and reasons for which forecasting is done, and the methodology used in the process.” (Whiteford, *et al.* 1999:1)

The 1999 study commenced with a survey of employers. Information was gathered on employers’ views regarding current as well as expected employment, skill shortages and possible changes in future skills needs. This was done by means of

structured questionnaires with key informants in 273 randomly selected companies. An integrated demand-forecasting model for 1998 to 2003 was then developed.

The study examined 36 sub-sectors of the economy and looked at the division of these 36 sub-sectors by 81 different occupational categories and tried to forecast changes to these sub-sectors, and their relative shares of occupations, over a 5-year period. This results in the model making 2916 individual forecasts.¹

Changes in total employment arise from two major contributors: changes in output and changes in labour productivity. Estimates of the change in these two factors and the derived change in total employment in each sub-sector were based on the expectations of persons active in each sector. In the survey, respondents were asked to estimate the change in output and the change in employment within their sector. From this it was possible to calculate the change in employment relative to the change in output or, more technically, the elasticity of labour demand relative to sector growth.

The 1998-2003 study separately looked at the expected future supply of and demand for labour in South Africa but did not go so far as to make a comparison between the two (Whiteford, Van Zyl, Simkins & Hall 1999:124).

On the demand side, the basic forecasting methodology comprised of four phases:

1. Estimation of the total employment in each of the 36 sub-sectors of the economy and the distribution of that employment across 81 occupational categories for 1998.
2. Forecast of the change in total employment in each sub-sector between 1998 and 2003.
3. Forecast of the change in occupational composition in each sub-sector between 1998 and 2003.
4. Distribution of forecast (2003) total employment in each sub-sector across forecasted occupational composition to arrive at occupational employment in each sub-sector.

On the supply side, the future supply of high-level human resources (HLHR) was estimated by obtaining a current estimate of the stock of HLHR through a stock-flow

modelling process and including projections of the future output of institutions of higher learning.

The fact that detailed comparisons of supply and demand were not undertaken reflects the difficulties (both practical and conceptual) that face the analyst in this objective. Only a few of the projections made in other countries have even attempted to do this.

3.1.1 How good was the HSRC (1999) forecast?

A study by Oosthuizen (2003) compares the observed trends in employment growth (based on the October Household Surveys) between 1995 and 1999 with the HSRC projections for 1998 to 2003. The critique by Oosthuizen is premised on the idea that the HSRC projections for the period 1998-2003 can be judged on the historical occupational changes between 1995 and 1999. Given that the two periods barely coincide, it is not immediately apparent why this should be a useful comparison.

Oosthuizen (*ibid*) argues that the HSRC forecasts were much better for highly skilled categories of workers than for unskilled workers. He goes on to say that this can be explained by the (explicit) exclusion of the informal sector from the HSRC modelling exercise. He argues: "with as many as 30 percent of working individuals active in the informal sector, meaningful estimates of labour demand cannot be made without taking this sector into consideration". While recognising that the informal sector is an important part of the South African labour market, there is still considerable value in understanding the dynamics of formal sector occupational growth and change.

Forecasting the size of the informal sector is an extremely difficult task, due in part to the lack of exact and reliable data from which to derive trends, and in part due to its dynamism and unpredictability.

Oosthuizen (*ibid.*) argues that "[d]espite the fact that the projections presented in the HSRC report are relatively accurate when compared to the real figures, there remain some methodological issues that may have resulted in inaccuracies". The main issue that he raises pertains to the use of outdated data. The most recent issue of the Manpower Survey that the authors of the HSRC report had available was for 1994. This was used to obtain the occupational breakdown of employment within each subsector for 1994, and historical trends were then used to estimate changes

¹ 36 sub-sectors x 81 occupations = 2916 estimations

between 1994 and 1998. Oosthuizen argues that this is “a risky procedure when one considers all the economic and other changes impacting employment that occurred during this time.” While this criticism may have some validity, it is important to recognise that *all* modelling efforts face data constraints.

The second methodological problem he raises revolves around the way in which firms were chosen to take part in the employer survey. Companies were randomly chosen from the *McGregors* database of companies. Consequently, none of the smaller, unlisted companies were surveyed. While “It seems highly unlikely that all employers, across the size spectrum, will experience identical trends in employment” (Oosthuizen, 2003), it is not clear how the study could have done better without engaging in a potentially costly and quite risky and difficult attempt to survey smaller companies.

3.2 HSRC (2003)

Woolard, Kneebone & Lee (2003) updated the earlier work by Whiteford *et al.*, focusing on employment forecasts for specific high-skill occupations over the period 2001-2006. They used a labour demand model to estimate the number of new positions that will arise as the result of sectoral growth. (The sectoral growth rates were exogenously specified) and a separate “replacement demand” model used to determine demand arising from retirements, emigration and inter-occupational mobility. They found that even in those occupations where employment levels are expected to decline substantially, there was likely to be a need to train new individuals simply to maintain the existing stock of skills at the required level.

A spreadsheet model was created, following the steps outlined below.

3.2.1 Baseline estimates

The first step was to estimate employment by occupation and sector for 2001. The previous study relied on the *Manpower Survey* to obtain the occupational structure of employment within each sector. Unfortunately, the most recent available *Manpower Survey* is for 1995. Consequently, Woolard *et al.* elected to use the data sets from the *Labour Force Surveys* conducted in February and September 2001. These two surveys were based on independent cross-sections, making it possible to pool the two data sets in order to obtain a reasonable sample size.

3.2.2 Sectoral forecasts

The second step was to obtain sectoral growth forecasts for the period 2001-2006. These sectoral growth rates are important exogenous variables as they play a large role in driving the model. They relied heavily on ABSA's growth predictions for the forecast period (ABSA, 2001). ABSA forecasts the performance of 37 sectors of the South African economy. The approach used is "top down", meaning that the analysis begins at the macroeconomic level. The various components of demand are forecast using a Keynesian demand model with a supply-side element that relies in turn on a variety of international and domestic assumptions. The projections of the components of demand then serve as inputs into an input-output based sectoral model. ABSA's sectoral forecasts are thus grounded on a set of consistent underlying assumptions about the macro environment for the next few years.

3.2.3 Demand forecasts

These sectoral forecasts were then fed through a matrix of elasticity's to obtain the changes in occupational demand within each sector. (As explained above, these elasticity's represent the change in employment relative to output growth.) The change in demand for a particular occupation was obtained by multiplying the sectoral forecasts by the elasticity's and then adding up the occupational demand across all sectors. This then gave an estimate of the increase in the number of positions available for each occupation.

The elasticity's used in the previous study had been estimated through a complex process heavily reliant on the information provided through interviews with companies and industry experts. A repetition of this survey process was beyond the scope and budget of the update, thus the elasticity's obtained in the previous study were assumed to still hold for all sectors, with the important exception of IT.

In the case of IT, however, the authors were of the opinion that domestic and global circumstances had changed sufficiently to require a re-assessment of the elasticity's used in the 1999 study. Interviews were conducted with several of the major IT companies and this information was used to re-calibrate the elasticity's for computer-related professionals. In general, it was found that IT companies were far more cautious in their predictions about the demand for IT professionals than they had been three years ago. IT companies indicated that they did not expect their workforce to grow by more than 1% or 2% per annum over the next five years. In addition, they

indicated that very few “entry-level” positions were being created. If new positions were being created, these were for experienced staff or specialised programmers.

3.2.4 Replacement demand

In addition to this additional (“new”) demand for labour, the authors needed to consider replacement demand arising from retirements, net migration, movement into other occupations and in-service mortality. Indeed, given the relatively low rate of economic growth in South Africa coupled with high mortality, it can be expected that replacement demand will exceed the creation of new positions.

Estimating replacement demand is not straightforward, especially in a country like South Africa where the data on the mortality effects of HIV/AIDS remain uncertain and controversial. To estimate replacement demand one ideally needs the following information:

Data on the age and gender structure of occupational employment;

Data on the rates of outflow due to:

- Retirement (and other reasons for leaving the workforce);
- Emigration;
- Inter-occupational mobility; and
- Mortality.

Information on the age and gender structure is required because many of the flows, especially retirements and mortality, are age and gender specific. Age structures vary significantly by occupation – for example, a higher proportion of managers than IT professionals are likely to be nearing retirement age. Differences in age structure across occupations will clearly influence exits, with more, older people retiring, but more, younger people changing occupations. Age structure also affects mortality – while older people are more likely to die of non-AIDS causes, younger people are more likely to succumb to AIDS.

Because the data for the model were obtained from a household survey, the authors had the distinct advantage of having detailed information about the demographics of

each occupation. This made it possible to estimate specific rates of retirement and mortality for each occupational class.

3.2.5 Validation of model results

The final step was to verify the plausibility of the results by means of interviews with industry experts. It was decided that these interviews needed to be done by the authors of the scarce skills chapters themselves as they had a deep and nuanced understanding of the specific occupational areas.

Where the results of the model were regarded as significantly out of line with the expert views, the authors re-visited the matrix of elasticity's for that occupational group and considered whether it was reasonable to make small adjustments within the industrial sectors that seemed to be most in question. They did not, however, arbitrarily change the elasticity's to manipulate the results to those that the experts expected.

3.3 Van Aardt (BMR) Projections (2001)

In 2001, the European Union, the Department of Labour and the Department of Trade and Industry commissioned Carel van Aardt from the Bureau of Market Research (BMR) at the University of South Africa (UNISA) to investigate key skills shortages and the fast tracking of skills development (van Aardt, 2001). Only skills shortages in engineering, information technology, management and related fields fell within the ambit of the study.

The study used a mixture of qualitative (interviews and workshops), quantitative (questionnaire and demographic analysis) and meta-analytical (secondary data) methodologies.

The data used for the BMR study were obtained from "researchers and institutions that have proved to be providers of reliable statistics or at least of statistics of greatest likelihood. Examples of such providers of reliable data included, *inter alia*, the World Bank group, the International Labour Organization (ILO), the South African Reserve Bank (SARB), the Human Sciences Research Council (HSRC), Statistics South Africa (Stats SA), the Bureau of Market Research (BMR), the Medical Research Council (MRC), the Development Bank of Southern Africa (DBSA) and the Actuarial Association of South Africa" (van Aardt, 2001: 43). The historical data used in the study were taken from these institutions. Stochastic forecasts were then made

using time series techniques (specifically the ARIMA method). Following this, probabilistic methods were used in order to provide a plausible *range* of outcomes. A number of expert interviews and workshops were conducted to validate and supplement the quantitative approach.

4. CONCLUSION

While it is easy to be critical of previous work in this area, it is important to recognise the difficulties faced by researchers, especially concerning the quality of relevant data. Rather than admitting defeat, it is the present authors' view that such problems and difficulties should be the spur for improvement and renewed effort.

The review of macroeconomic and multi-sectoral modelling in South Africa is encouraging, in the sense that it demonstrates the feasibility of carrying out such work in a South African context. In particular, there is a growing tradition of work on CGE models that provide the potential to produce a consistent set of sectoral employment projections, which lie at the heart of most national employment forecasting exercises. These include both private commercial operations (e.g. ABSA/Global Insights) as well as the IFPRI/TIPS model developed by Thurlow *et al.* The latter is in the public domain and is currently being extended so as to make forecasts of labour demand over the medium term under a range of plausible scenarios. Such models provide a useful starting point for the type of multi-sectoral modelling required for this project.

As far as occupational employment projections are concerned, the 1999 study by HSRC demonstrated the general feasibility of producing fairly comprehensive national projections. Subsequent exercises have demonstrated how this might be extended and refined, both with regard to methodology and use of information as well as emphasising the importance of the replacement demand issue. In some respects, the position on data has deteriorated since 1999, but on the other hand a number of important new data sets are now available. These should enable some progress to be made although further improvements in the underlying databases will be an essential part of any longer-term strategy to improve the anticipation of changing skill needs nationwide.

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Separate annexes and reports connected to the present document

Main Report:

Wilson, R. A, I. Woolard and D. Lee (2004). *Developing a National Skills Forecasting Tool for South Africa*. IER/HSRC/Department of Labour.

Separate Annexes:

- A: The Rationale for Conducting National Occupational Projections and how they are Typically Undertaken.
- B: Labour Market Projections: A Review of International Best Practice
- C: A Critical Review of Previous Work on Employment Projections in South Africa.
- D: Data Sources for National Skills Forecasting in South Africa: Strengths and Weaknesses - A Critical Assessment of Data Availability.