

POPULATION, EMPLOYMENT AND LABOUR FORCE PROJECTIONS

In a previous issue of this Commentary (July 1977, Vol.3.No.1) some projections of Scottish population and labour force were made. Required rates of new job creation were evaluated, given a target of 5% unemployment by 1981. This present article updates the earlier study, extending it in two main directions. Firstly, the migration forecasts, rather than spanning a range of possible outcomes, are derived directly from an econometric forecast of the Scottish economy over the next few years. Secondly, the projection period over which the forecasts are made is extended considerably; to 1993 as far as population and labour supply are concerned. The paper is divided into two sections, the first dealing with the methodology underlying the projections, while the second discusses results and implications.

Section 1 Methodology

In forming a forecast of future labour market conditions, three distinct, but not necessarily independent, problems have to be addressed. Firstly, an estimate of the future population size and structure is required. This will be based on past fertility, mortality and migration patterns. Secondly, given this population estimate and extraneous information on labour market participation, a forecast of the number of people willing to supply labour can be made. Thirdly, the future behaviour of the economy, particularly the rate of growth, can be used to indicate the likely demand for labour. Thus, estimates of labour demand and labour supply are formed and the difference between these aggregates will give a crude measure of the excess supply or excess demand for labour.

To a limited extent the market is self-regulatory. When there is an excess supply of labour, workers will have more difficulty in securing employment and the probability of them migrating to seek work elsewhere will rise. This is the main adjustment in the short term between the volume of supply and demand in the labour market and is the principal reason why the three components of the labour market forecast listed above cannot be treated independently. As indicated in the introduction, an attempt has been made in this study to derive migration forecasts from a projection of the Scottish economy. These are used as inputs to the demographic forecasts and will subsequently affect labour supply. Thus, if the demand for labour is low, *ceteris paribus*, migration will be high, and the supply of labour will consequently be reduced. Therefore, unemployment will not be as high as it would have been had there been no migration to move the supply and demand sides of the labour market closer to equilibrium.

Having outlined the approach to the projection to be adopted in this article, let us now consider in some more detail each of the three components of the projection, beginning with the estimation of future population structure.

Population Forecast

The baseline from which the forecasts are made is the Registrar General's estimate of Scottish population by single years of age and sex for 1977. From this base, projections are made for each year up to and including 1993. The fertility and mortality assumptions used in the production of these projections are much the same as those used in the previous article. These are:

- (1) Fertility - Further declines in age specific fertility rates are expected over the forecast period. However, an increase in the numbers of women in the child-bearing age groups should offset this decline and consequently the aggregate number of births should increase during the 1980's, reaching a peak of 76,000 in 1989. This is some 12,000 less than the Registrar General's estimate which is based on higher age specific fertility rates. Although current fertility patterns will have no effect on labour supply until after 1993, they will influence demand for labour in certain sectors, notably education.
- (2) Mortality - As in the previous study, death rates have been held constant, their levels being imputed from 1977 deaths by age statistics produced by the Registrar General. This is a more pessimistic view than that taken by the Registrar General who assumes an average decline of 10% in mortality rates over the next forty years. For this reason, these projections are likely to give a slightly lower overall population figure than do the Registrar General's. However, the difference in assumptions is not sufficient to produce a significant change in labour supply over the projection period.

Labour Demand Forecast

Forecasts of labour demand are made using the Scottish econometric model developed at the Fraser of Allander Institute by David Bell. In generating these, one implicitly assumes that past relationships continue to hold during the forecast period. Thus, the responsiveness of employment to changes in output, say, is assumed not to change when extended into the future. Because one cannot rely on the long-term stability of economic relationships it was felt unwise to extend the forecast period beyond 1984 and it should be borne in mind that greater uncertainty attaches to the forecasts as they approach this date.

Since the Scottish model has been developed as a 'satellite' of the UK economy, in order to derive forecasts one must take a view as to the development of the UK economy over the projection period. The UK forecasts which have been used are shown in Table 1 and are derived from a post-budget view of the UK economy. This entails a considerable reduction in the growth of industrial output during 1980. In fact, the Treasury view that manufacturing output will fall by 2½% next year has been followed.

Table 1 % Rate of Growth - UK Variables

Year	Manufacturing output	Manufacturing wages	Real govt. curr. exp.	Prices	Investment
1979	2.0	14.1	-2.0	9.8	7
1980	-2.5	16.0	-1.0	15.0	3
1981	-1.0	12.0	0	15.0	3
1982	0	11.0	0	12.0	3
1983	0	10.0	0	9.0	3
1984	1.0	9.0	0	9.0	3

Indeed, the outlook over the next five years is quite pessimistic. Judging from their most recent pronouncements this is not a view with which the major UK forecasters would differ. The inevitable result of the stagnation of manufacturing output is slackening of the demand for labour in this sector. Service employment

will grow more slowly than in recent years because of the cuts in government current spending and therefore will be unable to absorb excess labour from manufacturing.

The effect on migration of this development of the economy will be mixed. Because economic conditions in the UK as a whole will be nearly as bad as those in Scotland the incentive to move from Scotland to the rest of the UK will not be as strong as it has been. However, the probability of Scots moving outwith the UK to increase their living standards will remain quite high, though perhaps the relative importance of different destinations will change, with EEC countries becoming more popular than previously.

Taking both migration to the rest of the UK and to the rest of the world the model predicts an average net outward flow of 17,000 per annum over the period 1979-1984. It is this figure which has been input to the population forecast over the period 1979-1984 and the period 1985-1993. The projected net annual emigration is substantially higher than the estimate of 10,000 used in the Registrar General's latest published projections. Other things being equal, this would imply that our forecasts will produce substantially lower labour supply forecasts, given that most migrants are in the economically active age groups. Consequently, the higher level of migration will have the immediate effect of alleviating Scotland's unemployment problem. However, this is partly offset by the reduction in domestic demand resulting from migration.

Labour Supply Forecast

Once a population forecast is formed, labour supply is determined by applying age and sex specific activity rates to the appropriate population cohort. The activity rate is a measure of the proportion of the population willing to participate in the labour market. Those 'willing to participate' are normally termed the civilian labour force and this is made up of employees and employers, the self-employed, the registered unemployed, the so-called 'unregistered unemployed', and those out of work through sickness. These latter two categories comprise those who, for a variety of reasons are not registered as unemployed but nevertheless would be willing to supply labour should the opportunity arise. Surveys such as the population census, the General Household Survey and the EEC Labour Force Survey have consistently shown that these make up a significant proportion of the total unemployed. For instance, consider the labour force in 1975, the last full year for which a full set of statistics is available. The breakdown of the civilian labour force is shown in Table 2.

Table 2 Labour Force in Scotland 1975 ('000s)

	<u>Males</u>	<u>Females</u>
Employed	1219	868
Employers & Self-Employed	109	25
Registered unemployed	77	23
Civilian labour force	1426	926
Unregistered unemployed and Out of Work through Sickness	21	20

Source: *Scottish Abstract of Statistics 1978*
Scottish Economic Bulletin, Autumn 1978

The unregistered unemployed and those out of work through sickness have therefore been estimated to constitute 21% of total male unemployment and 47% of total female unemployment in Scotland. This is broadly in line with the estimates for the UK as a whole (Department of Employment Gazette June 1977 p.588) though some further adjustments should be made to take account of such things as double job holders and students with a part-time or vacation job. In 1975, the unregistered male unemployed were estimated at 5.4% of total male unemployment, while those unemployed through illness made up 22% of total male unemployment in Great Britain. For females the situation is somewhat different, with the unregistered unemployed constituting 30% of the total unemployed and those unemployed through sickness accounting for only 17%. The surveys earlier referred to generally show that a much higher proportion of females than males do not register as unemployed. The explanation for this is that the financial incentives to register are generally lower for females than males.

Clearly the projection of the numbers occurring within these groups whose attachment to the labour force is only peripheral poses numerous problems. In this exercise we have begun from an estimate which appears plausible for 1978. This is more fully explained in the results section.

As far as activity rates themselves are concerned the estimates used in this study have been adjusted to coincide with the 1978 labour force estimate and thereafter have been trended to take account of likely future patterns of labour force participation. For males this trend is downward for all age groups, but particularly so for younger males because of the expected growth in tertiary education. For females the same factor causes a reduction in the activity rate of 16-19 year olds but above this age activity rates are thought to be on an upward trend. This would result from increases in the number of married women entering the labour market, particularly those who have had children. The precise values of the activity rates for males and females which have been trended between 1978 and 1993 are given in Table 3.

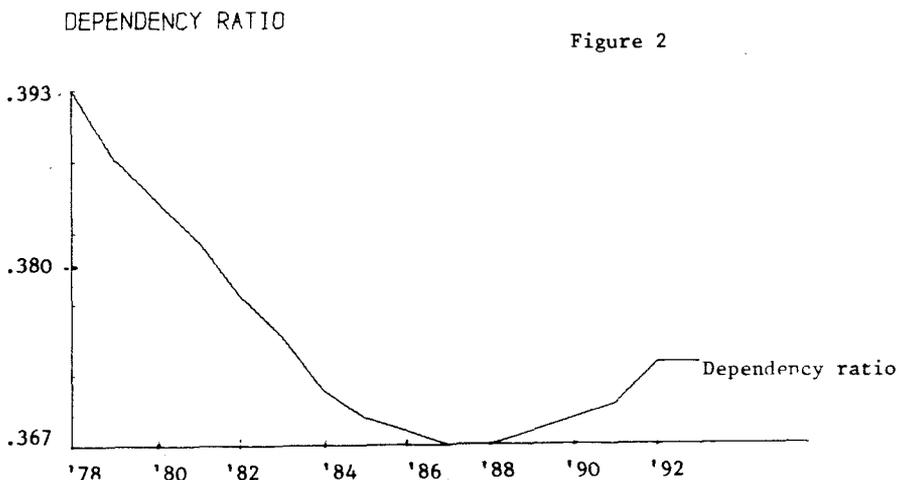
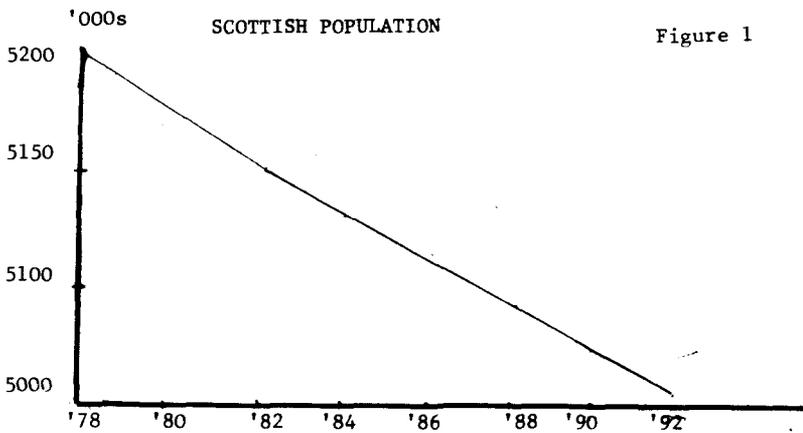
Table 3 Activity Rates Scotland 1978-1993 ('000s)

Age	Males		Females	
	1978	1993	1978	1993
16-19	.627	.606	.584	.572
20-24	.869	.834	.670	.678
25-29	.954	.921	.576	.599
30-34	.967	.934	.536	.556
35-39	.970	.937	.721	.762
40-44	.969	.936	.721	.762
45-49	.965	.931	.721	.776
50-54	.955	.922	.721	.776
55-59	.937	.904	.567	.567
60-64	.840	.810	.299	.313
65-69	.257	.248	.088	.093
70 +	.093	.090	.021	.021

(excluding adult students : activity rates for intermediate years are interpolated between the 1978 and 1993 values)

Section 2 Results and Implications

Given the estimate of 17,000 per annum net migration from Scotland over the period 1979 to 1993 and the fertility and mortality assumptions already discussed, the population profile over this period is as shown in Figure 1. The pattern is one of steady decline, the natural increase in population being insufficient to offset the loss through migration. However, although the overall population can be expected to decline, there will be a considerable shift in the age structure. This is illustrated in Figure 2 which shows the development of the dependency ratio (which is defined as the ratio of those not in the economically active age-groups to the total population). The steady fall in the ratio until 1988 indicates a shift in the age structure, with those in the economically active age-groups becoming more predominant. This shift will be sufficient to offset the decline in population and cause a significant increase in the labour supply as will be shown later.



Consider now the problem of developing a labour supply projection which is consistent with those figures already published for 1978. The figures which are already available are employment and unemployment (though the employment figure is based on a sample survey rather than a full census of employment). Numbers of employers and the self-employed change very little from year to year and it is reasonable to hold them at the levels estimated for 1975. Further, the numbers of unregistered unemployed and those out of work through illness can be expected to bear roughly the same relationship to total unemployment as has been the case in the past, at least as far as males are concerned. For females, there is an argument that an increasing proportion have been registering as unemployed since a larger number are now eligible for the financial benefits which frequently follow registration. To take account of this development the unregistered unemployed have been reduced from 30% to 25% of total unemployed females.

The complete set of estimates for the 1978 labour force are then as shown in Table 4.

Table 4 Labour Supply in Scotland 1978 ('000s)

	Males	Females
Employed	1202	877
Employers & Self-Employed	109	25
Registered unemployed	124	63
Unregistered unemployed and Unable to Work through Illness	33	46
Civilian Labour Force	1468	1011

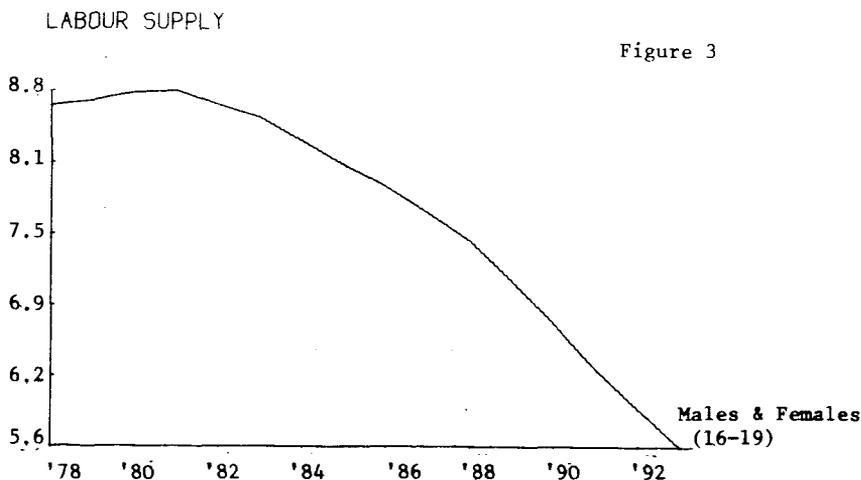
Source: *Department of Employment Gazette, May 1979*

Activity rates shown in Table 3 for 1978 are consistent with these totals and thus the baseline labour supply estimates conform well to recent experience. Further, the rates in Table 3 do not differ markedly from the age specific activity rates used by the Department of Employment to project labour supply in Great Britain, (Department of Employment Gazette, April 1978 p.426). Observed differences between Scottish and GB activity rates in recent years have been very small and tending to decline. Therefore, it is reasonable to expect a close correspondence between these rates in the future.

A number of points concerning the labour supply projections which are shown in Table 5 are worth noting. These are:

- (a) On the assumptions listed above one can expect an increase of 58,000 in the labour supply between 1978 and 1993. This is a somewhat lower projected growth than that expected by the Scottish Office (Scottish Economic Bulletin Autumn 1978 p.31), but this can almost entirely be explained by our higher migration assumption. Nevertheless, when the economy is likely to be stagnating, even a rise of this magnitude has serious implications for unemployment as will be evident from the subsequent discussion. Also, the rise in the labour supply is heavily concentrated in the earlier years of the projection so the problems will arise sooner rather than later. Indeed the projected rise between 1978 and 1988 is 80,000. The labour supply is expected to peak at this point and decline slowly thereafter.

- (b) The growth in the labour force will be concentrated amongst females because, although increasing population in the economically active age groups will cause upward movement in the labour supply of both males and females, the further stimulus of increasing activity rates will only apply to females.
- (c) Labour supply of those aged 16-19 should start to decline after 1982 (see Figure 3) primarily because the increases resulting from the high birth rates of the early sixties will no longer be effective. An important outcome of this change will be some improvement in the problem of finding employment for school leavers, though a general downturn in demand is still likely to affect this group disproportionately severely.



Now, bringing the demand side of the market into the analysis, we can develop a forecast of the extent to which the market will be out of equilibrium. As indicated earlier, the projections of labour demand have been limited to 1984 and the forecasts for the UK variables necessary to drive the model are as shown in Table 1. The forecasts of manufacturing and service employment which are derived from the model are given in Table 5 estimates. The assumption that the number of self-employed and employers remains constant has been made. In view of the stability of these categories in recent years this would seem the most reasonable assumption to make. However, constancy has also been assumed for the numbers employed in the primary sector and the utilities. In view of the recent downward trend in employment in these sectors this assumption may be regarded as over-optimistic.

Table 5 Projected Employment 1979-1984 ('000s)

Year	Males		Females	
	<u>Manufacturing</u>	<u>Services</u>	<u>Manufacturing</u>	<u>Services</u>
1979	405	524	204	681
1980	401	517	203	683
1981	396	511	201	682
1982	389	505	199	686
1983	380	500	197	689
1984	372	494	195	692

A full set of estimates for both sides of the labour market are then shown in Table 6.

Table 6 Labour Demand and Supply 1979-1984 ('000s)

<u>MALES</u>					
<u>Year</u>	<u>Labour supply</u>	<u>Employers & Employees (labour demand)</u>	<u>Supply-demand</u>	<u>Registered unemployed</u>	
1979	1472	1314	158	125	
1980	1476	1303	173	137	
1981	1482	1292	190	150	
1982	1487	1279	208	164	
1983	1495	1265	230	182	
1984	1502	1251	251	198	
					<u>TOTAL Registered Unemployed</u>
					1979 168
					1980 182
					1981 199
					1982 214
					1983 236
					1984 255
<u>FEMALES</u>					
<u>Year</u>	<u>Labour supply</u>	<u>Employers & Employees (labour demand)</u>	<u>Supply-demand</u>	<u>Registered unemployed</u>	
1979	1018	936	82	43	
1980	1021	937	84	45	
1981	1026	934	92	49	
1982	1032	936	96	51	
1983	1039	937	102	54	
1984	1045	938	107	57	

The main conclusions to be drawn from Table 6 are the following:

1. Between 1979 and 1984 we expect registered unemployment to increase by more than 50%
2. The rise in unemployment will be more marked for males than for females. This is because, although labour supply of both sexes is increasing, the model predicts that female employment will remain steady over the period, while that of males will decline.
3. If one includes those not registered and the temporarily sick amongst the unemployed, the estimate for total unemployment in 1984 rises to 358,000.

Obviously, one must hedge a projection such as this with a great many qualifications. It is possible that the present government's approach to the rejuvenation of British industry will succeed, and output will grow more rapidly than the forecasts suggest. However, if it also succeeds in improving Britain's very low levels of productivity, this effect will tend to offset any employment gain from the expansion of output. On the other hand, it may be the case that the estimate of net migration over the projection period, at 17,000, is too high. Certainly this figure is considerably higher than that used by the Registrar General. The effect of too high a migration assumption is to considerably reduce the labour supply (and unemployment) estimate below what it should be. Again, the only justification for the 17,000 migration assumption over the period 1984-1993 is that of the continuation of past trends. Considerable uncertainty must attach to such an assertion.

Nevertheless, whatever reservations one may have with the assumptions underlying the projections, the assertion that Scotland has now a serious unemployment problem

and will continue to have one in the foreseeable future, is undeniable. This article has endeavoured not to take too alarmist a view of the problem. Many commentators, particularly those concerned about the effects of the microprocessor on British industry, have argued that unemployment will be much worse than is being suggested here because the relationships between output and employment will alter radically. Even the Cambridge Growth Project has recently forecast an increase in UK unemployment of 5.6 million by 2000 which would imply around 750,000 unemployed in Scotland.

To conclude, this article has briefly described projections of labour supply and labour demand in Scotland. The most important conclusion of the study is that, over the next few years, labour supply is likely to rise while the demand for labour will probably fall. As a result it is estimated that registered unemployment will rise to 255,000 by 1984. The methodology and assumptions underlying these projections have been described. Some of the qualifications regarding these assumptions have been elucidated. Nevertheless, these are not the only set of assumptions which would give the same unemployment projection, and, at the present time, such an outcome must be accorded a high probability.

The most difficult problem lies not in the projection of the labour market, but rather in the decision as to what course of action should be taken so that the labour market does not follow the course outlined here. The UK has now experienced extremely high levels of unemployment for the last three years but no easy solution to the problem has emerged. It is becoming clear that there are no easy solutions, or at least no easy solutions which a UK government can implement. For instance, faster output growth, which would inevitably tighten the labour market, has not been attained over the past four years and, given the UK's post-war record, it is difficult to believe that it can be accomplished over the next few years. In these circumstances, moves towards a more equitable distribution of the available work would seem to be attractive. However, to maintain international competitiveness, this would have to be achieved without increasing unit costs. For instance, by reducing hours of work, substantial possibilities would exist to expand employment. But firms will only accede willingly to this change if it does not push up their costs. Therefore, wages of the existing employed would have to be reduced in proportion to the reduction in their hours of work. It is doubtful whether the employed would accept such a cut in their real earnings. To the authorities, such a scheme would have the attraction of reducing their liabilities for unemployment benefit (which cost the UK government £635 million in 1977). The savings would allow a small expansion of demand or a reduction in the public sector borrowing requirement. It is probable, such is the inertia of UK economic policy making, that unemployment would have to rise to very high levels before such a radical solution would be contemplated. Unemployment in Scotland may well have to exceed that projected in this article before decisive action is taken to remedy it.