

Comparative Analysis, Forecasts  
and Monitoring of the Northern  
Ireland Economy

*Updated Baseline Forecasts of  
Revised EDF Indicators*

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# 1 Description of the new Regional Forecasts model of the Northern Ireland Economy

Regional forecasts have developed a substantially new model of the Northern Ireland economy for the DETI targets project. This is intended to be used initially for forecasting EDF indicators to provide early warning of any substantial potential deviation from the targets adopted by EDF. The key features of the model of direct relevance to policy makers are:

- Inclusion of forecasts for EDF target variables including such things as inward investment, new company formation, expenditure on R&D and skills levels
- The linking of these ‘policy’ variables to the wider economy

The model is thus capable of answering questions about the impact of potential changes in these ‘policy variables’ on the wider economy. An example might be, for instance, the impact of a higher rate of new company formation on aggregate GVA per head.

The model is very large, and is a substantial addition to the tools available to those responsible for making economic policy in Northern Ireland. It includes over 2,000 variables and equations and covers a much wider set of economic issues than any previous model of the Northern Ireland economy. We believe that it is unique, in that no similar system exists for any other UK region.

The model has been built on the framework of the Northern Ireland section of the existing RF/OEF model of UK regional economies, although the new model is much larger, includes a much more extensive range of variables and has a richer set of inter-relationships between variables.

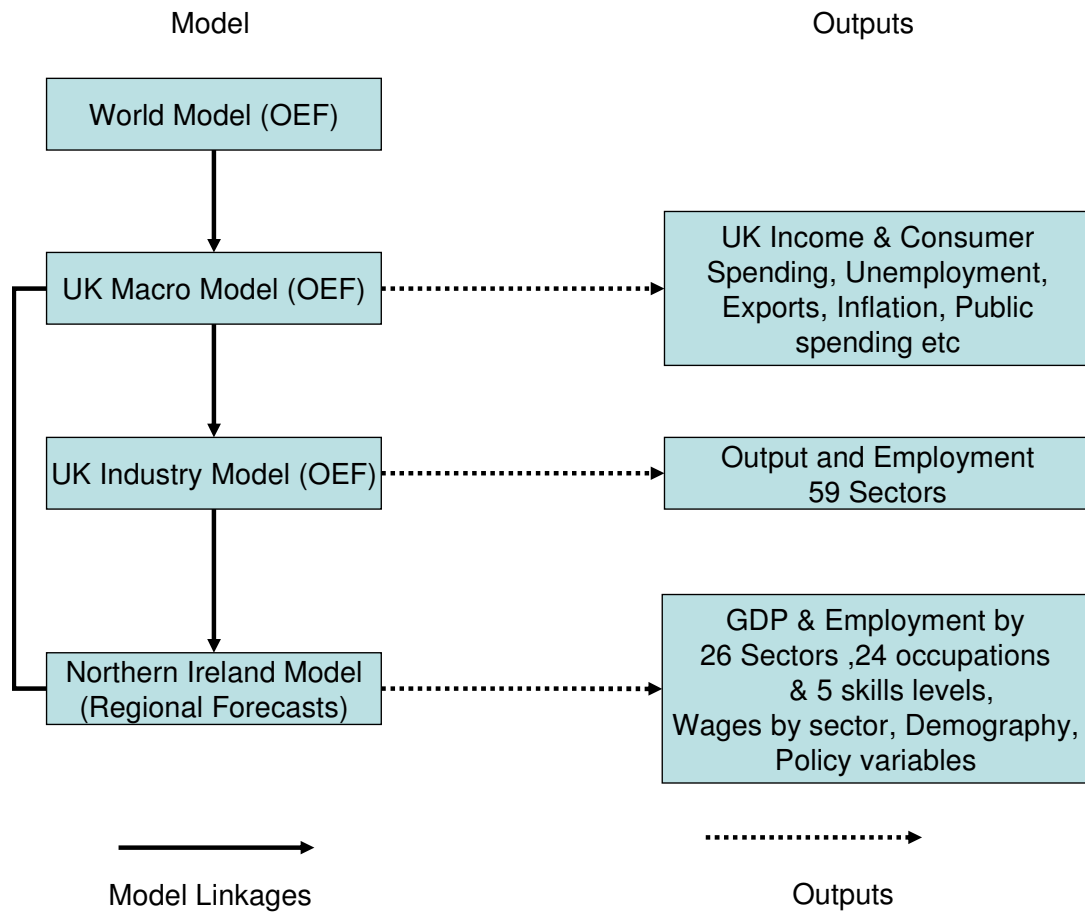
## Links to National Models

Like the regional model the new NI model is closely linked to OEF models of the world and UK economies. These relationships are described in Chart 1.1 below.

The major link between the OEF models and the new NI model is at the level of individual industry output and employment forecasts from OEF’s UK industry model (Chart 1.1). Each of the UK variables becomes an argument in the various regional model equations. The relationship between the MRM and the OEF models is thus not merely a mechanical imposition of constraints; it ensures that the projections are *fully consistent with a coherent macro-economic background*. Further, quantifiable alterations in the UK national or international context can be ‘cascaded down’ through the OEF models to the MRM and their regional implications traced out.

The OEF models are fully articulated econometric systems involving hundreds of variables and equations. These include a wide range of government policy variables, and forecasts are consistent with stated government policy on such things as public expenditure, tax and benefit rates. Interest rates are usually set so as to meet official inflation targets. In the long run, the UK economy is driven by a trend rate of growth, which is currently close to 2.5% per annum.

**Chart 1.1: Modelling Framework**



**The Northern Ireland Model**

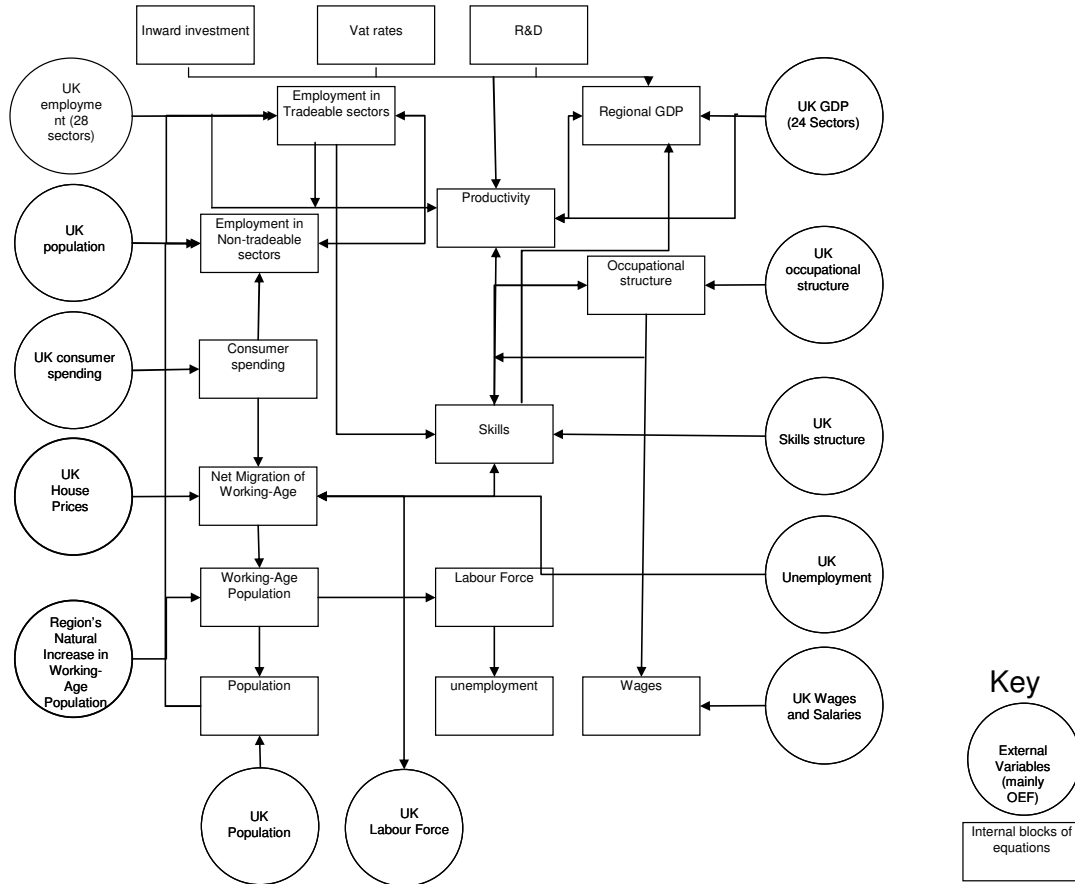
The NI model is a *simultaneous system* with feedback links between labour supply, population growth, employment, output and wages. For instance, wage levels influence output and hence employment. Employment in turn determines unemployment which then affects net migration of working age people and hence population. Since employment and output in most service sectors are dependent either directly on population, or indirectly via consumers spending, a simultaneous loop is completed via the link between population and output and employment.

In a national economic model, labour market conditions, and especially unemployment, would be expected to influence wage rates to complete another feedback loop. However in the Northern Ireland case there is little evidence that falling unemployment has increased wages. Indeed, the converse has occurred. As unemployment has converged on the GB average, wage levels have diverged. This may be due to diverging skills levels, but research remains to be done to demonstrate

this. As a result the wage equations in the Northern Ireland model do not include direct links to unemployment. Instead they are determined by extrapolating well established trends relative to national wage levels in each sector, with an additional term for relative skills levels.

Chart 1.2 sketches the various modules of the model.

**Chart 1.2: Modules of the New Northern Ireland Forecast Model**



### Output and Employment

Output and employment are projected at a detailed level of industrial disaggregation (26 sectors). Employment is also projected for 24 separate occupations, and 5 separate skills levels. In each case the equations for Northern Ireland include a term for the equivalent variable at national, UK, level. In this way, national monetary and fiscal influences, as well as fluctuations in national and international demand, influence the projections for the Northern Ireland economy.

Most detailed attention has been given to those sectors in which Northern Ireland has most export potential. These are manufacturing, including food production with its links to agriculture, and financial and business services. In the case of manufacturing, the system begins by calculating the expected change of GVA in manufacturing based on national rates of growth for each separate manufacturing sub-sector. The ratio of

actual change in GVA relative to the expected change is then modelled by an equation including the following policy-relevant terms and other influences:

- Inward investment
- New company formation
- Business expenditure on R&D
- Skills levels (level 0 and level 4/5)
- Wage levels
- Capacity utilisation in GB

In each case, the variables in the above list are expressed relative the national, UK, average. Employment in manufacturing is obtained through dividing GVA by productivity, measured as GVA per employee. Productivity, in turn, is estimated using a separate equation. This incorporates some of the same variables from the manufacturing output equation. For example, we assume that new inward investment projects have a higher productivity than that in existing firms, firstly because they embody new equipment and technology, and secondly because they are usually foreign-owned and foreign-owned companies in the UK typically have higher productivity than domestically owned companies. Inward investment thus increases productivity as well as output. The result is that output rises faster than employment when new inward investment is present. Similarly, we expect product innovation as a result of R&D to raise the average value of GVA by proportionately more than it raises employment.

In other sectors it is employment that is determined first, with output (GVA) subsequently calculated using a productivity relationship. This is done because employment data is more up to date and for many service sectors is felt to be more timely than the GVA series. In the case of business services, Northern Ireland's share of UK employment in the same sector is determined by the following variables:

- Inward investment
- New company formation
- Skills levels (level 0 and level 4/5)
- Wage levels
- Local demand (total employment used as an indicator)

Again, each of these variables is measured relative to the national average. In practice, skills levels in this sector are much the same in Northern Ireland as in GB and the relative variable has little influence and is omitted. It can however be included for policy simulation purposes. For employment in financial services, only the local demand and inward investment variables are included. New firm formation is negligible in this sector and is not included.

In other service sectors Northern Ireland employment is determined by trends relative to national employment in the same sector adjusted for the level of demand in Northern Ireland relative to the UK. For production sectors, other than manufacturing, employment is determined using estimated trends in Northern Ireland's share of UK employment. Similarly, productivity in these sectors is determined through extrapolating trends in past productivity relative to the UK average in the same sector.

The number of self-employed in each individual sector is projected as a multiple of the number of employed people in the same sector. The multiple in each case is the ratio of self-employed to the employed in the latest year. If there is any systematic trend in the ratio, this is reflected in the projected figures.

### **Employment by Occupation**

Employment is projected for 24 separate occupation groups. Projections prepared by the University of Warwick Institute for Employment Research (IER) are used to calculate shares for each occupation within each sector. These are then applied to projected employment totals for each Northern Ireland sector to obtain projected total numbers in each occupation. There is no facility in the model at present for these occupation *shares* to change, but occupation *numbers* alter each time the sectoral employment forecasts are changed.

### **Employment by Skill Level**

Two separate projections are included in the model. One is for the demand for skills, and the other is the supply of skills both among the employed and the working-age population as a whole. In each case the official classification of skills is used ranging from level 0 (no qualifications) to level 4/5 (graduate and postgraduate qualifications or equivalent). The demand for skills is projected in two stages:

1. the fixed (2001) proportion of each skills level in each occupation group within each sector is applied to the employment forecasts by sector and occupation
2. the projections obtained in stage 1 are adjusted by the extrapolated trend in the ratio of the actual to the expected (i.e. stage 1) proportions for each skills levels.

The supply of skills is measured as the proportion of each skill level among the working-age population as a whole. This is projected as a trend relative to the same proportion in the UK as a whole. There is currently no link in the model between the supply and demand for skills, and only the skill structure of the employed population influences changes in output or employment. The skills of the inactive population currently play no role in determining output or employment forecasts. However the model could be adjusted so that pools of unemployed or inactive people with skills could influence inward investment into Northern Ireland.

### **Exports**

Manufacturing exports are projected for the UK as a whole in the OEF UK Macro Model based on trends in international demand, exchange rates, and UK capacity utilisation. For Northern Ireland, exports in manufacturing as a whole are firstly expressed as a ratio to GVA. The trend in this ratio, relative to the same ratio at national level, is then projected forwards. Actual manufacturing exports are then calculated on the basis of this ratio multiplied by UK exports and the ratio of NI manufacturing output to UK manufacturing output. A similar procedure is followed

for individual manufacturing sectors. These are then scaled to the total of manufacturing exports.

Current OEF forecasts for UK exports predict double digit growth for several years as the level of world demand revives. This leads to a significant rise in the share of exports in UK manufacturing output, and we expect this to be reflected within Northern Ireland manufacturing.

## **Demography and Unemployment**

Population is simultaneously determined within the model alongside all of the other variables. The only exogenous input is the natural increase in population, by the Registrar General's Office. Net migration of working age is forecast from an econometrically estimated equation with the following terms:

- unemployment rate in Northern Ireland
- change in number unemployed in UK
- employment rate in UK
- ratio of UK house prices to UK wages

The projected number of migrants is added to the natural increase to obtain the projected population of working age. For the total population, net migration is estimated as working-age migration plus 10%. This is then added to the natural increase for the whole population.

The economically active population is forecast as 76% of the working-age population. The number of unemployed is simply the difference between the number of economically active people and the number of employed and self-employed.

## **Policy Variables**

The model includes a number of variables for economic activities that are assisted by government in Northern Ireland and hence directly amenable to influence by government policy. These include:

- jobs promoted and created through new inward investment in manufacturing and services separately
- jobs created through the creation of new companies in manufacturing and in financial and business services
- business expenditure on R&D in manufacturing and business services

Each of these variables has a series of equations. These project the variable and link it to the wider economy through its influence on manufacturing output and productivity and business services employment. Coefficients for these equations are either obtained from the economics literature or through estimation from historical data.

For inward investment, the number of jobs promoted in manufacturing and services is projected through an equation on UK business investment growth. These firms are assumed to create 76% of the promoted jobs spread over the three years following the

year of grant offer. The productivity of the new firms in manufacturing is estimated to be twice that of existing manufacturing firms in Northern Ireland.

For new company formation the number of new firms is forecast through projecting the trend in the NI formation rate relative to the UK rate. The change in the stock of firms is then calculated as the previous stock plus new firms less closures. The closure rate is taken as the average over the period 1994-2002. To express the change relative to the UK average, an expected change in the stock of firms is calculated. This is the previous year's stock multiplied by the growth rate of the UK stock. The surplus (or deficit) of new firms in Northern Ireland is the difference between the projected change in the stock of firms and the expected change. Each firm is estimated to have 5 employees, a figure based on past research undertaken at NIERC.

Business investment per employee in R&D in Northern Ireland is projected as a share of UK business investment per employee in R&D. The impact of this investment on output and productivity is estimated by an equation using coefficients based on the extensive economic literature on the impact of R&D investment.

## **Addendum      *Derivation of Equations for Manufacturing Output, Productivity and Employment***

From the point of view of policy simulations, the key equations in the model are those that link the major ‘drivers’ of competitiveness to the main ‘export’ or ‘tradable’ sectors. These drivers are:

- Inward investment in manufacturing and tradable services
- New company formation in manufacturing and tradable services
- Business investment in R&D in manufacturing and tradable services
- Skills levels among employees in manufacturing and tradable services

The equations in question are those for GVA, employment and productivity for manufacturing and its 14 sub-sectors, and for financial services and business services. In practice only two of the three equations need to be estimated for each sector, since the third can be obtained through identities. In this model we construct equations for output and productivity. Projections for employment are obtained through dividing output by productivity. In this note the equations for manufacturing are described in depth. The equations for financial and business services are similar, although simpler in structure.

In each case the equations are constructed through a process of trial and error using imposed coefficients obtained from reviews of the relevant literature. This process is used in place of econometric estimation because the data is often not precise for individual years even though it is likely to be reasonably accurate over a run of years. Annual econometric estimation is likely to mis-specify relationships under these conditions, although further research would be valuable to investigate such relationships. Our view is that further detailed research is needed on these relationships. The results outlined below are our best estimates given the time available, but further work should improve them.

### ***GVA in Manufacturing***

One key equation is for manufacturing output measured as real GVA. Although we have a series for real gross output (the index of manufacturing output) that is forecast elsewhere in the model, GVA is the measure used here for the following reasons:

- The measure is available for all 14 manufacturing sub-sectors used in the model
- It is consistent with measures used for all other sectors in the model
- GVA is closer to a measure of the value to the region obtained from production and is not distorted by issues of bought-in components (which can change output without much change in employment)

The equation for real GVA in manufacturing is obtained as follows:

$$qqmf = \sum(zqmf_d_i) * zqmf$$

Where;

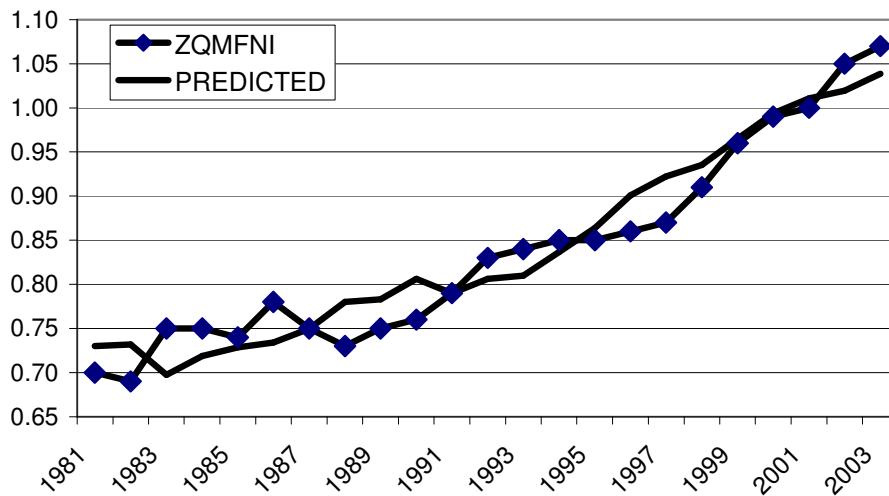
qqmf = real GVA in (total) manufacturing

$zqmf_{d_i}$  = 'expected' real GVA defined as real GVA in individual manufacturing sub-sectors  $d_a - d_n$  in 2001 projected as growing at the UK rate for the same sector

$zqmf$  = is the ratio of actual to 'expected' real GVA in manufacturing. This is determined as  $f(d_1, d_2, \dots, d_n)$  where  $d_1 \dots d_n$  are competitiveness drivers and other influences on the ratio of actual GVA to the sum of the projected GVA in manufacturing sub-sectors

The equation  $zqmf=f(d_1 \dots d_n)$  is thus an equation for the actual GVA in manufacturing as a whole divided by 'expected' GVA, where the latter is the sum of GVA in manufacturing sub-sectors projected to grow at UK rates for the same sub-sector. These UK sub-sector growth rates are obtained from the OEF UK Industry Model forecasts for the most recent forecast run (currently Spring 2005). The ratio  $zqmf$  is shown in the chart below for the period 1971-2003. (Real GVA is actual GVA deflated by UK GVA deflators in each manufacturing sub-sector. For the period 2002-3 real GVA is assumed to grow at the same rate as the Index of Manufacturing Production).

**Chart 1.3: ZQMF, predicted and actual 1981 - 2003**



The arguments  $d_1, d_2, \dots, d_n$  in this equation include each of the four drivers listed above and three other variables. The full list of variables is thus:

- Inward investment in manufacturing
- New company formation in manufacturing
- Business investment in R&D in manufacturing
- Skills levels among employees in manufacturing (specifically this includes the proportion of employees in NI manufacturing with no qualifications relative to the proportion in Great Britain, and the same for the proportion with higher qualifications i.e. levels 4/5)
- Wages in manufacturing relative to the UK average level in manufacturing
- A measure of labour shortage in the UK (the employment rate in excess of 74%)
- A dummy variable for the availability of standard capital grant in NI (1981-88=1.0, subsequent years = 0.0).

### **Inward Investment in manufacturing**

The data in the model begins with IDB and InvestNI data for the number of jobs promoted in new manufacturing companies each year from 1981-2004. Because created jobs are usually less than promoted (i.e. promised) jobs we have created a series for created jobs. This includes data for actual created jobs where it is available (e.g. from 1995-99). For other years we have created a series using the observed average that in-moving firms create 76% of promoted jobs. We have also assumed that these jobs are created evenly over a three year period following the year of the letter of offer. These created jobs are then cumulated from 1984 and expressed as a percentage of total employment in NI manufacturing. This gives an estimate of the cumulative contribution of new inward investment firms to employment in NI manufacturing. To convert this to an estimate of the contribution to GVA we need an estimate of average productivity in inward investing firms. In the absence of any data on this as yet, we have made an assumption. This is based on :

- Census of production and ABI data showing that foreign owned firms have levels of GVA well above the GB and NI averages
- The expectation that new investment will be more productive than older depreciated investment in existing firms
- Opinions from IDB that post cease-fire firms coming into NI had higher productivity than pre-cess-fire firms.

Using the assumption that inward investing firms will have above average levels of GVA per employee, and that this will have accelerated after 1995, we experimented with different levels in order to fit an equation to observed values of the ratio of actual to 'expected' real GVA. A reasonable fit was obtained with assumptions that GVA per employee was 20% above the NI manufacturing average prior to 1996 and 100% higher from 1996 onwards. If actual data becomes available, we will revise these estimates.

### **New Company Formation**

Since our dependent variable is a ratio of actual to expected GVA in manufacturing, we are concerned with the surplus or deficit of output produced by new manufacturing firms relative to similar firms in GB. (The same is also true for inward investment but in this case we have ignored inward investment into GB since it is a small proportion of all manufacturing.)

To estimate this surplus/deficit we have calculated a difference between the actual change in the stock of new manufacturing firms and an 'expected' change. The latter is calculated as the number of new firms in NI if the stock grows or declines at the UK average rate. This difference gives an excess of around 100 new firms each year. Based on NIERC research we have assumed that each of these new firms employs 5 people. The aggregate employment in these firms is cumulated from 1981 and expressed as a proportion of total manufacturing employment in NI.

This provides an estimate of the contribution made to manufacturing employment by the excess of new firms created in NI over and above the number that would have been created at UK average rates of change. To make a similar estimate of the contribution to GVA we need an assumption of the average GVA per employee in these firms. Since we know that young and small firms usually have a below average productivity we have adopted this assumption here. Our assumption is that GVA per employee is 75% of the NI average for manufacturing. Different assumptions below 100% (and above, say, 50%) would not make a large difference to our overall results. These figures are then used in the equation for the ratio of actual to expected manufacturing GVA with a coefficient of unity.

Projections of the contribution of new firms to GVA are done in slightly different way although the coefficient remains the same. For the projections the starting point is a projected level of the share of NI in the UK total of new manufacturing firms. This has been set equal to the average share over the period 1994-2002. This share is then multiplied by the forecast for the number of new manufacturing firms in the UK as a whole. The latter is projected forward on its past (falling) trend in the number of new

firms per thousand employees in manufacturing. We have continued the downward trend of 2001-2. This gives a slower downward trend than using a trend fitted over the longer 1994-2002 period. With further research it would be possible to refine these UK projections based on research by Robson, but at this stage in the model development it has not been considered worth undertaking the additional work.

### **Business Investment In R&D (BERD)**

The equation for the ratio of actual to expected GVA in manufacturing uses the ratio of BERD per employee in NI manufacturing to BERD per employee in UK manufacturing. We have three observations for this ratio. These are for 1999, 2001 and 2003. The values are 42%, 55% and 32%. For both data and projection purposes we have assumed a fixed value of 42%. UK BERD per employee is projected to rise on a path following its past trend, and BERD in NI is set at 42% of this level.

Our review of research on the relationship between BERD and GVA indicates that a reasonable estimate is that a given percentage increase in expenditure on R&D has an impact on GVA of 7% as large (Griffith, 2000). Due to the way in which the equation is structured this translates into a coefficient of 0.14.

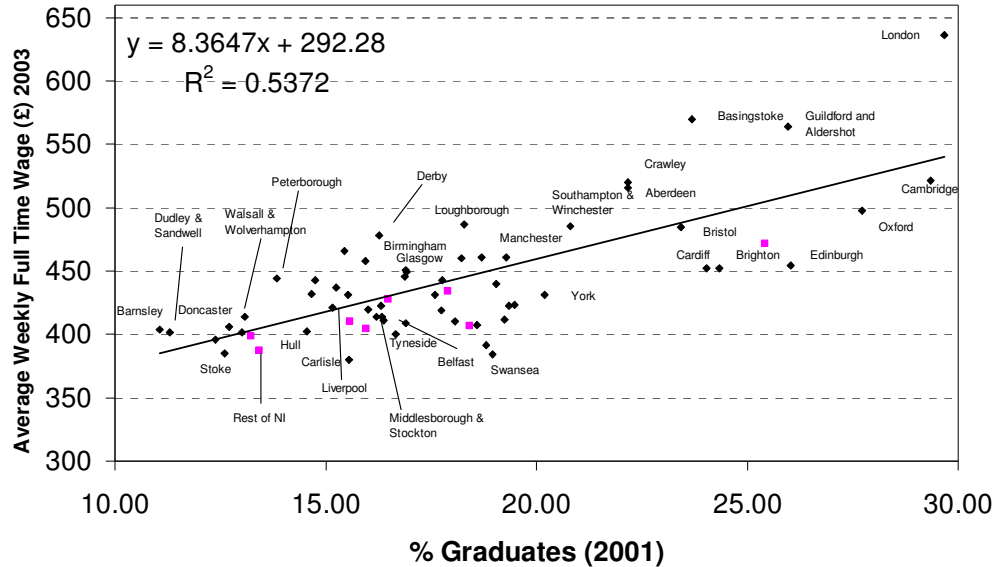
### **Skills Levels**

Until recently it has been difficult to find compelling evidence of a clear link between levels of educational attainment and GVA. Although a large number of studies were able to show that attainment and GVA were correlated across developed and less developed countries, it was difficult to show that increases in attainment levels among developed economies alone made any difference. This counter-intuitive view has been changed due to a remarkable recent Canadian study (Coulombe et al., 2004), and also in light of our own research on the relationship between wages and proportions of graduates across the UK.

This evidence shows:

1. That increases in average literacy attainment across developed countries leads to a large increase in GVA. A 1% increase in the average score on international literacy tests leads to an increase in long-term GVA levels of 2.5%. This is of considerable interest since the NI score in the 1996 international literacy study was 4% below GB, and on the Canadian study's evidence this would be consistent with a level of GVA per head 10% lower than GB. It would thus account for most of the gap between NI and GB.
2. The relationship between the proportion of graduates among employees in local labour markets across the UK is quite strongly related to average wage levels (and hence to GVA since incomes comprise 70% of GVA). The chart below shows that a 10 percentage point increase in the graduate proportion is associated with an increase in average wages of 17-23%.

**Chart 1.4: Graduate/Earnings Relationship in UK Travel To Work Areas and UK Regions**



Source: New Earnings Survey, Census 2001

Although the model includes forecasts for all five skills levels on the scale 0-4/5 we have chosen to link only the highest and lowest levels to our forecast for GVA in manufacturing. The proportion of people in manufacturing with level 4/5 skills is obtained from the 2001 census, with annual changes from the LFS. The growing GB proportion is assumed to continue to grow on trend, and in the base forecast the NI level is fixed at the 2001 level of 83% of the GB level.

Similarly, data on the proportion of employees in manufacturing with no qualifications is drawn from the same sources. The 30% higher proportion in NI relative to GB in 2001 is assumed to continue indefinitely in our base forecast.

Because we lack reliable data to indicate whether the skills gaps between NI and GB have been widening or narrowing we have assumed that in the past they have been stationary. The impact of these variables is thus constant in the equation fitting process. The assumption of stationarity is also used in the base forecast, but the model is set up to enable alternative assumptions to be used in simulations of alternative skills outcomes.

The coefficient linking the percentage of people with skills level 4/5 (i.e. graduates and post-graduates) to levels of actual/expected GVA is taken from the chart above. The 2001 percentage for level 4/5 skills in NI manufacturing was 15.8% compared with a GB average of 19.1% giving a ratio of 0.83. An increase in the NI percentage to the GB average i.e. 17 percentage points, would raise average wages by 7%. We have assumed that GVA would rise proportionately. The coefficient in the equation is thus 0.41 (=7/17).

We have also assumed here that this influence is independent of other factors included in the equation. In practice, this is unlikely to be the case. Factors such as BERD per employee and the sectoral composition of manufacturing are also likely to change as

the skills profile changes. Hence, the effect included here should be interpreted as the impact of a change in the graduate proportion holding other factors constant.

To calculate the coefficient on the 'no qualifications' variable, we have used the relationship between skills levels and literacy scores given in table 2 of the NISRA summary report 'Adult Literacy in NI (1998) using data from the 1996 International Adult Literacy Survey. Literacy scores for each skills level in NI were weighted by the proportion of people at each skills level in NI manufacturing in 2001, using census data. The calculated literacy score for NI manufacturing on the 1-5 scale was 2.37, and this was 96.6% of the GB score of 2.45. Results from the Canadian study suggest that this difference would depress GVA per person by 8.3% ( $=3.3 \times 2.5$ ) below the GB level.

We have used this data to calculate the impact on GVA per person of reducing the proportion of NI employees with no qualifications from the 2001 level of 34.5% to the GB average of 26.2 in 2001. We have further assumed that half of this change leads to rise in level 1 qualifications and the other half to a rise in level 2 qualifications. These changes would raise average literacy scores to close to the UK average. On the Canadian evidence this would be associated with a rise in GVA per head of around 8%.

In practice, a change of this size could take a long time to achieve through educational or training reforms. It could happen more quickly through closures of low productivity firms, in for instance clothing production, but if production were replaced by firms using higher qualified labour. It is not obvious that such a large impact could be achieved solely by up-skilling workers in existing plants. The effect discovered in the Canadian study is based on cross country comparisons, and higher levels of GVA per head associated with higher literacy may have evolved slowly and may have involved structural changes including the decline in agriculture. We have thus assumed that the impact of education/training alone might be half of that described above. In this case a reduction in the NI proportion of employees with no qualifications to the GB average level would raise GVS per head by 4%. In the equation this requires a coefficient of  $0.14 (=0.04/0.30)$ .

### **Wage Levels**

Wages are measured as wages per employee using regional accounts data. The ratio of NI to UK wages in manufacturing has been falling for many years, and in the base forecast the ratio is projected to continue on its trend of recent years. We have taken a conventional elasticity of -0.5 for the relationship between output (GVA) and wages. Hence a decline in the ratio of NI wages to GB wages of 1% results in a rise of 0.5% in the ratio of actual to expected GVA in NI.

### **Labour Shortages in GB**

It is noticeable that during periods of labour shortage in major parts of GB, the NI ratio of actual to 'expected' real GVA rises sharply. This happened at the end of the 1980's and the end of the 1990's. In both cases the rise has been subsequently maintained. In the late 1980's labour shortages disappeared rapidly in GB, but a contemporaneous fall in relative wages may have allowed NI firms to maintain their earlier gains. Since the late 1990's high employment rates in GB have been maintained, and the rapid gains in NI's real GVA have been retained. The equation

includes a term for the UK employment rate less 74%. This term influences the real GVA ratio with a coefficient of 0.3.

### Standard Capital Grant

The ratio of real GVA to ‘expected’ real GVA was higher prior to the abolition of Standard Capital Grant in 1989. We have included a dummy variable set as equal to 1.0 for the period prior to 1989 and zero there-after. This is included in the equation for the real GVA ratio with a coefficient of 0.03, implying that SCG raised the ratio by 3%.

### The Full Equation

$$\begin{aligned} ZQMFNI = & 0.48 + 0.01 * (ERUK,UK - 74.0) \\ & - 0.5 * ((WSEMFNI(-1) / WSEMFUK,UK(-1)) - 0.9) \\ & + ((0.001 * IICUMMFNI) / ETMFNI(-1)) \\ & + 0.03 * DUMSCG \\ & + 0.01 * (0.75 * CUMBSMFEE / ETMFNI(-1)) \\ & + 0.14 * ((BERDMFNI / ETMFNI(-1)) / (BERDMFUK,UK / ETMFUK,UK(-1))) \\ & + 0.14 * (1.30 - EMFPCL0NI / EMFPCL0GB,GB) \\ & + 0.41 * ((EMFPCL4NI / EMFPCL4GB,GB) - 0.83) \end{aligned}$$

Where;

|           |   |
|-----------|---|
| ZQMFNI    | Total Actual MF/Expected MF in subsectors                     |
| ERUK      | UK Employment rate  |
| WSEMFNI   | Wages and Salaries in Northern Ireland manufacturing          |
| WSEMFUK   | Wages and Salaries in UK manufacturing                        |
| IICUMMFNI | Inward investment – Cumulative manufacturing jobs created     |
| ETMFNI    | Total manufacturing employment in Northern Ireland            |
| ETMFUK    | Total manufacturing employment in UK                          |
| DUMSCG    | Dummy variable  |
| CUMBSMFEE | Cumulative employment MF - excess VAT stock change            |
| BERDMFNI  | Manufacturing Business Expenditure on R&D in Northern Ireland |
| BERDMFUK  | Manufacturing Business Expenditure on R&D in the UK           |
| EMFPCL0NI | Manufacturing Employment - Qualification level 0 (%) NI       |
| EMFPCL0GB | Manufacturing Employment - Qualification level 0 (%) GB       |
| EMFPCL4NI | Manufacturing Employment - Qualification level 4 (%) NI       |
| EMFPCL4GB | Manufacturing Employment - Qualification level 4 (%) GB       |

### GVA per Employee in Manufacturing

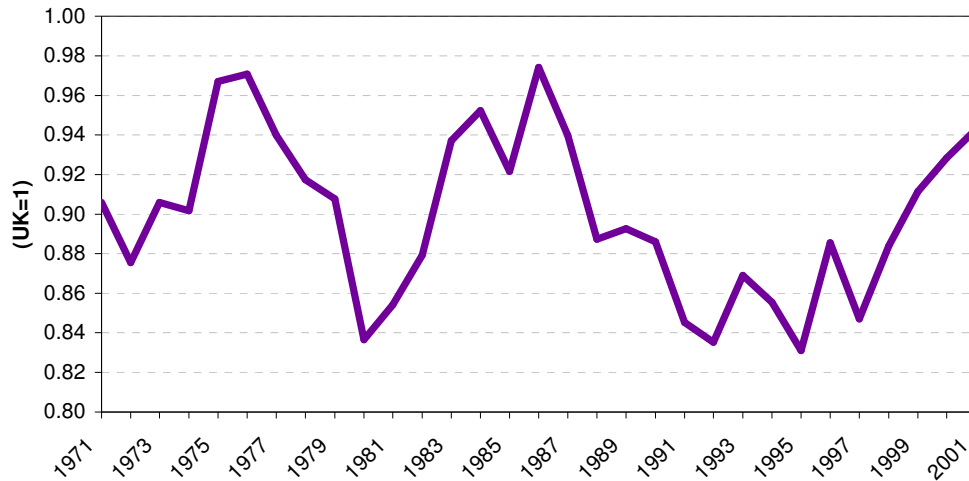
The key equation in estimating GVA per employee is for ‘zrpfm’ defined as real GVA per employee in NI divided by the same in the UK. Relative ‘productivity’ defined in this way is determined by the following factors:

- Relative wages in manufacturing (wsemfni/wsemfuk)
- Inward investment
- Labour shortages in GB
- Business Investment in R&D

Relative productivity is related to relative wages because wages form the majority of GVA. In essence, falling relative wages help to boost demand and hence output and GVA, but also lead to lower GVA per employee. This implies a degree of mark-up pricing. Where prices are set as a mark-up on costs, including wage costs, falling relative wages leads to falling relative GVA per employee. The relative wage term enters the equation with a coefficient of unity.

Over the period 1971-2001 relative GVA per employee in NI is quite close to the UK average during the 1970's when national wage bargaining was common, but begins to fall along with relative wages from the 1980's when national wage bargaining breaks down. However it begins to rise once more from the late 1990's. We believe that this reflects the arrival of a number of high productivity companies through inward investment following the paramilitary cease-fires. Since we have assumed that these companies have twice the rate of GVA per employee as existing firms in NI manufacturing, we need to boost GVA employee by an amount equivalent to half of the additional GVA generated by new inward investment.

**Chart 1.5: GVA per person employed relative to the UK**



The boost to GVA in NI that derives from end of economic boom labour shortages similarly leads to higher GVA per employee. What appears to happen here is that short-term constraints on expansion in GB allow NI firms to gain market share and to increase their capacity utilisation without a commensurate expansion in the number of employees.

Similarly we assume that investment in R&D leads to improvements in the average value of products and to improvements in the production process that raise productivity. IN both cases GVA is likely to be increased without significant increase in employment. We have assumed that the whole gains to GVA due to BERD are reflected in higher GVA per employee, and thus do not raise productivity.

$$\begin{aligned} \text{ZRPMFNI} = & (\text{WSEMFNI} / \text{WSEMFUK,UK}) \\ & + 0.5 * ((\text{IICUMMFNI}/1000) / \text{ETMFNI}(-1)) \\ & + 0.07 * ((\text{BERDMFNI}/\text{ETMFNI}(-1))/(\text{BERDMFUK,UK}/\text{ETMFUK,UK}(-1))) \end{aligned}$$

Where;

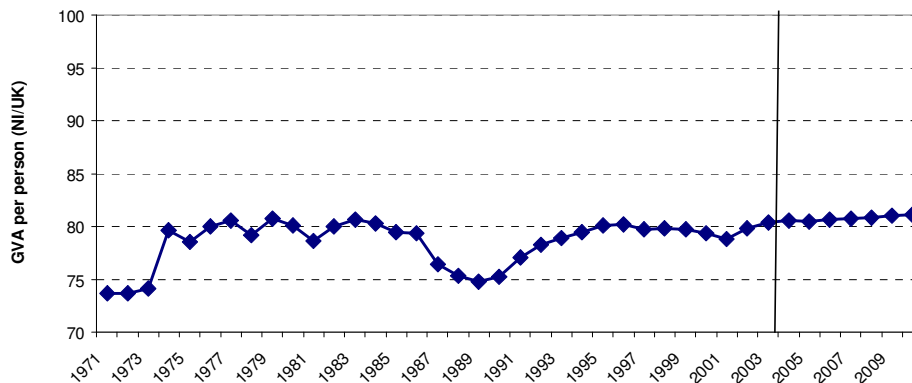
|           |   |
|-----------|---|
| WSEMFNI   | Wages and Salaries in Northern Ireland manufacturing          |
| WSEMFUK   | Wages and Salaries in UK manufacturing                        |
| IICUMMFNI | Inward investment – Cumulative manufacturing jobs created     |
| ETMFNI    | Total manufacturing employment in Northern Ireland            |
| ETMFUK    | Total manufacturing employment in UK                          |
| BERDMFNI  | Manufacturing Business Expenditure on R&D in Northern Ireland |
| BERDMFUK  | Manufacturing Business Expenditure on R&D in the UK           |

## 2 Baseline forecast of revised indicators

The original aim of this research project was to develop a model to monitor progress towards the Economic Development Forum's targets for the Northern Ireland economy. Earlier reports in this series highlighted many issues around the EDF targets, as originally specified. DETI and DFP funded an additional piece of work to allow Regional Forecasts to produce a set of revised indicators. The revised structure maintained EDF's strategic priority themes and introduced a distinction between policy influenceable drivers and higher level aims. Updated baseline forecasts of these new indicators, consistent with Regional Forecasts Spring 2005 outlook, are presented in this chapter.

### Goals

**Figure 2.1: Goal: GVA per Person in Northern Ireland relative to the UK (UK=100)**



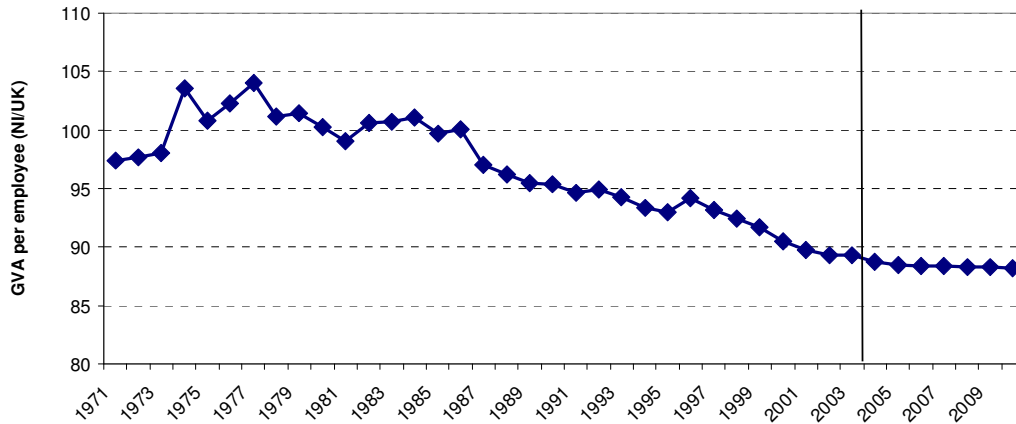
**Comment:** Although there was no EDF target for this indicator in the original EDF targets, Strategy 2010 contained a target to increase Northern Ireland's relative position to 90% of the UK. From a low point of around 75% of the UK average at the end of the 1980's, GVA per person relative to the UK has risen to 80%.

As outlined in the previous chapter, the forecast for GVA is driven by;

- Inward investment
- New company formation
- Business expenditure on R&D
- Skills levels (level 0 and level 4/5)
- Wage levels
- A measure of labour shortage in the UK
- A dummy variable for the availability of the standard capital grant in NI

Our projections show that Northern Ireland's relative position is expected to increase slightly by 2010 to just over 81%, well short of the 90% target.

**Figure 2.2: Goal: GVA per employee in Northern Ireland relative to the UK (UK=100)**

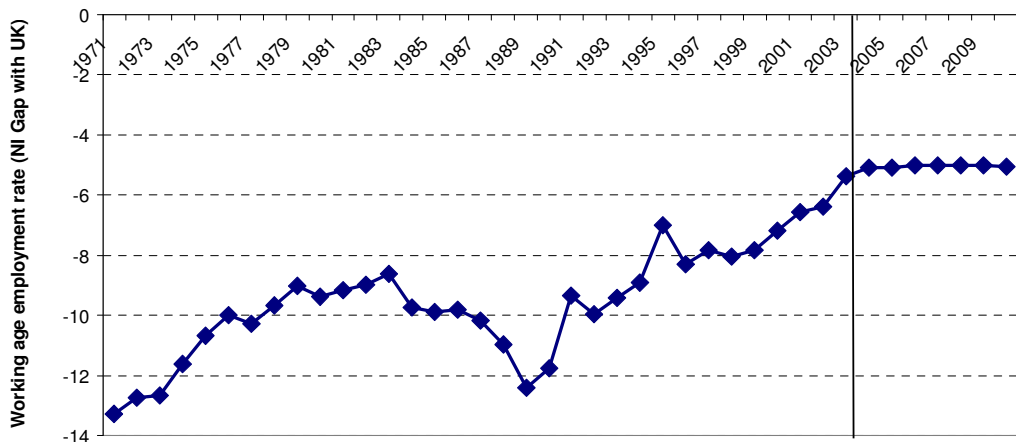


**Comment:** Relative productivity is determined by the following factors:

- Relative wages
- Inward investment
- Labour shortages in GB
- Business Investment in R&D

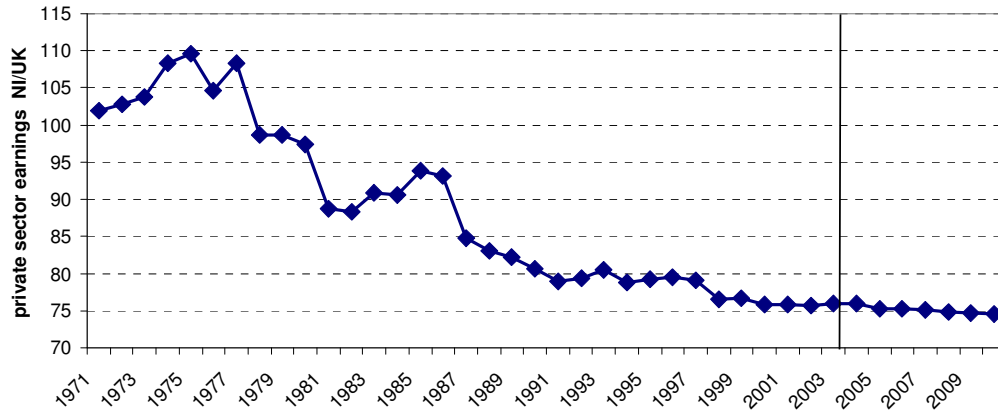
We expect GVA per employee in Northern Ireland to increase by just under 20% between 2002 (EDF’s base year) and 2010. Relative to the UK our projection is that Northern Ireland will remain at around 88% of the UK average.

**Figure 2.3: Goal: Working age employment rate (NI vs UK gap)**



**Comment:** The gap between Northern Ireland’s employment rate and the UK’s narrowed from around 10% in the early 1990’s to 6.5% by 2002. Employment growth in Northern Ireland between 2002 and 2010 is forecast to be 4.1% faster than the UK, while working age population growth is expected to increase by just over 1% faster in Northern Ireland over the same period. Our projections therefore show a slight improvement in the working age employment rate gap, closing to 5% in 2010.

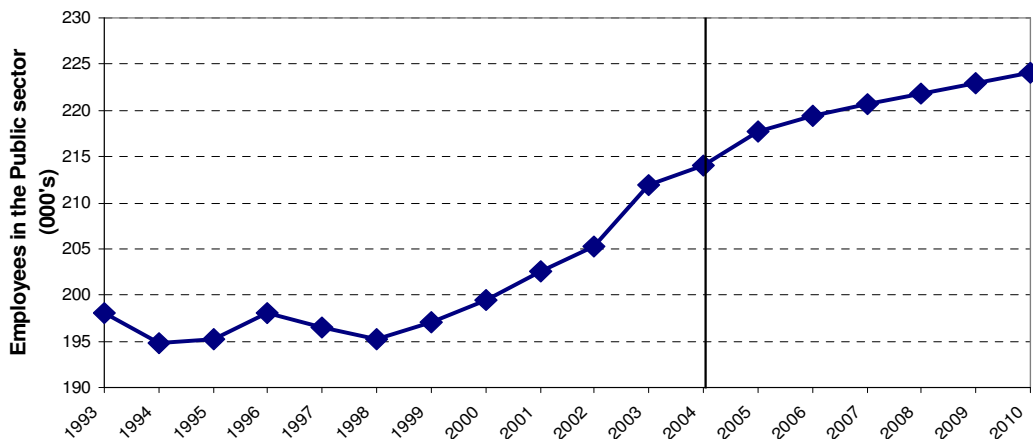
**Figure 2.4: Goal: NI private sector earnings (NI/GB)**



**Comment:** The previous EDF target related to wages in the whole economy and aimed to increase whole economy wages in Northern Ireland to 89% of the UK by 2010, up from 86% in 2000. This new indicator relates to the private sector and shows a slight decline in Northern Ireland’s relative position by 2010. This forecast is based on our view of skills demand in Northern Ireland and the correlation between the proportion of graduates in an area and higher wages. We expect that graduates will increase their share of total employment in Northern Ireland from 23% in 2002 to 25% in 2010. This is much lower than in GB, where we expect graduates to increase from 26% of employment to 33% by 2010.

### Intermediate Objectives

**Figure 2.5: Intermediate Objective: Total Employees in Public Sector**

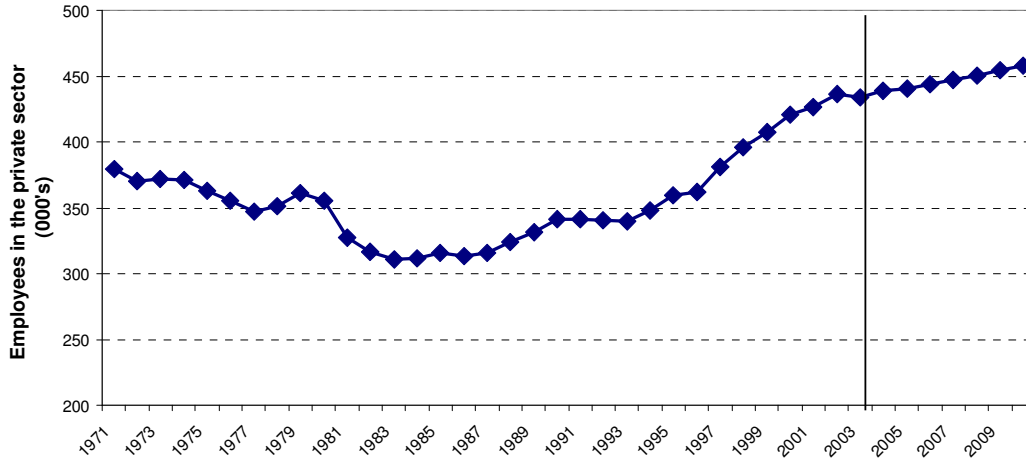


Note: This indicator has been amended to reflect DETI’s published public sector employees series and not the SIC public administration, health and education series which includes some private sector employment.

**Comment:** The growth in public sector employees in Northern Ireland between 1998 and 2004 was considerable, increasing from 195,000 to 214,000. Because the chart depicts the whole public sector, it masks the contrasting outlook for public administration, health and education. Public administration is forecast to decline in each year between now and the end of the decade, losing 2,000 employees. However,

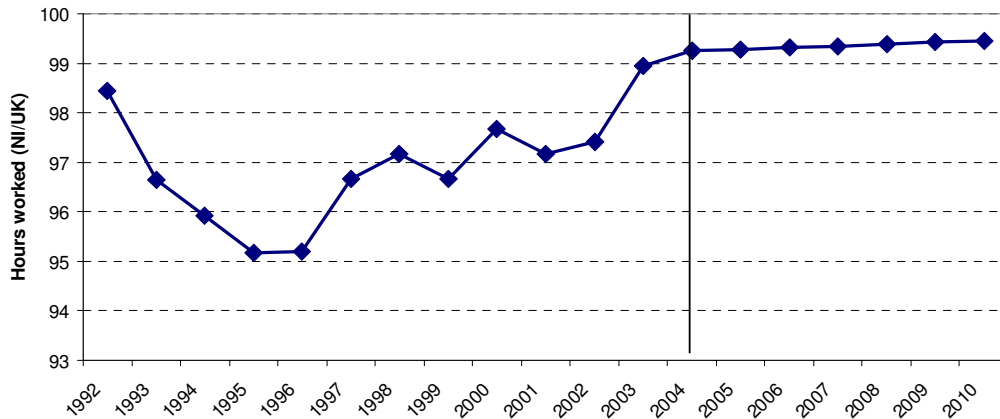
these losses are more than offset by increases in health employees (5,500 between 2004 and 2010) and education (6,000 between 2004 and 2010).

**Figure 2.6: Intermediate Objective: Total Employees in the Private Sector**



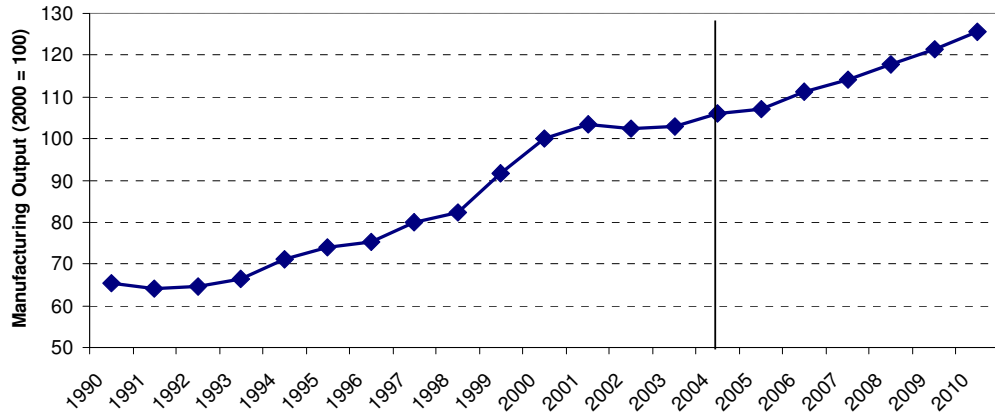
**Comment:** Much of the recent service sector growth has been focussed in the Belfast region, but recent out of town retailing centres in Lisburn and Ballymena have provided some notable growth elsewhere. Our forecast for private sector employees to grow at a slower rate than in the recent past reflects our view that there is less capacity for further retail expansion. Between 2002 and 2010, we forecast that the private sector will create an additional 22,000 jobs. It should be noted that within the private sector, services are projected to create an additional 47,000 jobs between 2002 and 2010 with manufacturing losing just over 22,000 jobs.

**Figure 2.7: Intermediate Objective: Hours worked (NI/UK)**



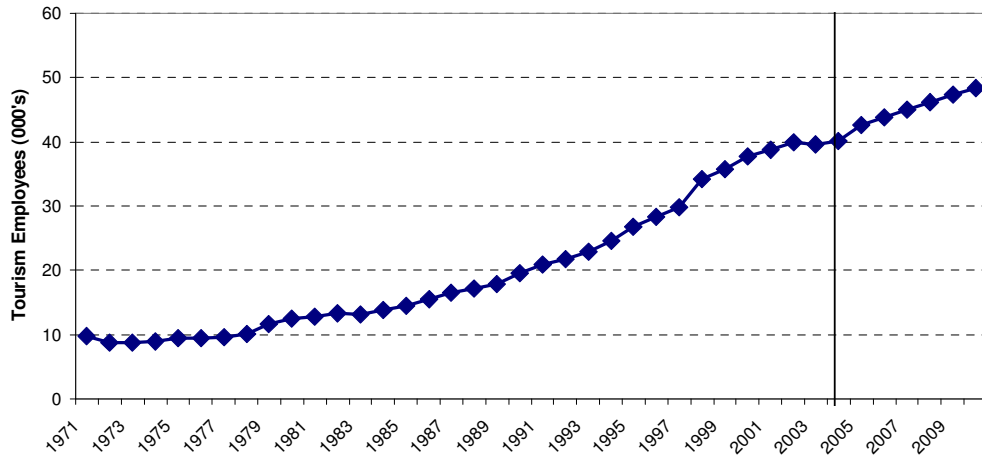
**Comment:** Relative to the UK, Northern Ireland has consistently been within 5% of the UK average and is projected to be just below parity with the UK throughout the forecast period.

**Figure 2.8: Intermediate Objective: Manufacturing output growth (%)**



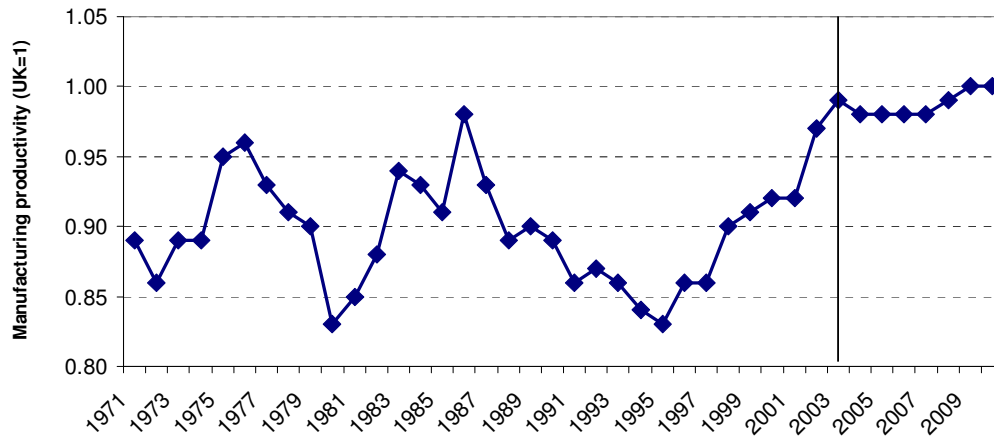
**Comment:** The original target was for manufacturing output to increase by 25% between 2001 and 2010. The improving macro climate and projected UK improvement in exports – OEF’s current projection is for UK manufacturing exports to increase by 8% in 2004 – are impacting on our new forecast and the current strength of manufacturing output is likely to be maintained.

**Figure 2.9: Intermediate Objective: Employees in Tourism**



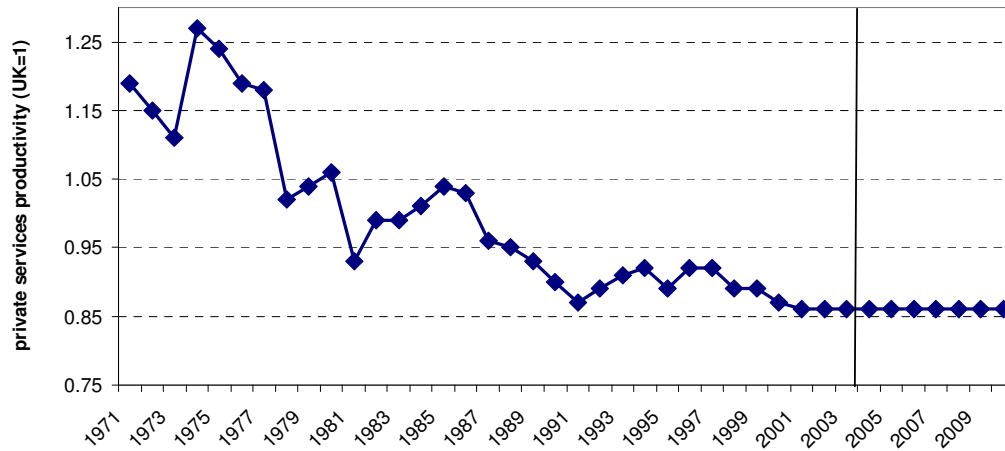
**Comment:** Based on our view that the vast majority of the projected increase in tourism numbers will come from those visiting friends and family and business visitors we believe that the improvement in tourism employees will be modest, increasing by around 8,000 between 2002 and 2010.

**Figure 2.10: Intermediate Objective: Manufacturing productivity in Northern Ireland (UK=1)**



**Comment:** We expect the improvement in Northern Ireland manufacturing productivity to fall short of the original target of 1.05 relative to the UK. Slow change in the structure of Northern Ireland’s manufacturing sector from low tech to medium and high tech companies (see Figure 2.12) will hamper further progress in this area.

**Figure 2.11: Intermediate Objective: Private services productivity in Northern Ireland (UK=1)**

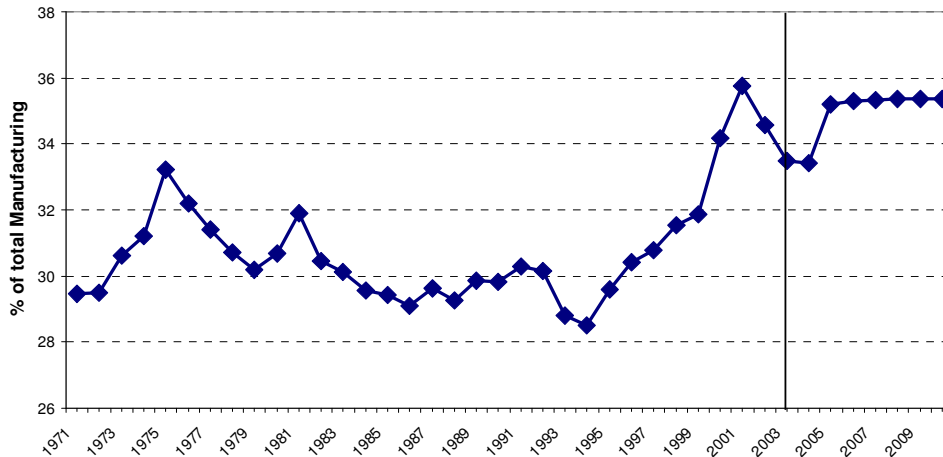


**Comment:** The previous target for this indicator proposed that Northern Ireland would be 0.95 relative to the UK by 2010. Recent history shows that Northern Ireland’s relative position has declined consistently, from 20% above the UK level in the early 1970s to 15% below the UK rate at the end of the 1990s. Without a significant increase in high value added private services in Northern Ireland we have no reason to believe that private services productivity will increase relative to the UK over the forecast period.

## Drivers of Change

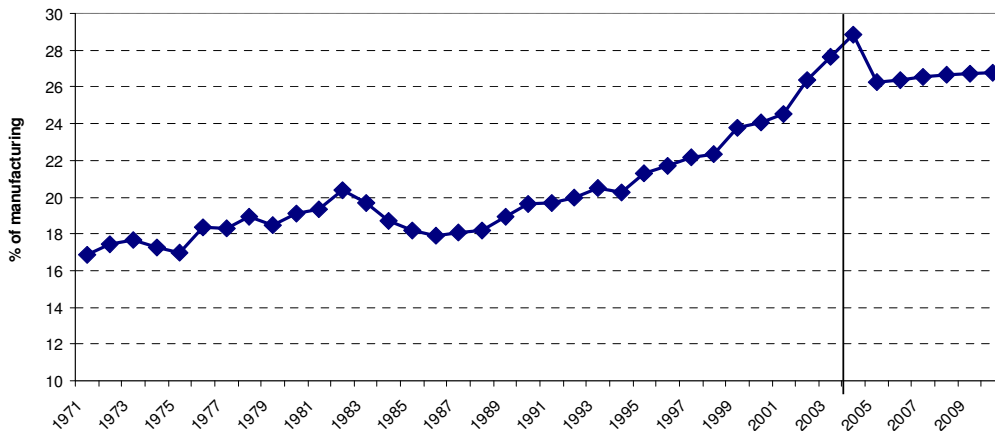
### Strategic Priority: Knowledge/Productivity Growth

Figure 2.12: High tech manufacturing (% total manufacturing)

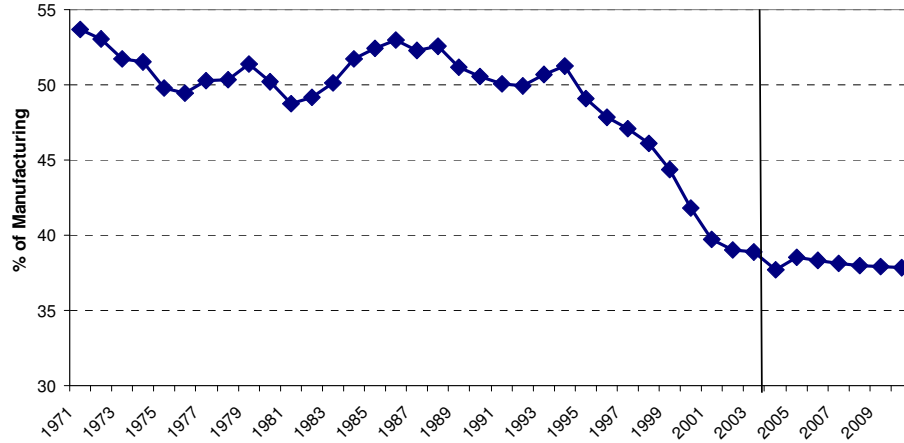


**Comment:** In the latter half of the 1990's there was a steady increase in the structure of manufacturing employment driven by an inward investment boom in high tech companies. The chart clearly shows the decline in high tech manufacturing post 2001. Looking forward, a lack of new inward investment drives our view that high tech manufacturing as a percentage of total manufacturing employment will remain fairly static at around 35%, missing the original target of between 39% and 47%. Although no longer included as EDF indicators, the following two figures, included for information, show the projections for the shares of medium tech and low tech manufacturing.

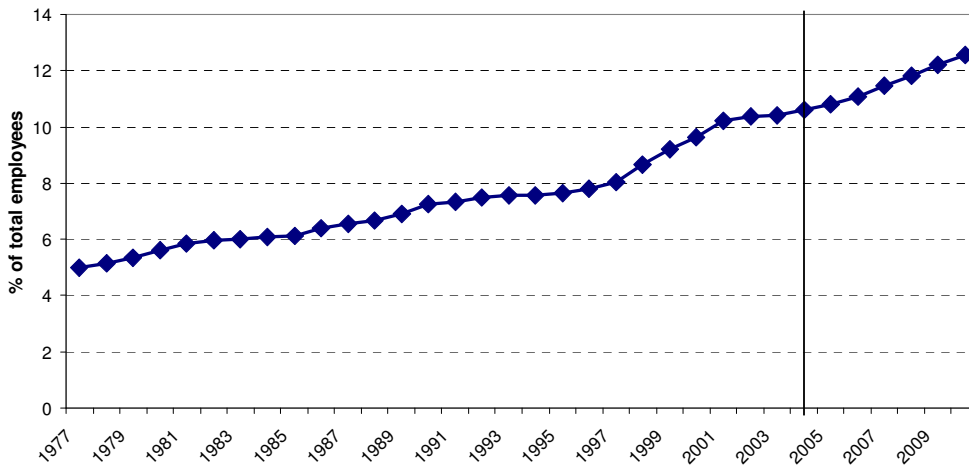
Figure 2.12b: Medium tech manufacturing employment (% of total manufacturing)



**Figure 2.12c: Low tech manufacturing employment (% of total manufacturing)**



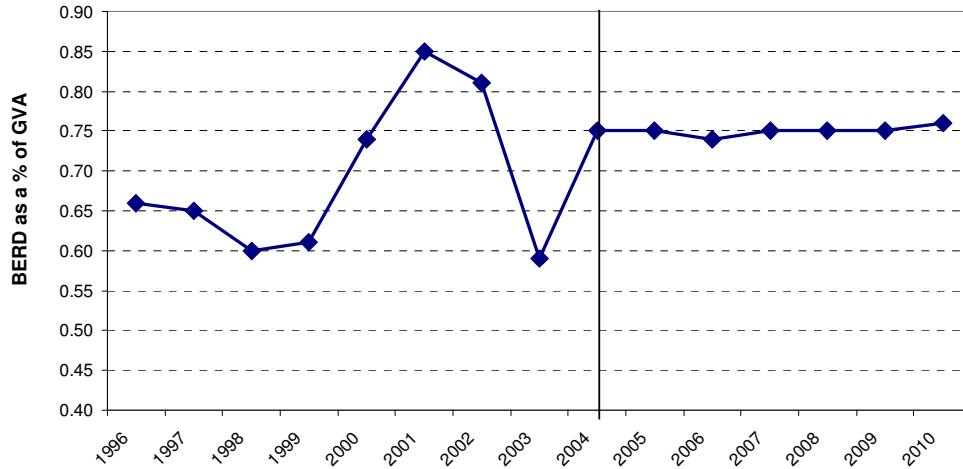
**Figure 2.13: Employees in tradeable services (% total)**



**Comment:** Supported by growth in call centre employment, tradeable services have been a strong source of employee growth in the recent past and are projected to provide further growth over the forecast period. The relatively limited size of the tradeable professional services sector is unlikely to expand significantly under current policy. The original target to have 12.5% of employees in tradeable services by 2010 looks likely to be met.

**Strategic Priority: Innovation and Creativity**

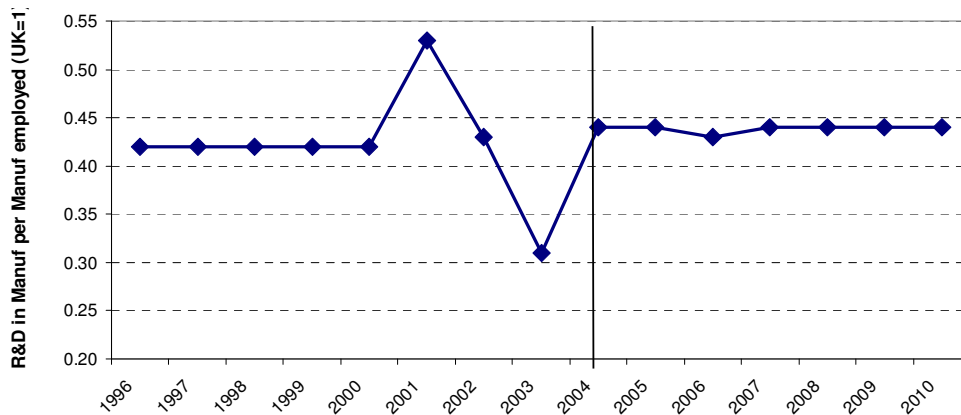
**Figure 2.14: BERD as a % of GVA**



**Comment:** Business investment per employee in R&D in Northern Ireland is projected as a share of UK business investment per employee in R&D. The impact of this investment on output and productivity is estimated by an equation using coefficients based on the extensive economic literature on the impact of R&D investment.

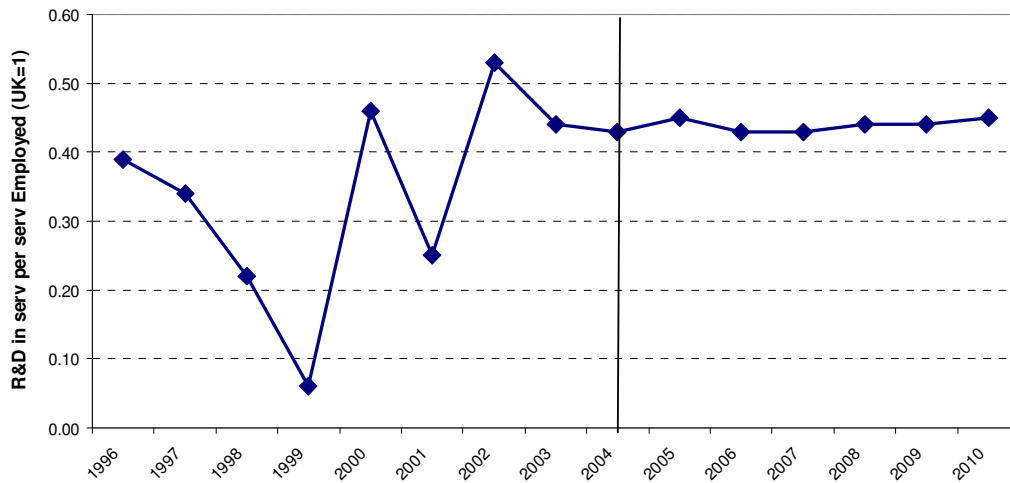
Our current projections for Real Business expenditure on R&D are for an increase in each year until 2010. However, the disappointing data for 2003 results in less optimistic projections than in our original model. In real terms BERD is forecast to be 0.75% of GVA by 2010. This projection assumes no Northern Ireland specific R&D fiscal incentive and that current policy will not lead to a step change in recent performance.

**Figure 2.15: Manufacturing BERD per manufacturing employee in Northern Ireland (UK=1)**



**Comment:** The 2001 figure, which shows Northern Ireland’s BERD per person employed in manufacturing at 55% of the UK is assumed to be a ‘spike’ in the data. The collapse in Northern Ireland’s relative position in 2003 highlights the fluctuating nature of the data and as a result, the trend is projected to remain closer to previous figures of around 45% relative to the UK.

**Figure 2.16: Service sector BERD per Service sector employees in Northern Ireland (UK=1)**



**Comment:** Again, A lack of data prevents a more robust projection of this indicator. Therefore service sector business expenditure on R&D per services employees relative to the UK is projected to remain at around 55% relative to the UK.

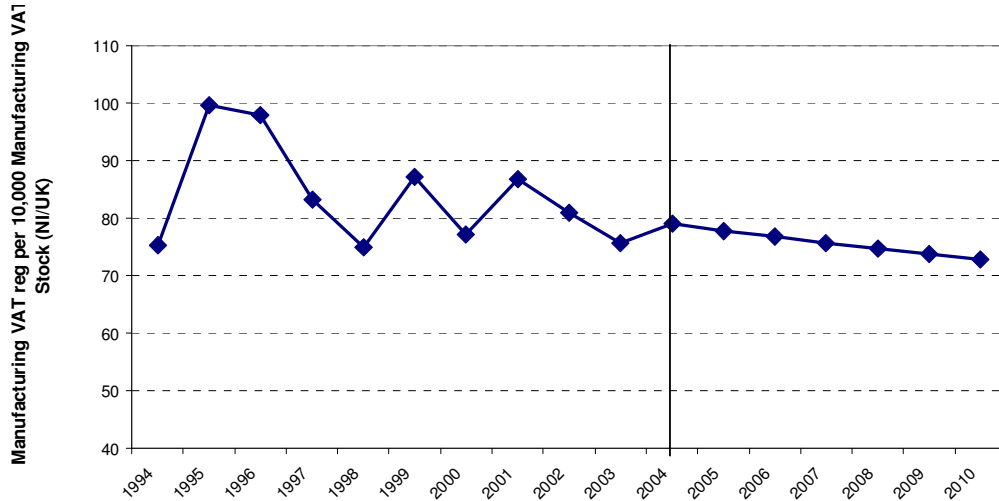
### Other Indicators

**Product and Process Innovation:** In 2002 there were 54% of firms involved in Product innovation and 50% of firms involved in process innovation. As yet, there is no further data available. DETI should seek clarification from Invest NI as to whether or not the Innovation survey will be re-commissioned

**Percentage of Business R&D devoted to commercialisation in NI as a percentage of the UK:** It appears that this data series will be available annually for both Northern Ireland and the UK. Currently however, there is not enough data to provide a robust forecast. Northern Ireland was 119% of the UK in 2002, up from 115% in 2001.

**Strategic Priority: Enterprise**

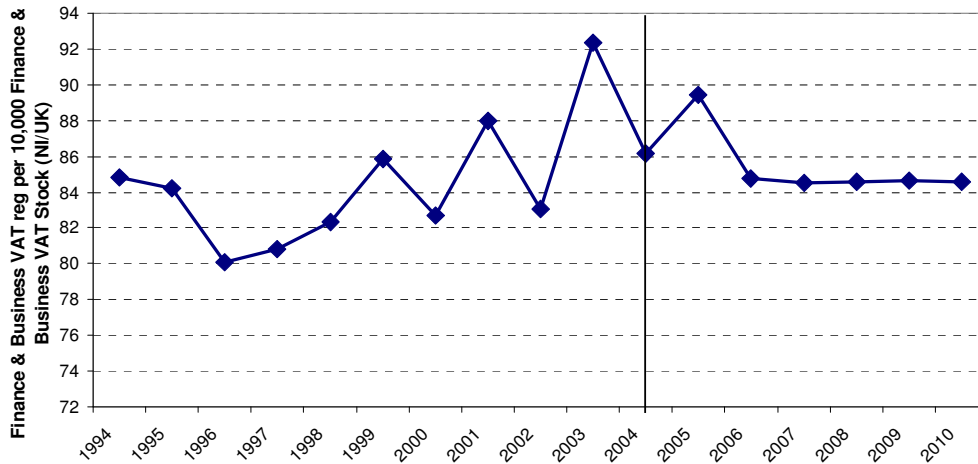
**Figure 2.17: Manufacturing VAT registrations per 10,000 manufacturing businesses in Northern Ireland (UK=100)**



**Comment:** The number of new firms is forecast through projecting the trend in the NI formation rate relative to the UK rate. The change in the stock of firms is then calculated as the previous stock plus new firms less closures. The closure rate is taken as the average over the period 1994-2002. To express the change relative to the UK average, an expected change in the stock of firms is calculated. This is the previous year's stock multiplied by the growth rate of the UK stock. The surplus (or deficit) of new firms in Northern Ireland is the difference between the projected change in the stock of firms and the expected change. Each firm is estimated to have 5 employees, a figure based on past research undertaken at NIERC.

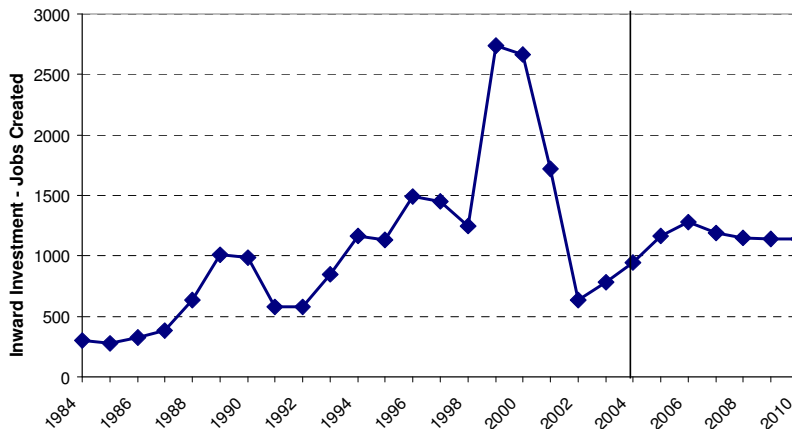
Relative to the UK, we are forecasting slight decline in relative manufacturing VAT registrations to around 73% of the UK average down from 87% in 2002. Manufacturing VAT registrations and Stocks are expected to decline in both Northern Ireland and the UK but the decline in NI manufacturing VAT registrations per 10,000 manufacturing businesses between 2002 and 2010 is 19%, nearly twice as fast as the 10% decline in the UK. Within this forecast is the assumption that policies such as Accelerating Entrepreneurship do not seem likely to assist in breaking recent trends.

**Figure 2.18: Financial and business services VAT registrations per 10,000 financial and business services VAT stock (UK=100)**



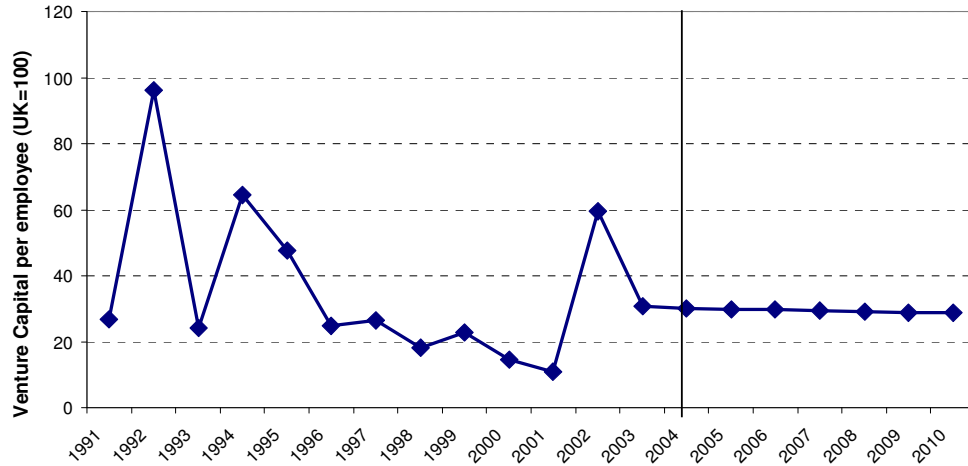
**Comment:** Based on the methodology outlined above, relative to the UK, we expect financial and business services VAT registrations per 10,000 financial and business services businesses to remain stable, at around 85% of the UK average over the forecast period. Between 2002 and 2010, financial and business services VAT registrations are expected to increase in Northern Ireland by over 40% - driven by a questionable 23% increase in the 2003 historical data - while the stock is forecast to increase by 38%. This results in an increase in registrations per 10,000 stock of 3.6%, slightly higher than the 1.8% increase in UK registrations per 10,000 businesses.

**Figure 2.19: Inward investment - jobs created**



**Comment:** The number of jobs promoted in manufacturing and services is projected through an equation on UK business investment growth which we forecast to return to growth over the remainder of the decade. Evidence from Invest NI states that the number of jobs created is 75% of job promotions averaged over three years. As a result, jobs created from inward investment are forecast to increase to over 1,000 per annum during the remainder of the decade, up from just over 600 in 2002.

**Figure 2.20: Levels of Venture Capital per employee in Northern Ireland (UK=100)**



**Comment:** The high volatility of venture capital data has led us to project a fairly steady trend over the forecast period. By 2010 Venture capital per employee relative to the UK is expected to be around 29%. Although this is down from the 2002 figure of 60% it is higher than each period between 1996 and 2001.

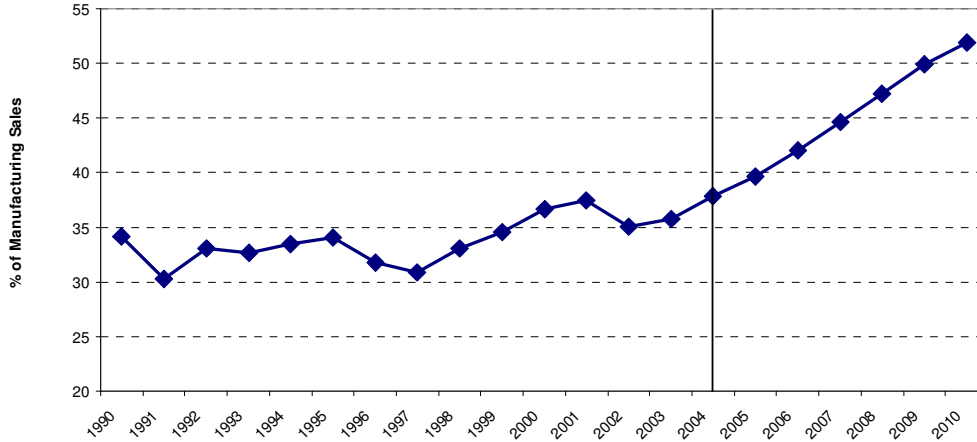
### Other Indicators

**Attitudes towards entrepreneurship:** There are only 2 data points for the Total Entrepreneurship Index (used as a proxy for attitudes towards entrepreneurship) and so a forecast is not possible. However, the measure increased from 66% in 2002 to 81% in 2003.

**Job quality – inward investment income compared to NI average private sector earnings:** As yet, no data exists for this measure that we are aware of. We propose that DETI engage with Invest NI to ascertain whether wages in inward investment companies is readily available.

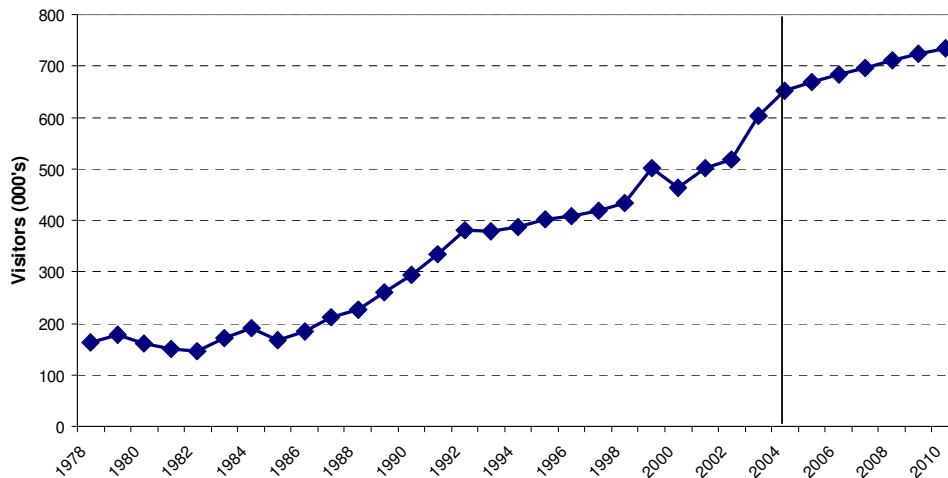
## Strategic Priority: Outward Looking

**Figure 2.21: Northern Ireland manufacturing exports as a % of sales**



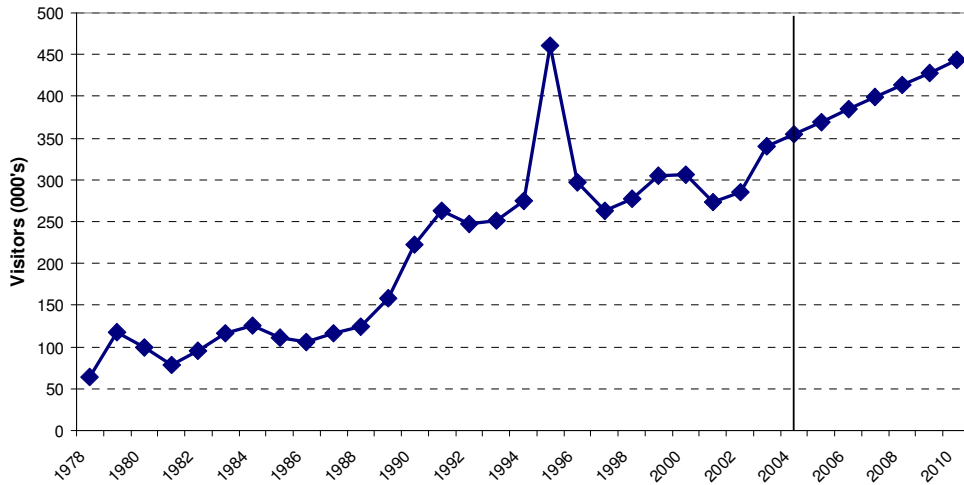
**Comment:** Oxford Economic Forecasting are forecasting double digit growth in UK exports over the next few years. We expect this to be reflected in Northern Ireland's export performance and predict that manufacturing exports as a percentage of manufacturing sales will increase to over 50% by 2010.

**Figure 2.22: Tourism numbers-business travellers**



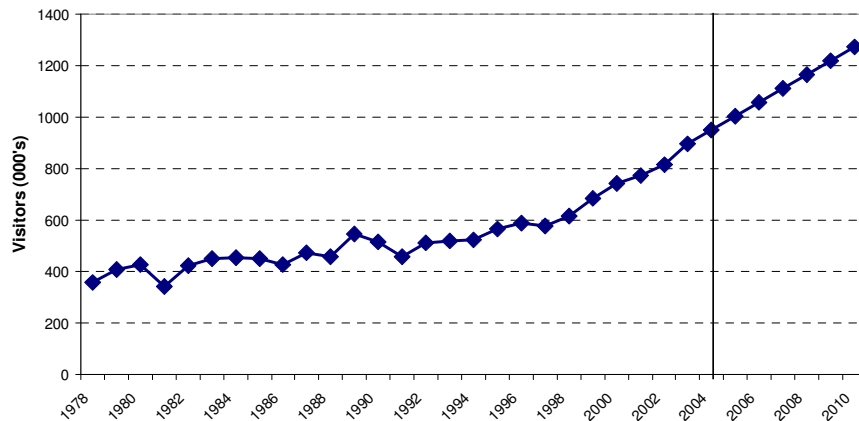
**Comment:** The new Northern Ireland model links the number of business travellers to total employment in Northern Ireland. As a result, business traveller numbers are expected to increase consistently – reaching nearly 750,000 by the end of the decade.

**Figure 2.23: Tourism numbers-holiday visitors**



**Comment:** A recovery in global tourism is reflected in our projected growth in holiday visitors over the decade. By the end of the decade, holiday visitors are expected to have increased from 285,000 in 2002 to nearly 450,000.

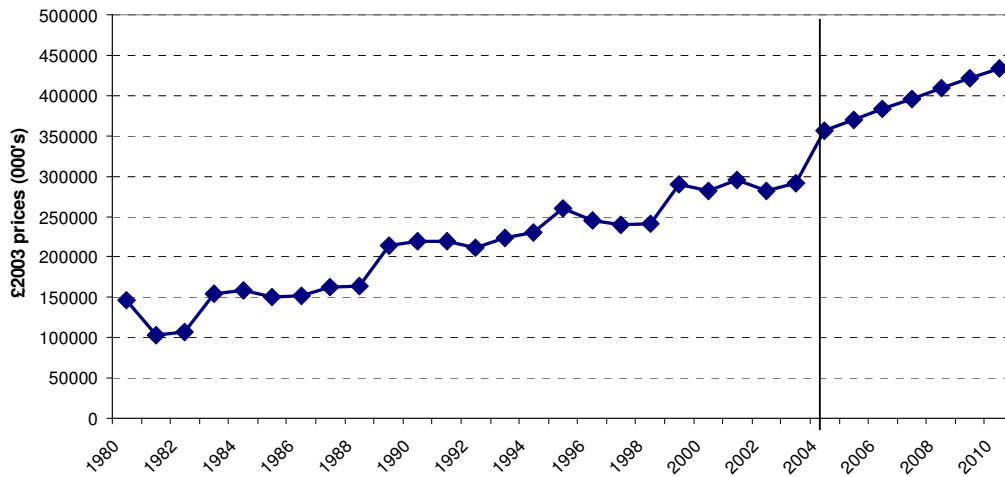
**Figure 2.24: Tourism numbers-visiting friends**



**Comment:** Since 1998 the pace of growth of the number of people visiting friends and family has increased considerably with growth rates of over 5% in five of the last six years. We expect this recent trend to continue and that visitor numbers in this group will reach 1.3 million by the end of the decade.

EDF's original target was for 3.34 million total visitors by 2010. The new cumulative total from our model is 2.5 million.

**Figure 2.25: Real Tourism Expenditure in Northern Ireland**



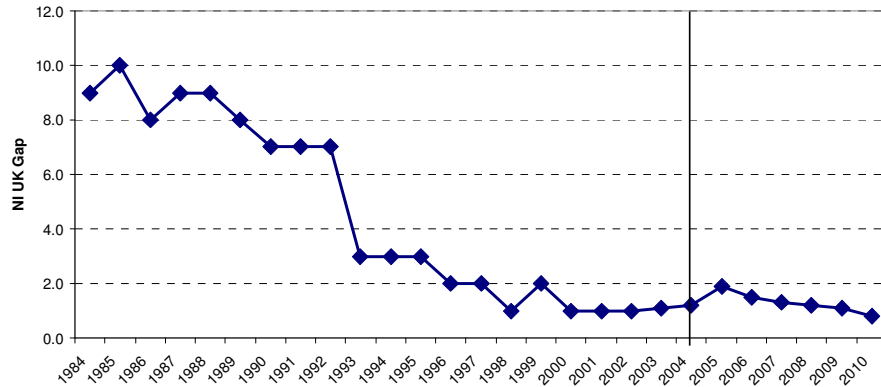
**Comment:** Against a previous target of £565 million (2003 prices) by 2010 our model forecasts tourism expenditure of £430 million in 2003 prices by 2010. This is based in recent trends in tourism spend per visitor.

### Other Indicators

**Tradeable Services Exports:** DETI statistics branch have been conducting a pilot study in each of the last three years into tradeable services exports but we were unable to get these figures in time for publication.

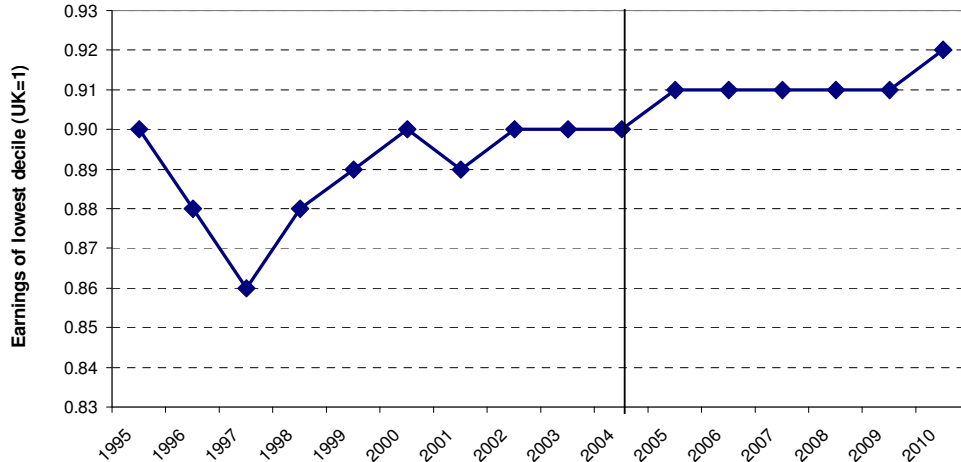
**Strategic Priority: Equality of Opportunity / Social Inclusion**

**Figure 2.26: Long term unemployment as a percentage of the economically active (Northern Ireland/UK gap)**



**Comment:** The gap with the UK has decreased consistently from around 3% in the early 1990's to around 1% currently. At present this is not explicitly modelled. This trend has been projected forward over the forecast period.

**Figure 2.27: Earnings of lowest decile in Northern Ireland relative to GB (GB=1)**



**Comment:** Earnings for people in the lowest decline have growth at around 5% per annum since 1998 in Northern Ireland. Relative to GB, Northern Ireland has increased from 86% of the average to 90%. Based on a stable trend projection in low income earnings we expect that this gap will have closed to around 92% by the end of the decade.

## **Other Indicators**

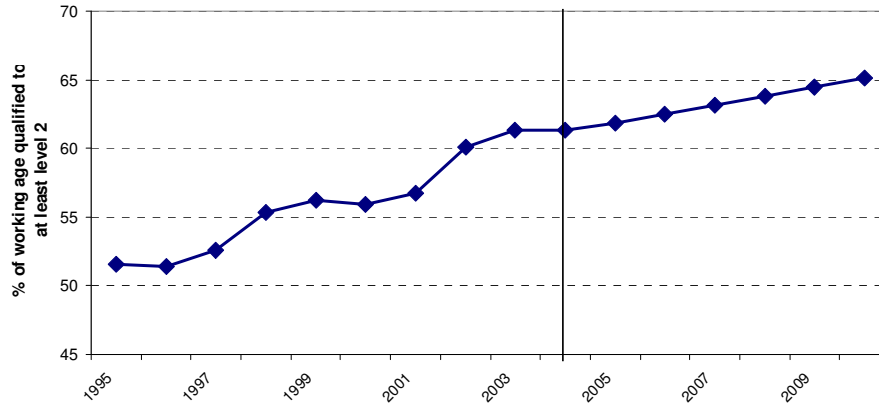
**Change in employment in New TSN areas:** The change in employment between 1999 and 2001 was 6,709. At this time, there is no further information on this indicator.

**Share of inward investment going to New TSN areas:** The proportion of new inward investment going to New TSN areas was 91% in 2002. This declined to 80% in 2003 and the figure for 2004 shows a further decline to 67% of the total. It should be noted that the actual numbers of investments going into New TSN areas were 10, 8 and 6 respectively.

**Proportion of employees earning less than £250 per week:** Concerns remain with this variable due to the request to index link the indicator. As a result, we have not attempted to forecast it. However, data for 2003 shows that the 24% of employees earned less than £250.

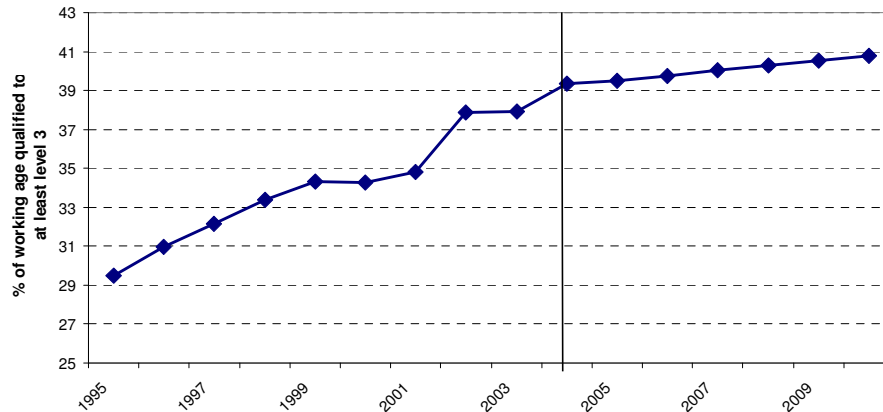
## Strategic Priority: Human Capital

**Figure 2.28: Percentage of the working age population qualified to at least level 2**



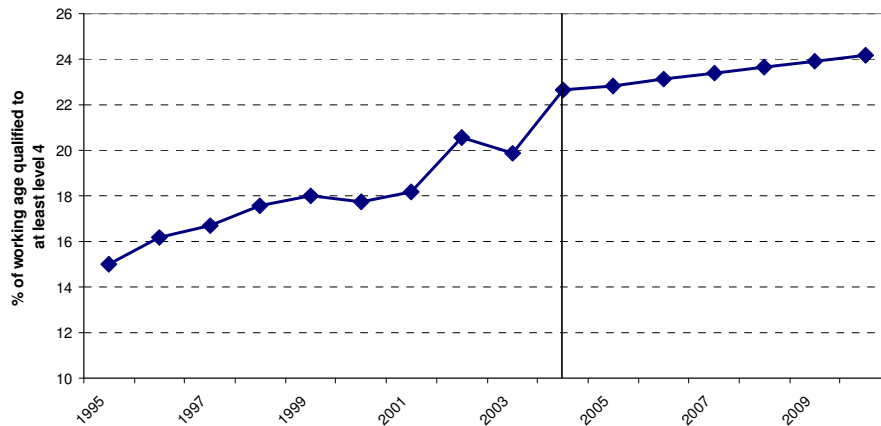
**Comment:** Two separate projections are included in the model. One is for the demand for skills, and the other is the supply of skills both among the employed and the working-age population as a whole. These projections are used to produce figures for the EDF indicators on qualification levels. We expect a further 60,000 to be qualified to at least level 2 between now and the end of the decade. Therefore, the proportion of the working age population qualified to at least this level is expected to increase from 61.4% to around 65%.

**Figure 2.29: Percentage of the working age population qualified to at least level 3**



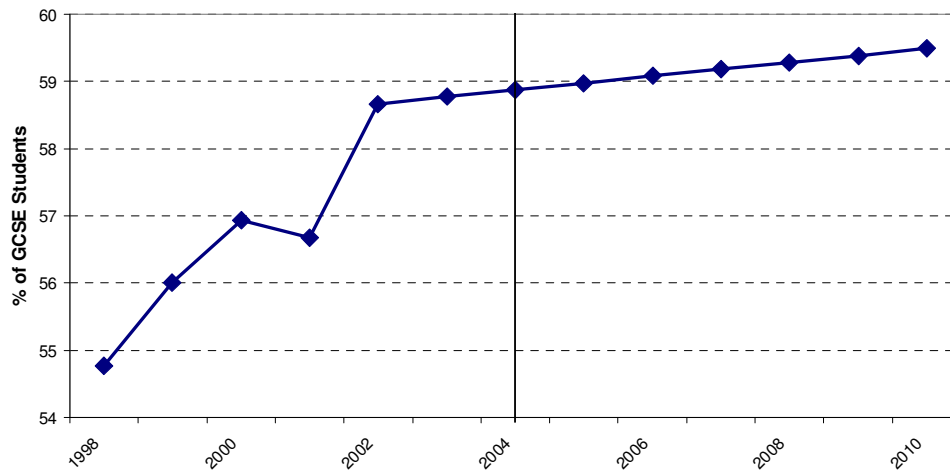
**Comment:** We expect to see the proportion of the working age population qualified to at least level 3 increase to 41%, a slight increase from 38% in 2002.

**Figure 2.30: Percentage of the working age population qualified to at least level 4**



**Comment:** Based on a changing occupational structure in our model and recent trends the proportion of working age people qualified to at least level 4 increases from 21% in 2002 to 24% in 2010.

**Figure 2.30: Percentage of GCSE students achieving 5+ GCSE's grades A\* to C or equivalent**



**Comment:** Recent data provided by the Department of Education shows that the proportion of GCSE students achieving 5+ GCSE at grades A\*-C or equivalent has increased from 55% in 1998 to 59% in 2003. A steady continuation of this trend has been projected.

### Other Indicators

**Level of essential skills:** The number of people participating on the essential skills programme was 8,426 in 2002 and 9,820 in 2003. We do not make any attempt to forecast this figure and suggest that EDF adopt DEL's own targets for this indicator.

**Strategic Priority: A Competitive Physical Infrastructure**

**Broadband:** DETI statistics branch have commissioned work to provide a figure for the Broadband indicator and it should be available soon.

**Average speed on key transport corridors:** Data from the Shaping our Future monitoring report, June 2004 shows that the average speed on each of Northern Ireland's key road corridors was less than 50 miles per hour. No attempt has been made to forecast this indicator.

## Annex 1

### Review of progress against targets 2004

#### Goals

| Indicator   | Baseline<br>(Position at 2002 unless otherwise specified) | Position at 2003                                   | Position at 2004                                   | 2010 Prediction                                   | Rationale / Assumptions for Prediction   |
|---|---|--|--|---|--|
| GVA :<br>(A) per person<br>(B) per employee (NI/UK) | (A) per person – 80%<br>(B) per employee – 89.7%          | (A) per person – 80.4%<br>(B) per employee – 89.3% | (A) per person – 80.6%<br>(B) per employee – 88.7% | (A) per person – 81.1%<br>(B) per employee – 88.2 | Slight improvement driven by Inward investment, new company formation, skills levels, wage levels and capacity utilisation in GB   |
| Employment rate NI UK gap                           | +6.5  | +5.4   | +5.1   | +5.1  | Slight improvement due to employment growth in NI 1.2% higher than UK between 2004 and 2010 and working age population growth less than 1% faster than UK over the forecast.         |
| Average earnings in private sector (NI/UK)          | 75.7%   | 75.9%  | 75.9%  | 74.5  | NI steadily falling behind due to skills structure. Graduates as a proportion of total employment expected to increase from 26% to 32% in GB and from 23% to 25% in Northern Ireland |

Data Sources: ONS/Regional Forecasts

Note: Employment Rate is calculated from Regional Forecasts Employment and working age population

**Intermediate Objectives**

| Indicator                               | Baseline<br>(Position at 2002 unless otherwise specified) | Position at 2003 | Position at 2004 | 2010 Prediction | Rationale / Assumptions for Prediction  |
|---|---|------------------|------------------|-----------------|---|
| Total employees                         | 663,400   | 668,800          | 678,500          | 712,200         | Continuing rise (but decelerating) – Factors such as end of the retail (job creation) boom. |
| Employees in public sector <sup>1</sup> | 205,300   | 211,900          | 214,000          | 224,100         | Slower rise than recent past (public expenditure factors)                                   |
| Employees in private sector             | 436,200   | 434,200          | 438,900          | 457,900         | Continued rapid growth but decelerating due to end of the retail boom                       |
| Hours worked (NI/UK)                    | NI/UK = 97.4%   | 99%              | 99.3%            | 99.5%           | Stable  |
| Manufacturing output growth (2000=100)  | 102.4   | 102.8            | 105.9            | 125.6           | Resumption of rapid growth due to macro economic factors                                    |
| Employment in tourism sector            | 40,000  | 39,600           | 40,100           | 48,400          | Steady but unspectacular growth, reflecting largely business visitors                       |
| Manufacturing productivity (NI/UK)      | NI / UK = 97%   | 99%              | 98%              | 100%            | Slow improvement from 2005, driven by relative manufacturing wages, inward investment, R&D  |
| Private services productivity (NI/UK)   | NI / UK = 86%   | 86%              | 86%              | 84%             | Slight decline– lack of high value added financial and business services                    |

Data Sources: ONS, Labour Force Survey, Regional Forecasts

<sup>1</sup> The employees in the public sector indicator has been amended to reflect the series published by DETI as part of the quarterly employment survey and not the public administration, health and education series used previously which included private elements of health and education. This new measure of public sector employees is not used in the calculation of total employees.

**DRIVERS OF CHANGE**

**Strategic Priority Area: Knowledge / Productivity Growth**

| Indicator  | Baseline<br>(Position at 2002 unless otherwise specified) | Position at 2003 | Position at 2004 | 2010 Forecast | Rationale / Assumptions for Prediction |
|--|---|------------------|------------------|---------------|--|
| % of Manufacturing Employment Structure made up of High Technology companies | 34.6%   | 33.5%            | 33.4%            | 35.4%         | Steady – Lack of new inward investment |
| Knowledge based tradeable services employment                                | 10.4% of employees  | 10.4%            | 10.6%            | 12.5%         | Stable percentage                      |

Data Sources: Regional Forecasts

**Strategic Priority Area: Innovation & Creativity**

| Indicator  | Baseline<br>(Position at 2002 unless<br>otherwise specified) | Position at 2003  | Position at 2004                                 | 2010 Prediction                                     | Rationale / Assumptions for<br>Prediction  |
|--|--|---|--|---|--|
| Business R&D expenditure as a<br>% of GVA  | A) All companies 0.8%<br>B) Excluding top 10: 0.3%           | A) All companies<br>0.59%<br>B) Excluding top 10:<br>0.3% | A) All companies<br>0.75%<br>B) Excluding top 10 | A) All companies<br>0.76%<br>B) Excluding top<br>10 | A) All companies - Steady<br>increase projected. Trend based<br>on NI's manufacturing BERD<br>per manufacturing employed<br>relative to the UK |
| Business R&D expenditure per<br>person employed<br>(2 targets – manufacturing &<br>services) NI/UK | A) Manufacturing<br>43%<br>B) Services<br>54%                | A) Manufacturing<br>30%<br>B) Services<br>43%             | A) Manufacturing<br>44%<br>B) Services<br>43%    | A) Manufacturing<br>44%<br>B) Services<br>44%       | Steady increase projected.<br>Trend based on NI's services<br>BERD per financial and<br>business services employed<br>relative to the UK       |
| % Plants involved in<br>Innovation<br>(2 targets – Product & Process)                              | 1999<br>Product 58%<br>Process 58%                           | 2002<br>Product 54%<br>Process 50%                        |  |   | No new data since 2002, and a<br>lack of historical data prevents<br>forecasting   |
| % of Business R&D devoted to<br>commercialisation  | 2001<br>NI / UK% = 115%                                      | 2002<br>119%  |  |   | See above  |

Data Sources: ONS, DETI, Invest NI, Regional Forecasts

**Strategic Priority Area: Enterprise**

| Indicator   | Baseline<br>(Position at 2002 unless otherwise specified)                               | Position at 2003   | Position at 2004   | 2010 Prediction  | Rationale / Assumptions for Prediction  |
|---|---|--|--|--|---|
| Birth rate VAT registered per 10,000 businesses<br>(2 targets – manufacturing & financial/business services)<br>NI/UK | A) Manufacturing<br>81%<br><br>B) Financial & business services<br>83%                  | A) Manufacturing<br>76%<br><br>B) Financial & business services<br>92% | A) Manufacturing<br>79%<br><br>B) Financial & business services<br>83% | A) Manufacturing<br>73%<br><br>B) Financial & business services<br>85% | Manufacturing – falling behind GB but low closure rates give positive employment<br><br>Financial & business services – stable projection – 25% increase in NI financial and business registrations in VAT statistics for 2003 are assumed to be a spike in the data. |
| No of jobs created through Inward Investment  | 638   | 785  | 949  | 1,138  | Increasing trend due to favourable business cycle, largely in service sector. Driven by Oxford Economic Forecasting forecast for UK inward investment levels  |
| Job quality – inward investment income compared to NI average private sector earnings                                 | No data available   |  |  | Not applicable   | This measure has not yet been developed by Invest NI  |
| Level of venture capital £ per employee   | 1999<br>NI £ / UK £ = 22.8%   | 2002<br>60%  | 30.7%  | 28.7%  | Highly volatile data has led us to project a fairly steady trend over forecast. Although 2010 projection is lower than 2002, it is higher than each period between '96 and '01.   |
| Attitudes to Entrepreneurship   | New indicator<br>NI Total Entrepreneurial Index/UK<br>Total Entrepreneurial Index = 66% | 81%  |  |  | There are only two data points for this indicator, thus preventing a forecast   |

Data Sources: ONS, Invest NI, BVCA, Global Entrepreneurship Monitor

**Strategic Priority Area: Outward Looking**

| Indicator   | Baseline<br>(Position at 2002 unless otherwise specified)   | Position at 2003  | Position at 2004  | 2010 Prediction   | Rationale / Assumptions for Prediction   |
|---|---|---|---|---|--|
| Manufacturing Export Growth – NI exports as a % of NI sales | 35%   | 35.8%   | 38%   | 52%   | Rising fast due to macroeconomic conditions and forecast recovery of UK exports                  |
| Tourism Numbers   | A) business visitors – 518,000<br>B) holiday visitors – 285,000<br>C) visiting friends and family – 817,000 | A) business visitors – 603,000<br>B) holiday visitors – 340,000<br>C) visiting friends and family – 896,000 | A) business visitors – 651,100<br>B) holiday visitors – 354,700<br>C) visiting friends and family – 949,700 | A) business visitors – 734,700<br>B) holiday visitors – 443,200<br>C) visiting friends and family – 1,271,900 | Rising on trend reflecting expanding business in NI and recovery in the global tourism industry. |
| Tradable Services Exports                                   | No data available   |   |   | Not applicable  |  |
| Tourism Expenditure   | 2002 = £282m (2003 prices)  | £291m   | £356m   | £434m   | Rising on trend reflecting expanding business in NI and recovery in the global tourism industry. |

Data Sources: DETI, NITB, Regional Forecasts

**Strategic Priority Area: Equality of Opportunity / Social Inclusion**

| Indicator  | Baseline<br>(Position at 2002 unless otherwise specified) | Position at 2003 | Position at 2004 | 2010 Prediction | Rationale / Assumptions for Prediction |
|--|---|------------------|------------------|-----------------|--|
| LTU as a % of the economically active  | Spring 2002<br>NI vs UK gap = +1%                         | +1.1%            | +1.2%            | +0.8%           | Relatively stable trend projected      |
| Changes in employment of people from NTSN areas (2 targets – changes & share of inward investment) | A) Change in employment between 1999 and 2001 = 6,709     | A) No new data   | A) No new data   | Not applicable  | Lack of data prevents forecasts        |
|  | B) Share of Inward Investment in 2002 = 91%               | B) 80%           | B) 67%           | Not applicable  |  |
| Low income measure: NI wages of the lowest decile as a % of GB lowest decile                       | 90.4  | 90.3             | 90.4             | 91.5            | Stable trend projected                 |

Data Sources: DETI, Regional Forecasts

**Strategic Priority Area: Human Capital**

| Indicator   | Baseline<br>(Position at 2002 unless otherwise specified)        | Position at 2003 | Position at 2004 | 2010 Prediction | Rationale / Assumptions for Prediction                |
|---|--|------------------|------------------|-----------------|---|
| % working age population qualified to at least Level 2                        | 60.1%  | 61.4%            | 61.4%            | 65.1%           | Sectoral and occupational structure and trend factors |
| % working age population qualified to at least Level 3                        | 37.8%  | 37.9%            | 39.4%            | 40.8%           | See above   |
| % working age population qualified to at least Level 4                        | 20.5%  | 19.8%            | 22.6%            | 24.2%           | See above   |
| Level of Essential Skills for Living  | 5,500 learners supported by FE colleges and the voluntary sector | 9,820            |                  |                 |   |
| Number of pupils achieving 5+ A*-C GCSEs or comparable Level 2 qualifications | 58.7%  | 58.8%            | 58.9             | 59.5            | Steady trend projected                                |

Data Sources: DE, NI Census 2001, Labour Force Survey, Regional Forecasts

**Strategic Priority Area: A Competitive Physical Infrastructure**

| Indicator   | Baseline<br>(Position at 2002 unless<br>otherwise specified) | Position at 2003 | Position at 2004 | 2010 Prediction | Rationale / Assumptions for Prediction                              |
|---|--|------------------|------------------|-----------------|---|
| Take up of Broadband                                    | No data available  | 7%               | 23%              | Not Applicable  | Only two historical data points prevents forecasting this indicator |
| Average traffic speeds<br>on Key Transport<br>Corridors |  |                  |                  |                 |   |
| Northern Corridor                                       | Not available  | 46               | No data          |                 | Only one data point prevents construction of forecast               |
| North Western   | Not available  | 46               | No data          |                 | Only one data point prevents construction of forecast               |
| Western   | Not available  | 38               | No data          |                 | Only one data point prevents construction of forecast               |
| Eastern   | Not available  | 46               | No data          |                 | Only one data point prevents construction of forecast               |
| South Western   | Not available  | 46               | No data          |                 | Only one data point prevents construction of forecast               |

Data Sources: Regional Transportation strategy

Note: Figures are an average of the 'to' and 'from' speeds on each corridor

