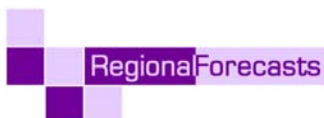


Comparative Analysis, Forecasts and Monitoring of the Northern Ireland Economy

Report 1: Initial Monitoring

November 2003



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i. NI Target Monitoring – Project Overview and Methodology

Overview

Regional Forecasts have been commissioned by the Department of Enterprise, Trade and Investment (DETI) to carry out research into exploring, understanding and monitoring the Economic Development Forum (EDF) economic development targets. First published in 2002 these targets provide a range of indicators against which economic performance can be monitored. The research has a number of distinct aims, namely:

- To investigate the viability of the targets
- To investigate potential linkages and interactions between individual targets
- To relate the targets to the wider economic environment and develop a forecasting methodology to provide ‘leading’ evidence of the projected path of the target variables
- To provide recommendations to the Department, both with respect to the targets themselves and the potential role of government in supporting progress towards the targets

The research project is initially scheduled for 12 months, though the longer-term requirement for target monitoring and assessment is recognised. This is the first of 4 quarterly reports which the project will provide over the year and the structure of these has been agreed at the project initiation stage and recorded in the inception document (2nd September, 2003).

Reporting structure

The structure of the reports is described in Figure i.1 below. Each report will contain chapters on the current economic content and the analysis of targets. In addition each report will contain a feature article, the first of which, in this report is productivity.

Figure i.1: Overview of report structure

| Initial monitoring | First forecast report | Monitoring review | Second forecast report |
|--|--|--|--|
| Methodology <ul style="list-style-type: none"> • Overview • Reporting structure • Modelling approach | Methodology <ul style="list-style-type: none"> • Overview • Reporting structure • Modelling approach | Methodology <ul style="list-style-type: none"> • Overview • Reporting structure • Modelling approach | Methodology <ul style="list-style-type: none"> • Overview • Reporting structure • Modelling approach |
| Economic Context <ul style="list-style-type: none"> • Quarter in context • Economic outlook | Economic Context <ul style="list-style-type: none"> • Quarter in context • Economic outlook | Economic Context <ul style="list-style-type: none"> • Quarter in context • Economic outlook | Economic Context <ul style="list-style-type: none"> • Quarter in context • Economic outlook |
| Analysis Chapter <ul style="list-style-type: none"> • Viability of targets | Analysis Chapter <ul style="list-style-type: none"> • Forecast of targets | Analysis Chapter <ul style="list-style-type: none"> • Role and impact of policy | Analysis Chapter <ul style="list-style-type: none"> • Forecast of targets |
| Feature Article <ul style="list-style-type: none"> • Productivity | Feature Article <ul style="list-style-type: none"> • Enterprise | Feature Article <ul style="list-style-type: none"> • Innovation | Feature Article <ul style="list-style-type: none"> • Human Capital |
| Conclusions | Conclusions | Conclusions | Conclusions & Recommendations |
| Monitoring annex <ul style="list-style-type: none"> • Current actuals • Current targets | Monitoring annex <ul style="list-style-type: none"> • Current actuals • Current targets | Monitoring annex <ul style="list-style-type: none"> • Current actuals • Current targets | Monitoring annex <ul style="list-style-type: none"> • Current actuals • Current targets |

A number of special features have been proposed by the RF team on the basis of research deemed appropriate to the overall aims of the project. However discussions will take place prior to each quarterly report to ensure the structure, and feature article in particular, meets the Department’s requirements.

The reporting timeline and associated project meetings is set out in the table below:

Table i.1: Summary of project timeline and meeting schedule

| Date | Deliverable | Meeting |
|--------|---------------------------|---------------------------------|
| Aug-03 | | Informal Project Update Meeting |
| Sep-03 | Inception Document | Formal Steering Group Meeting |
| Oct-03 | Initial Monitoring Report | Formal Steering Group Meeting |
| Nov-03 | | Informal Project Update Meeting |
| Dec-03 | | Informal Project Update Meeting |
| Jan-04 | First Forecast Report | Formal Steering Group Meeting |
| Feb-04 | | Informal Project Update Meeting |
| Mar-04 | | Informal Project Update Meeting |
| Apr-04 | Monitoring Review Report | Formal Steering Group Meeting |
| May-04 | | Informal Project Update Meeting |
| Jun-04 | | Informal Project Update Meeting |
| Jul-04 | Second Forecast Report | Formal Steering Group Meeting |

Modelling approach

Later in this project we propose to construct and operate a predictive model of the Northern Ireland economy to project forward trends in the main indicators underlying the EDF targets. In this section we outline the approach we propose to adopt in developing the model.

The model will include as many of the EDF key indicators as possible, and will embed these in a wider macro-economic system. This will cover all of the main aspects of the economy including GVA, employment, unemployment and population. The latter are important measures of the overall health of the economy, and hence of the factors that the EDF targets ultimately aim to improve.

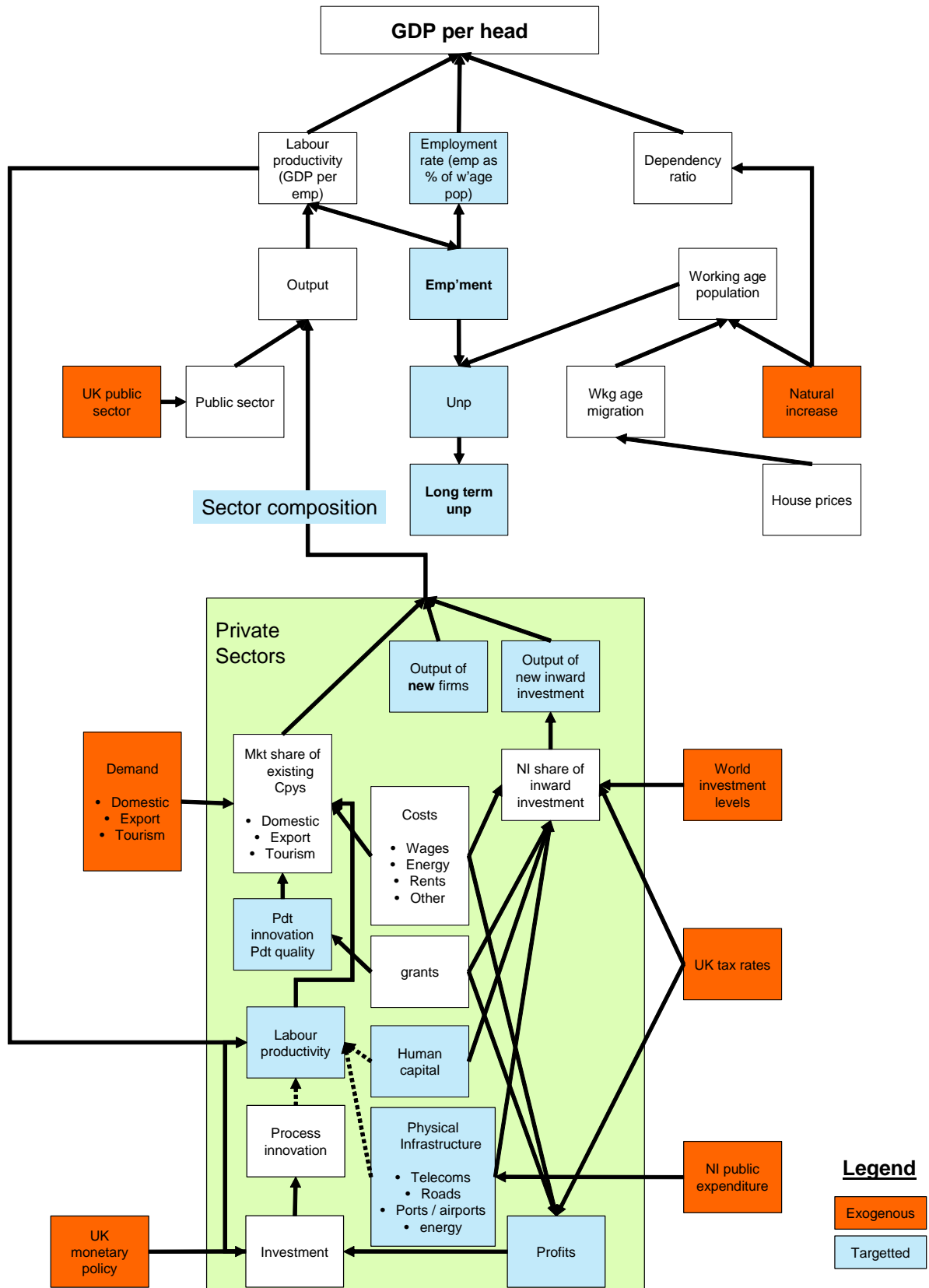
The EDF targets focus on those aspects of local economic activity that can be most directly influenced by government. This influence can either be through grant aid, advice or facilities provided by official agencies, or through the direct provision of services, such as training, and infrastructure. Most of these can be regarded as inputs to the process of production. The success of Northern Ireland's economic development policy will be judged partly on these, but more directly on the key economic outputs which together contribute to prosperity.

Macro-economic contextual indicators

Most important among the wider indicators is per capita GVA. This is the most widely used measure of economic prosperity, and is frequently used as an aspirational target in economic development strategies. It is not an EDF target, since it is heavily influenced by factors outside the remit of economic development policy, not least employment and incomes in the public sector. It is however important to appreciate how the EDF indicators contribute to per capita GVA and indeed also to employment, unemployment, incomes and population. We should note at this stage that employment growth is included as a primary target. Some of the other macro-economic variables are also included within the EDF strategy as secondary indicators. These include the employment rate (employment as a proportion of the working-age population) and the unemployment rate.

Our approach, based as far as possible on an accounting system is illustrated in schematic form in the accompanying box. It begins with per capita GVA and works towards private sector production where most of the EDF targets are focussed. The next step is to decompose per capita GVA into its three components. These are labour productivity, employment rate and dependency ratio. As we show in section 4, Northern Ireland's per capita GVA is low by UK and EU standards, because it has low labour productivity, low employment rates (and hence high unemployment and low economic activity rates), and also has a high dependency ratio. Low labour productivity and low employment rates are of similar magnitude and importance. High dependency is less important.

Figure i.2: Overview of proposed model framework



The major factors feeding directly into labour productivity and employment rates are GDP levels, employment levels, and working-age population. The EDF target indicators indirectly influence each of these, but in our view, the most logical route in which to include the targets is via output and GDP. A major subset of the model will thus comprise private sector output. Here we distinguish between existing firms and new firms, with the latter further sub-divided between new local businesses and new inward investment.

Private sector output

New firm formation and new inward investment are both less directly influenced by local economic conditions than are existing locally-based firms. We propose to model the level of new firm formation, especially in key tradable sectors, based on the large research literature on this topic. Equally important however, for the overall impact on the economy is the net creation of jobs and output in new firms, allowing for closures and for growth subsequent to formation. These are included as secondary indicators within the EDF strategy. The evidence suggests that policy intervention is more effective in reducing the closure of new firms than in stimulating their formation.

The level of inward investment will be modelled as depending on national and international economic investment levels in appropriate sectors and on local economic attractiveness as measured by relative grant levels, relative wages, and skills. Infrastructure will also be included although we take the view that infrastructure normally acts as a facilitating or constraining factor rather than as a direct inducement.

Influences on the expansion of existing firms also include external economic conditions and grants, but also on a host of other factors. These include relative costs of wages, energy, rents etc, the skills of the local workforce, management quality and the physical infrastructure. Of particular importance are a set of activities involved with change. These include product and process innovation, and raising product quality. All of these factors influence the market share taken by local firms in domestic markets, export markets and tourist markets. Actual levels of output, of course, also depend on levels of demand in each of these markets.

Methods of Estimation

To operationalise the model we require a set of equations to describe each of the relationships. These equations will be constructed on the basis of economic theory and observed behaviour over the last two or three decades. For the main macro-economic relationships we will rely on the experience gained in developing models of the Northern Ireland and GB regional economies. For some areas, including new firm formation there is an extensive literature to guide us.

In other areas evidence is less available. These include the important relationships between innovation and company growth since there can be no certainty of outcome

when investing in innovation. Nor does the availability of skills necessarily mean that corresponding value-added will be generated. In these cases we will be guided by the available evidence, including Stephen Roper's work on innovation and management methods in Northern Ireland manufacturing.

A particular lacunae concerns the service sector. Less is known about the influences on export growth and productivity in the service sectors than in manufacturing. Our focus will be on the financial and business services sectors where we expect the fastest growth in employment and GVA over the next decade. Where research results are lacking we will use transparent assumptions consistent with recent and past trends.

Forecasting

The projections will be guided and constrained by the forecasts of the world, UK macro and sectoral economies obtained from Oxford Economic Forecasting who are now one of the two major forecasting groups for the world economy. Particular importance will be given to the OEF forecasts for output and employment in UK sectors since these provide guidance as to the main opportunities for inward investment. Also of critical importance will be the forecasts for UK and international demand conditions.

We will also make use of the RF forecasts for UK regions to provide benchmarks against which to compare Northern Ireland. Key summary comparators will be per capita GVA, labour productivity and unemployment rates.

Conclusion

The many uncertainties involved in the exercise described above mean that no completely reliable estimates can be made of the future path of particular indicators or their influence on key macro-economic variables. However best estimates can be made of the likely path of the Northern Ireland economy based on past trends. This will help us to address a series of important questions.

One important question is whether the targets imply an improvement over past macro-economic performance, or instead a continuation of established trends. Past trends have generally involved rapid growth in employment, but at relatively low levels of labour productivity, wages and per capita GVA.

Where targets are ambitious and improve on previous performance we first need to take account of performance elsewhere to assess the relative improvement. Then we must make an assessment of the likely impact of that relative improvement on the Northern Ireland economy.

1. Economic Context and Outlook

The quarter in context

In this section we examine the NI economy over the last quarter. Examining short term indicators this section will provide a short synopsis of the changes occurring in the period between each of the quarterly reports.

Looking at the first half of 2003 NI has continued its trend of steady growth that has typified the economy for over a decade. As has been the case for some time the performance of the labour market looks more encouraging than the output market. Although GVA data are not available past 2000 at an industry level¹ the RF/OEF forecast model predicts suggests GVA growth of around 2.7% in 2001, 3% in 2002 before falling to 2.4% in 2003. This places NI towards the upper end of UK regional performance in 2001 and 2002 before returning to roughly UK level growth in the medium term. The forecast is driven by the above average employment performance in each of the last four years.

Despite the above UK average growth, 2003 has been a challenging year for NI with the sluggish global economy keeping FDI levels depressed and constraining growth in existing business. However the strength of the consumer demand continues to underpin local demand in NI as it has throughout the UK, and continues to create new jobs. Retail expansion across NI has led to the opening of a number of major shopping outlets, including B&Q and Debenhams opening major new stores in the last 6 months. The continued growth in consumer spending has been driven by favourable borrowing conditions, a strong labour market and increased wealth. Evidence of the increase in wealth can be seen in the data for house prices which, although slowing recently continues to grow. The average house price in Q3 2003 was nearly £88,000, over 9% higher than a year ago.

Other short term indicators over the last 6 months provide further evidence of a generally robust economy in what has been a the challenging period for parts of the UK economy. The table below summarises some of the data available for the first half of 2003.

¹ Industry level GVA are required to produce real GVA estimates, that is GVA in constant, not market, prices. As such although total GVA for 2002 for NI is known the lack of industry data prevents 'deflation' of these data.

Table 1.1: Short term indicators for the NI economy

| | Period | Level | Change (12 months) |
|-----------------------------|-------------|---------|-----------------------|
| Total employment | May-July 03 | 732,000 | 16,000 (2.2%) |
| Manufacturing employees | Jun-03 | 92,930 | -4,670 (-5%) |
| Services employees | Jun-03 | 510,710 | 10,930 (2.1%) |
| Claimant unemployment | Aug-03 | 34,300 | -900 (-2.6%) |
| Long term unemployment | Aug-03 | 7,670 | -1,290 (-16.8%) |
| Manufacturing output | Q2 2003 | 120.9 | -3.7 (3.1%) |
| CBI own business confidence | Jun-03 | 4 | -4 |
| CBI NI economy confidence | Jun-03 | -50 | -45 |
| House prices | Q3 2003 | 87,980 | 8,050 (9.2%) |

Source: LFS, DETI, CBI, HBOS

The fall in employment in manufacturing and services, although worrying, is in line with the UK contraction. Indeed the fall is not mirrored in the Labour Force Survey data which continues to show a rise in total employment. Manufacturing employment is at its lowest level for over 3 decades, however unemployment is also as low as it has been for a quarter of a decade.

Manufacturing output has out-performed UK growth recently, however a fall of over 3% in the year to Q2 2003 reflects some of the recent challenges facing the sector. Nevertheless, the output growth in recent years, coupled with the employment loss in manufacturing is likely to have led to some improvement in NI manufacturing productivity.

Business confidence in the Northern Ireland economy fell in June 2003 for the third consecutive time and, with the exception of September 2001 is at its lowest level for five years, perhaps a reflection of the manufacturing job loss and depressed world markets. Own business confidence, in contrast, has improved since Q3 2001 and remains positive at +4 in June 2003.

Economic outlook

Using data from the RF/OEF regional economic outlook and the other forecast reports in the OEF forecasting suite (UK Industry Prospects and UK Macro Economic Outlook) this section will examine the outlook at a global, UK and NI level.

The global economy

The global economy has endured a challenging period over the last 2 years with growth muted across most of the world major economies. The US economy, the major driver in world growth with over a third of world GDP, has had a number of 'false dawns' with growth stalling each time an upturn occurs and no consistent recovery apparent. Despite aggressive rate cuts and ambitious tax cutting plans, the US economy had not shown many signs of sustained recovery by mid-summer. However over recent months the omens look better, as the triple boost of low interest rates, fiscal expansion and a lower

dollar all begin to kick in. A huge and growing US external deficit remains to be addressed however, and a smooth recovery still looks risky.

The Japanese and Euroland economies have struggled even more significantly with Germany experiencing no growth in 2002. Japan, although beginning to show some signs of recovery can look back upon the 90's as a 'lost decade' with virtually no growth over the period. Expectations for the long overdue revival have been rising recently, but a great deal more needs to be achieved to overcome Japans structural problems of company indebtedness. Strengthening spending levels in China may provide a similar boost to the Japanese exports as the US and Euroland did over 10 years ago. However concerns over the value of the Asian economies currencies remains. At some point these currencies must revalue against the dollar with the consequence that Asian exports will fall and those in the US will rise.

The table below provides data on OEF forecasts for the major economies in the period 02 – 05.

Table 1.2: Economic growth and forecasts for the major world economies

| Real GDP/GNP | 2002 | 2003 | 2004 | 2005 |
|---------------|------|------|------|------|
| United States | 2.4 | 2.7 | 3.9 | 2.8 |
| Japan | 0.2 | 2.6 | 1.9 | 1.5 |
| Eurozone | 0.8 | 0.4 | 1.5 | 2.2 |
| Germany | 0.2 | -0.1 | 1.1 | 1.6 |
| France | 1.2 | 0.3 | 1.4 | 2.3 |
| UK | 1.9 | 1.7 | 2.9 | 2.6 |

Source: OEF – World Economic Prospects

The figures show that the UK economy has not struggled as markedly as elsewhere particularly in the Eurozone but it nevertheless remains below trend growth. UK is forecast to remain at the upper end of the Eurozone growth table but below the US recovery levels. Moreover the recent adoption of improved methods of deflation show better past performance than generally realised our expectation is that the forecast for 2003 will be raised, perhaps to 2%, as a result.

Looking at the OEF world forecast, the economies forecast to be at either end of the growth spectrum in 2004 are set out in the table below:

Table 1.3: Fastest and slowest growing economies in 2004

| Top 5 Growing Economies 2004 | |
|--|-----------------|
| Country | % Change |
| China | 7.5 |
| South Korea | 5.5 |
| Taiwan | 5.2 |
| Ireland | 4.5 |
| Greece | 4.3 |
| Bottom 5 Growing Economies 2004 | |
| Country | % Change |
| Germany | 1.1 |
| Netherlands | 1.2 |
| Italy | 1.3 |
| France | 1.4 |
| Switzerland | 1.5 |

Source: OEF – World Economic Prospects, Autumn 2003

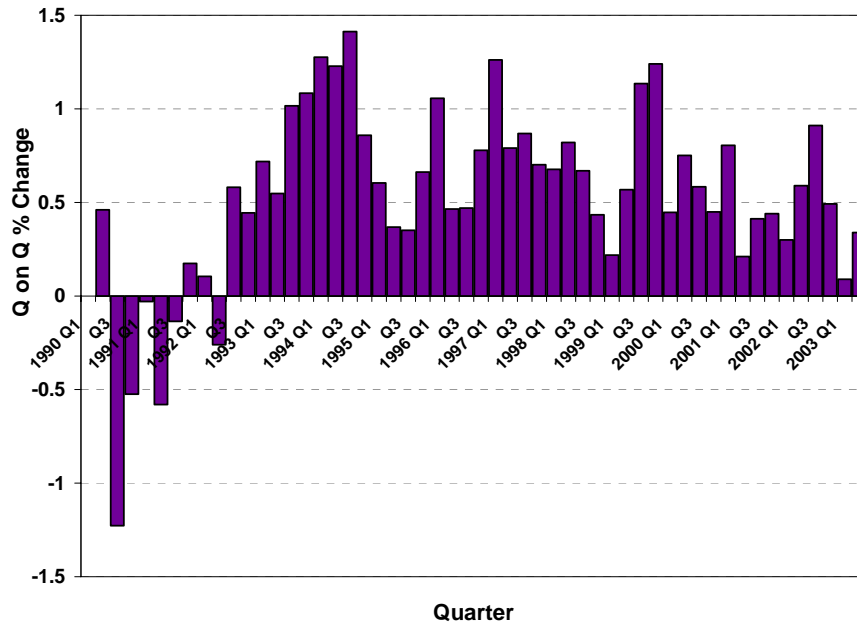
The forecast growth in China is a result of continuing high exports based on an undervalued currency and still strong import demand in the USA. The Irish growth, despite being under half the level of a couple of years ago remains strong by world standards and above any UK country or region. Ireland’s corporate tax incentives appear to have dissuaded many high multinationals from retrenching, and are likely to support future growth.

EU countries dominate the slowest economies with Germany and France continuing to grow at almost half the UK rate. It is notable however that no major economy is expected to grow at less than 1% in 2004 reflecting the upturn in global prospects.

The UK economy

As the section above suggests the UK economy has performed modestly well throughout the global downturn with growth only just falling below 2% in 2003. However the quarterly GDP data reveals rather more fluctuations than the annual figures suggest.

Figure 1.2: Quarterly GDP growth in UK

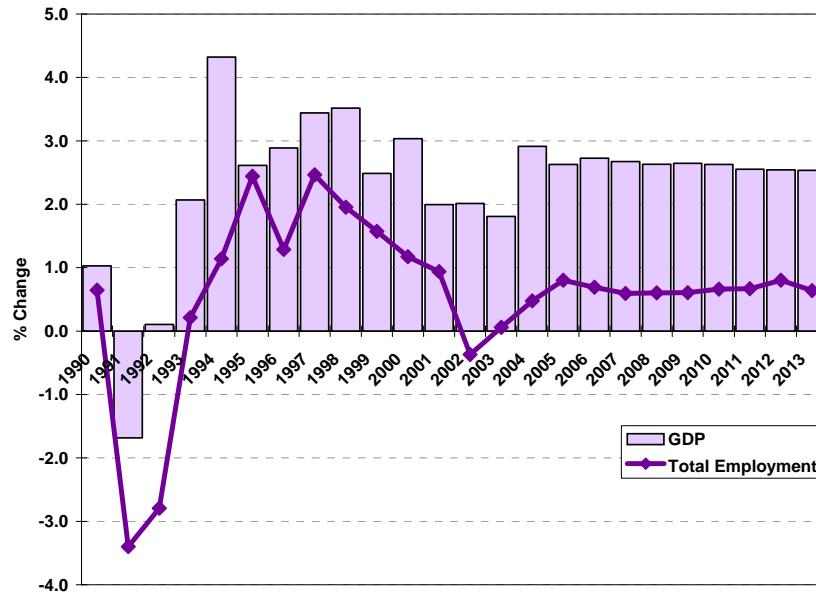


Source: National Statistics

The fall to just 0.1% growth in 2003 Q1 reveals a significant slowdown in growth though not as marked as in the early 1990's. It is a point to note that throughout the slowdown, quarter on quarter growth had never fallen below 0% at any time, though it has not grown at over 1% for 3 years. It is evident from the chart that no distinct pattern exists over the last 2 years with up-turns often lasting only 1 quarter.

Significantly the levels of growth remain below long term trend and well below the level necessary to meet the Chancellors ambitious forecasts for 2004 (3.5%). However the OEF outlook does predict something of a recovery in 2004, as a result of the pick-up in many industries suggested in the most recent 2003 data. GDP and employment forecasts for the UK are set out in the figure below:

Figure 1.3: GDP and employment forecasts for UK



Source: National Statistics, Regional Accounts, Regional Forecasts

Employment growth is expected to resume in 2004, however future growth is forecast to be modest at around 1%

Looking sectorally the major growth sectors, and those sectors with the bleakest outlooks are set out in the table below

Table 1.4: Fastest and slowest forecast sectors in 2004

| Top 5 Growing Sectors 2004 | | |
|-------------------------------|---------------------------------|----------|
| Rank | Sector | % Change |
| 1 | Basic metals | 7.6 |
| 2 | Communication | 6.0 |
| 3 | Electrical engineering | 4.7 |
| 4 | Fuels | 4.6 |
| 5 | Computers & optical instruments | 3.9 |
| 5 | Business services | 3.9 |
| Bottom 5 Growing Sectors 2004 | | |
| Rank | Sector | % Change |
| 1 | Agriculture | -0.4 |
| 2 | Other transport equipment | -0.4 |
| 3 | Non-metallic minerals | -0.1 |
| 4 | Food drink and tobacco | 0.1 |
| 5 | Textiles and clothing | 0.1 |

Source: OEF UK Industrial Prospects, Autumn 2003

The strong growth in metals is in part a reflection of the improving exchange rate and partially a pick up from poor performance in the last 2 years. Communications and

business services are forecast to continue their strong recent performance. Only three sectors have forecast declines for 2004. Unfortunately for NI traditional manufacturing features strongly among the weaker sectors.

Looking towards the medium term, projected job growth over the next decade in the UK, offers insight into the projected sectoral demand pattern. The table below reflects the macro level forecasts for job creation in the UK over the next decade

Table 1.5: Total job creation projections over the next decade in the UK

| Sector | Job Creation (000's) |
|----------------------------|-------------------------|
| Agriculture | -85.2 |
| Extraction | -26.4 |
| Manufacturing | -714.7 |
| Electricity, Gas & Water | -26.6 |
| Construction | 202.6 |
| Distribution & Hotels | 274.3 |
| Transport & Communications | 99.4 |
| Business & Finance | 1315.0 |
| Forces Stationed at home | 2.8 |
| Public Admin & Defence | -7.0 |
| Health & Education | 639.9 |
| Other Personal Services | 307.3 |
| Total | 1981.5 |

Source: Regional Forecasts

Clearly services are expected to remain the main source of new employment with business and finance expected to create over 1.3 million jobs. Health and education and other services have also strong outlooks. By contrast the manufacturing sector and agriculture are expected to continue to lose jobs throughout the decade.

The NI economy

This section will look at the NI economy, both historically and over the forecast period, it will draw upon the RF/OEF forecast which is updated bi-annually.

Profile of the NI economy

The NI economy is a small regional economy at the lower end of UK spectrum of prosperity. A look at some benchmark data supports this view. The table below sets out NI's regional rank in a number of key economic indicators with a 1 representing the highest in the UK and a 12 the lowest.

Table 1.6: Benchmark indicators for the NI economy

| Indicator | Rank in 2003 |
|--|--------------|
| Share of working age population | 10 |
| Participation rate | 9 |
| Unemployment rate | 11 |
| Share of emp. manufacturing | 8 |
| Share of emp. private services | 12 |
| Self employment as share of total emp. | 5 |
| GVA per person | 10 |
| GVA per manufacturing employee | 10 |
| GVA per private services employee | 11 |
| Average earnings | 12 |
| Real personal disposable income | 11 |
| Real consumers expenditure | 10 |
| House prices | 11 |

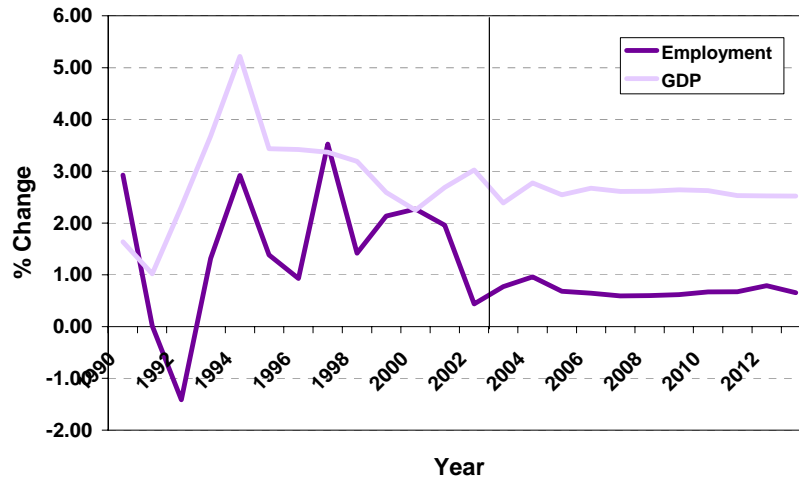
Source: Regional Forecasts

The ‘weakness’ of the economy is reflected in the relatively low ranks for most of the indicators. However, only the share of private services and average earnings are the lowest in the UK with a rank of 12. The most common rank position is 10 or 11. In most cases it is Wales or North East which are below NI. This represents some improvement over historical performance and both the relatively high level of self employment and an improving participation rate provide sign of encouragement.

Although low incomes and high unemployment characterise NI this does not mean that it is a strong growing economy. In fact the opposite is true, and low wages are one of the reasons for rapid growth.

Labour market growth has been NI’s most impressive economic achievement over the last decade, though interestingly such impressive labour market growth has not been associated with as rapid productivity growth as in the Republic of Ireland.

Figure 1.4: Employment and GDP growth in NI



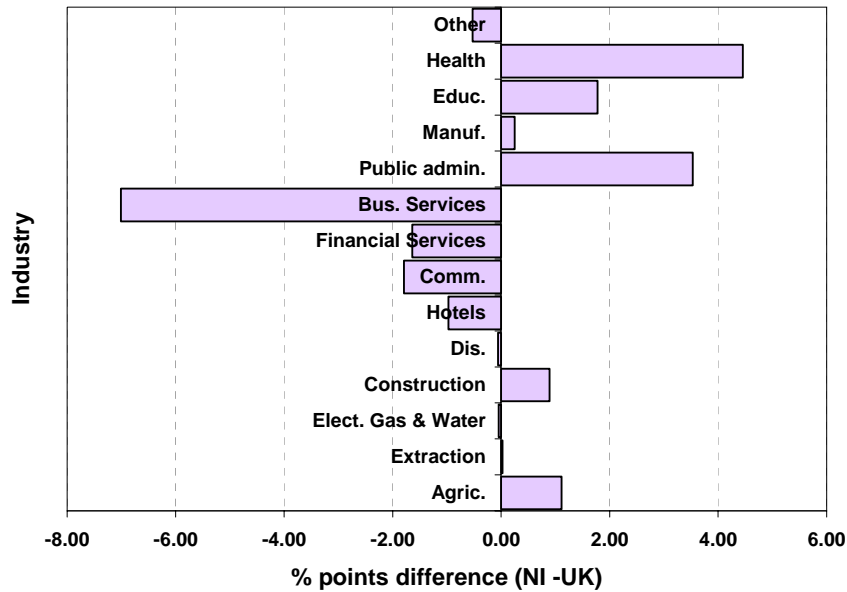
Source: National Statistics, Regional Accounts, Regional Forecasts

The reasons for slower productivity growth in NI include:

- Much of the employment growth has been in low value added sectors, such as the public sector and hotels and distribution which have been largely driven by rising population and hence consumer demand
- There has been an increase in the levels of part-time work across the economy in Northern Ireland
- The Republic's low corporation tax regimes continues to be attractive to R&D intensive firms with high recorded GVA (although much of this represents profits generated by R&D undertaken in the USA and elsewhere).

A comparison of NI's sectoral balance with that of the UK clearly identifies a lack of sectors in which most high value added service sector export firms operate (namely transport and communication and financial and business services).

Figure 1.5: Relative employment concentrations in NI (2003)

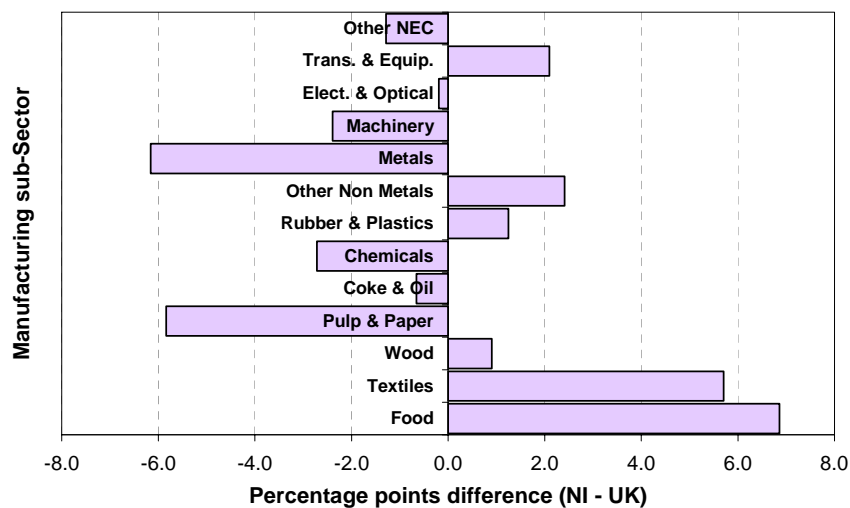


Source: Regional Forecasts

The figures beside each bar reflect the percentage change in jobs required to equate each sectors share of NI employment with that of the UK (assuming static levels of total employment). Over 80,000 private service jobs would for instance, be required to have a private services sector of equal size to that in the UK as a whole.

The manufacturing sector also provides the opportunity for high value added exports though it is worth remembering that across the UK this sector has declined significantly in recent years. Again NI's sectoral mix is not focussed on the sectors with the most promising outlooks, namely chemicals and electrical and optical.

Figure 1.6: Relative employment concentration in NI manufacturing (2003)



Source: Regional Forecasts

Medium term outlook

Looking forward, the NI economy is projected to continue to grow steadily, with employment growth keeping pace with the UK throughout the period to 2013. However output growth, although also tracking the UK, does not grow sufficiently strongly to erode any of the regional disadvantage described in the section above. Projected growth is however above the other peripheral regions of the UK and roughly on a par with the ‘midland’ regions of the UK.

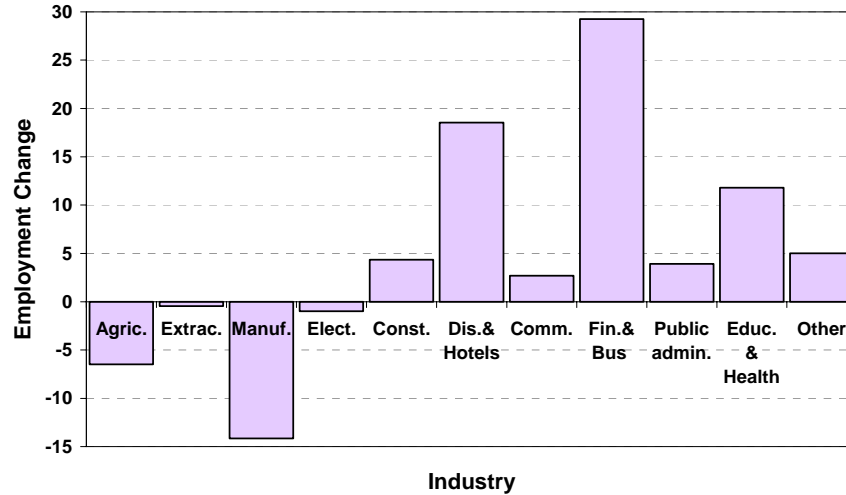
Table 1.7: Summary of growth forecasts

| Region | Growth 2003 | Average Growth (04-13) |
|------------------------|----------------|------------------------------|
| South East | 2.9 | 3.2 |
| London | 2.0 | 3.0 |
| Eastern | 2.3 | 2.7 |
| South West | 1.1 | 2.6 |
| West Midlands | 1.1 | 2.3 |
| East Midlands | 1.0 | 2.6 |
| Yorkshire & the Humber | 0.7 | 2.2 |
| North West | 1.3 | 2.3 |
| North East | 2.2 | 2.2 |
| Wales | 3.2 | 2.1 |
| Scotland | 1.6 | 2.3 |
| Northern Ireland | 2.4 | 2.6 |
| UK | 1.8 | 2.6 |

Source: Regional Forecasts

Looking at the forecast in more detail the current outlook is for growth to continue to be focussed in the private services sector, with the public sector also making a contribution. Employment in manufacturing is expected to fall consistently throughout the forecast period. The table below summarises the net employment changes projected over the next decade in NI.

Table 1.7: Summary of employment change over the next decade in NI



Source: Regional Forecasts

Population is expected to continue to expand at above UK rates with migration, remaining, roughly in balance. Projected consumer's expenditure remains strong, though growth is forecast to slow after its recent expansion. A summary of key forecast metrics is set out in the table below.

Table 1.9: Key forecast metrics, UK and NI

| | 2004 (%) | | 2002-2013 avg (%) | |
|-----------------------------|----------|-------|-------------------|-------|
| | UK | NI | UK | NI |
| Population | 0.28 | 0.38 | 0.29 | 0.49 |
| Working age population | 0.54 | 0.88 | 0.46 | 0.95 |
| Total employment | 0.48 | 0.96 | 0.52 | 0.67 |
| Manufacturing employment | -2.57 | -2.02 | -2.36 | -2.08 |
| Private services employment | 0.63 | 1.22 | 0.97 | 1.60 |
| Personal disposable income | 2.76 | 2.98 | 2.55 | 2.45 |
| Consumers expenditure | 2.56 | 2.58 | 2.67 | 3.62 |
| House prices | 6.30 | 7.40 | 6.09 | 5.79 |

Source: Regional Forecasts

More detailed forecast tables are provided in annex A.

Challenges

Looking at the profile and forecast data, they suggest a number of challenging facing the local economy:

- Attract high value added industry
- Educate and retain people to work in 'tomorrows' sectors
- Manage the change process as jobs continue to be lost in certain sectors
- Support the change to a private services sector led economy
- Continue to generate enough employment for the rising population

These macro challenges are complemented by a number of local level challenges with respect to equality of opportunity. The development of a project such as this which attempts to understand the structures that dictate growth in the NI economy and may provide a useful indicator of where policy may be able to contribute to meeting these challenges.

2. Viability of Targets

Overview

The EDF targets (henceforth referred to as the targets) first published in 2002 and then updated in summer 2003 provide a detailed list of primary and secondary targets for the NI economy for the year 2010. The targets are only set for the end of the period and not for each of the intervening years.

There are 20 primary and 19 secondary targets across 7 strategic aims. Some of the targets have distinct individual components; treating these separately there are 58 targets for the NI economy. The 7 Strategic aims are as follows:

- Knowledge / Productivity
- Innovation / Creativity
- Enterprise
- Outward Looking
- Equality of Opportunity / Social Inclusion
- Human Capital – Enhancing Capabilities and Skills
- A Competitive Physical Infrastructure

The process of target setting is a challenging one, but effective targets provide very useful indicators or ‘flags’ against which to assess economic performance. Used correctly they can provide early warning of economic challenges facing an economy and can provide a guide as to where policy could intervene to provide stimulus for improvement. Equally they can reveal areas where existing policy is perhaps not being best targeted. To fulfil this role targets should be:

- **Meaningful** – they should represent accurately the measure of economic performance which they are viewed to be
- **Influenceable** – they should be able to directly influence via the actions of those targeted with delivery
- **Acceptable** – all stakeholders with a role in helping to deliver economic development to meet the target levels should accept the process and the targets
- **Challenging** – the targets should provide a challenge above and beyond trend of ‘policy neutral’ growth

The four criteria can be viewed as the ‘applicability’ of the targets and considerable research is necessary to fully address these issues. In addition to the applicability of targets there are a number of practical considerations in selecting particular measures as targets, and these are considered below in the context of the actual EDF targets. At this stage we are mainly concerned with these practical issues of viability and leave for later reports the detail with respect to applicability. Also in later reports we will consider how

targets relate to the wider economy. This exercise will require development of the model outlined in the methodology section of the report.

Developing a data system

In order to carry out any viability assessment, monitoring work or forecasting, we will develop a database to store information on the targeted variables (both currently and historically). This dataset is intended for use both in monitoring and evaluating targets, and together with other data, as an input into the forecasting model which projects the likely future track of target variables. This dataset construction has a number of aims:

- **Providing a data dictionary** – A data dictionary provides information on the database variables. This includes the definition, source and the precise form of the data (e.g. annual average or monthly data). The dictionary is important in ensuring a clear and unique set of targets that can then be unambiguously monitored
- **Setting out a data monitoring framework** – The database will set out the monitoring tables and data that will provide the quarterly update of progress towards each individual target
- **Providing a modelling framework** – the collection must, where possible, gather historical data to ensure that modelling work can be carried out using a time series dataset. The period of collection has initially been aimed at 1995 onwards, but for some variables a longer period will be possible.

The EDF definitions contained in the 2002 Report ‘Working Together for a Stronger Economy’ provide a basis for a data dictionary. For this chapter we have examined the definitions of the target variables, and in consultation with the Department, have attempted to reproduce the baseline data in the EDF report. Not all of the data are publicly available and some require special requests to be made from providers of the initial data. In addition a limited number of targets do not have any historical data available or in some cases do not have measurable data.

The table below summarises the data dictionary that is now part of the data collection system. It summarises the high level source of the data (more detailed sources are set out in annex B) the years for which it was available (post 1995) and whether the data were available publicly, were requested or not available at the time of writing.

Table 2.1: Data dictionary summary

| Primary Target | Source | Data Gathered | Availability |
|----------------------------------|--------------------|---------------|--------------|
| Knowledge | | | |
| Manufacturing productivity | NS/DETI | 95-02 | Public |
| Private services productivity | NS/DETI | 95-00 | Public |
| MF employment | DETI | 95-02 | Requested |
| Tradable services emp | DETI | 95-02 | Requested |
| NI employment | DETI | 95-02 | Public |
| Invest NI client growth | Invest NI | 96-01 | Public |
| Inward investment | Invest NI | 95-01 | Public |
| Innovation | | | |
| Business R&D growth | DETI | 01 | Public |
| R&D per person employed | DETI | 99,01 | Public |
| % plants involved innovation | Innovation Lab | 99,01 | Requested |
| Average product changes | Innovation Lab | 99,01 | Requested |
| New products per employee | Innovation Lab | 99,01 | Requested |
| % sales from new products | Innovation Lab | 99,01 | Requested |
| Enterprise | | | |
| Birth rate per 10,000 businesses | NS | 95-01 | Public |
| Jobs from inward invest | Invest NI | 95-01 | Public |
| Job quality | - | - | N/A |
| Level of VC | BVCA | 01 | Requested |
| Outward Looking | | | |
| Export growth | DETI | 95-02 | Public |
| Tourism numbers | NITB | 95-02 | Public |
| Equality | | | |
| LTU % active | DETI | 95-02 | Requested |
| TSN employment | Invest NI | 95-01 | Public |
| Low income measure | DETI | 95-02 | Requested |
| Human Quality | | | |
| NVQ Level 2 | DETI | 98-02 | Requested |
| NVQ Level 3 | DETI | 98-02 | Requested |
| NVQ Level 4 | DETI | 98-02 | Requested |
| No qualifications | DETI | 98-02 | Requested |
| Level of essential skills | DEL | 02-03 | Requested |
| Infrastructure | | | |
| Broadband access | - | - | N/A |
| Electricity prices | Electricity Assoc. | 02 | Requested |
| Development of roads | - | - | N/A |

| Secondary Target | Source | Data Gathered | Availability |
|--|------------------|---------------|--------------|
| Knowledge | | | |
| MF output growth | DETI | 97-02 | Public |
| Average earnings | DETI/NS | 95-02 | Public |
| Whole profitability | - | - | N/A |
| Invest NI client company profitabilty | Invest NI | 95-00 | Public |
| Innovation | | | |
| % R&D devoted to commercialisation | DETI | 99,01 | Public |
| Experimental development R&D per employee | DETI | 99,01 | Public |
| % employment in business R&D | DETI | 99,01 | Public |
| Enterprise | | | |
| Survival rate | DETI/SBS | 98-01 | Public |
| Failure rate | DETI/SBS | 95-02 | Public |
| No. of medium sized companies | DETI | 00-02 | Requested |
| Growing small businesses into med. business | DETI | 00-02 | N/A |
| Outward Looking | | | |
| Value of exports of goods | HM Customs & Ex. | 96-02 | Public |
| Tradeable services exports | - | - | N/A |
| Tourism spend per visitor | NITB | 95-02 | Public |
| Tourism expenditure | NITB | 95-01 | Public |
| JV/SP % of stock of business | - | - | N/A |
| Equality | | | |
| Employment rate | DETI/NS | 95-02 | Public |
| Unemployment rate | DETI/NS | 95-02 | Public |
| Economic inactivity rate | DETI/NS | 95-02 | Public |
| Human Quality | | | |
| High income measure | DETI | 00,02 | Requested |
| Higher level jobs (% employees in SOC 1 - 3) | DETI | 95-00 | Requested |
| Higher level jobs (% employees in SOC 1 - 2) | DETI | 95-00 | Requested |
| Proportion of organisations with IIP 200+ | IIP UK | 01-03 | Requested |
| Proportion of organisations with IIP 50+ | IIP UK | 01-03 | Requested |
| Infrastructure | | | |
| Gas availability % of households | DETI | 01-02 | Requested |
| GP: small commercial plus industrial | DETI | 01-02 | Requested |
| GP: large commercial plus industrial | DETI | 01-02 | Requested |
| Electricity produced from renewable sources | DETI | 02-03 | Requested |

The table reveals some of the problems constructing a dataset, especially with respect to maintaining consistency over time. Work is continuing to further populate the dataset and uncover any additional sources of data. It is however worth reflecting the breakdown of availability and completeness at this stage:

- 26 targets (50%) are based on publicly available data
- 20 targets (38%) are based on data only available through special requests
- 6 targets (12%) have no currently available data
- 38 targets (44%) have data available for each year since 1995

At the time of writing (October 2003) less than 10 targets have data available for 2003. In future we aim to provide a mixture of estimates and forecasts to help establish how well targets are being met in the current year.

The RF team welcome any further advice on filling the gaps in any of the data sources.

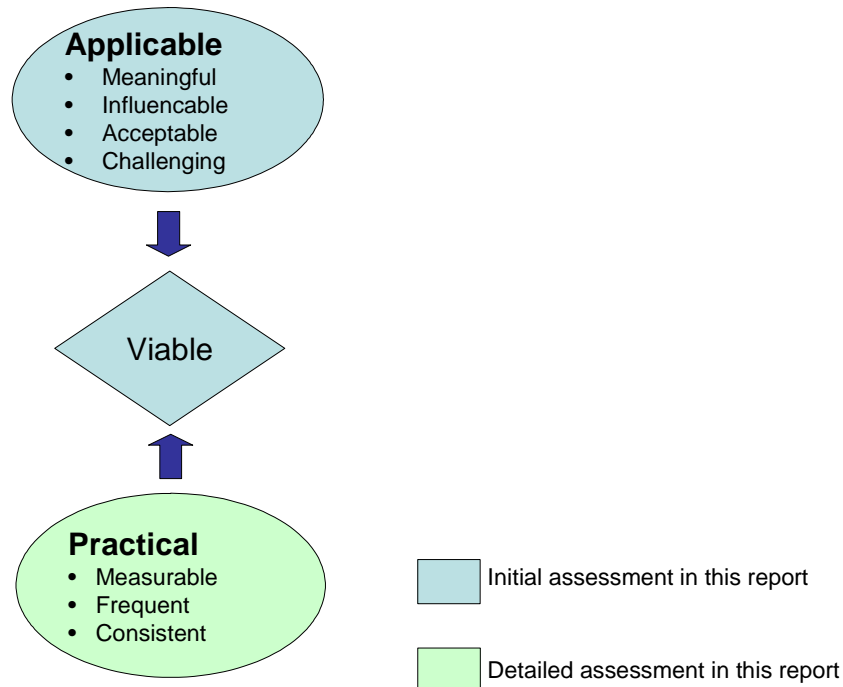
Assessing viability

With such a detailed list of targets it is important to have a robust and ongoing monitoring system that provides updated information for each of the individual targets. Based on the evidence of the data dictionary exercise and subsequent consultation with the Department it is clear that the exercise in establishing a monitoring framework for the targets has been a challenging one. This is in part due to the diverse nature of the sources from which the data are drawn (many of which are not published) and also in part due to a lack of clarity on the precise definition of the targets. It is therefore important to examine the targets in detail at the outset of this project to ensure that they are ‘viable’ targets.

There are a range of criteria that could be used to assess viability, but broadly speaking they can be classified into two categories, namely applicable and practical criteria. Applicable criteria focus on the aims which the targets should meet, set out at the start of this chapter. Practical criteria focus on whether the data are available, (currently, consistently, historically and frequently).

The figure below summaries the two aims.

Figure 2.1: Approach to assessing target viability



It is relatively straightforward at this early stage of the project to assess the practical ‘arm’ of the viability tests, however the applicable arm will not be fully examined until a later stage. An initial examination of the targets in the table below tentatively explores how meaningful the targets are. Applicability will be further developed during the course of this research project. In particular, the questions with respect to whether the targets are both challenging and possible to influence have not yet been addressed. The table following will therefore be revisited during our research with recommendations with respect to test of applicability.

For this report data has been gathered on all the targets (both primary and secondary) and an initial assessment of viability made for each of the targets. Whilst this will need to be revisited it does provide some preliminary findings that require consideration by the Department and the EDF.

The table below sets out the results of the viability exercise with each test assessed as follows:

- **Practical:** Are consistent published data available historically, currently and with sufficient frequency for the indicator?
- **Applicability:** Does, upon initial consideration, the target provide a helpful and meaningful target in its current form?

A ‘tick’ in the table means the data in question passes the test, a question mark means some concerns exist and an X means it fails the test.

The sections following the summary tables provide a brief discussion of the targets which do not pass either test.

Table 2.2: Viability of targets

| Primary Target | Practical test | Applicable Test |
|----------------------------------|----------------|-----------------|
| Knowledge | | |
| Manufacturing productivity | ✓ | ? |
| Private services productivity | ? | ✓ |
| MF employment | ✓ | ✓ |
| Tradable services emp | ✓ | ✓ |
| NI employment | ✓ | ✓ |
| Invest NI client growth | ✓ | ? |
| Inward investment | ✓ | ✓ |
| Innovation | | |
| Business R&D growth | ? | ✓ |
| R&D per person employed | ? | ✓ |
| % plants involved innovation | ? | ✓ |
| Average product changes | ? | ✓ |
| New products per employee | ? | ✓ |
| % sales from new products | ? | ✓ |
| Enterprise | | |
| Birth rate per 10,000 businesses | ✓ | ✓ |
| Jobs from inward invest | ✓ | ? |
| Job quality | x | ✓ |
| Level of VC | ? | ✓ |
| Outward Looking | | |
| Export growth | ✓ | ✓ |
| Tourism numbers | ✓ | ✓ |
| Equality | | |
| LTU % active | ✓ | ? |
| TSN employment | ✓ | ✓ |
| Low income measure | ✓ | ✓ |
| Human Quality | | |
| NVQ Level 2 | ✓ | ✓ |
| NVQ Level 3 | ✓ | ✓ |
| NVQ Level 4 | ✓ | ✓ |
| No qualifications | ✓ | ✓ |
| Level of essential skills | ? | ? |
| Infrastructure | | |
| Broadband access | x | ✓ |
| Electricity prices | ✓ | ✓ |
| Development of roads | x | ✓ |

| Secondary Target | Practical Test | Applicable Test |
|---|----------------|-----------------|
| Knowledge | | |
| MF output growth | ✓ | ✓ |
| Average earnings | ✓ | ✓ |
| Whole profitability | x | ✓ |
| Invest NI client company profitability | ? | ? |
| Innovation | | |
| % R&D devoted to commercialisation | ✓ | ✓ |
| Experimental development R&D per employee | ✓ | ✓ |
| % employment in business R&D | ✓ | ✓ |
| Enterprise | | |
| Survival Rate | ✓ | ✓ |
| Failure rate | ✓ | x |
| No. of medium sized companies | ✓ | ✓ |
| Growing small businesses into medium sized business | ? | ✓ |
| Outward Looking | | |
| Value of exports of goods | ✓ | ✓ |
| Tradeable services exports | x | ✓ |
| Tourism spend per visitor | ✓ | ✓ |
| Tourism expenditure | ✓ | ✓ |
| JV/SP % of stock of business | x | ✓ |
| Equality | | |
| Employment rate | ✓ | ✓ |
| Unemployment rate | ✓ | ✓ |
| Economic inactivity rate | ✓ | ✓ |
| Human Quality | | |
| High income measure | ✓ | ? |
| Higher level jobs (% employees in SOC 1 - 3) | ✓ | ✓ |
| Higher level jobs (% employees in SOC 1 - 2) | ✓ | ✓ |
| Proportion of organisations with IIP 200+ employees | ? | ? |
| Proportion of organisations with IIP 50+ employees | ? | ? |
| Infrastructure | | |
| Gas availability % of households | ? | ✓ |
| Gas prices: small commercial plus industrial | ? | ✓ |
| Gas prices: large commercial plus industrial | ? | ✓ |
| Proportion of electricity produced from renewable sources | ? | ✓ |

Targets with 'practical' concerns

As the table suggests, 7 targets fail the practical test and 16 (50%) targets raise at least some concerns.

The targets failing the practical test do not currently have any data available, though the EDF documentation states that work is ongoing to develop some of them. It is important that consideration is given to determining when these data will be available and whether this fits within the time frame of the monitoring work. These targets are:

- **Job quality** (*primary, enterprise*) : work is ongoing in Invest NI
- **Broadband access** (*primary, infrastructure*) : currently no data on companies with broadband access
- **Development of roads** (*primary, infrastructure*) : targets are set out in the 'Regional Transport Strategy'
- **Whole profitability** (*secondary, knowledge*) : work is ongoing to establish precise definition²
- **Tradeable services exports** (*secondary, outward looking*) : work is ongoing in DETI
- **Joint Ventures and Strategic Partnerships as % stock of business** (*secondary, outward looking*) : work is ongoing in Invest NI

Broadly speaking the targets with concerns over practicability require further engagement with data providers in an attempt to provide a longer time series of data. In some cases, however, the data originates from surveys which if not repeated will prevent the extension of a historical data series. The targets raising some concerns are as follows:

- **Private services productivity** (*primary, knowledge*) : data lag of 3 years, forecasts will provide and indicator of likely progress
- **R&D per person employed** (*primary, innovation*) : based on a bi-annual publication with limited historical data
- **% plants involved innovation, average product changes, new products per employee, % sales from new products** (*primary, innovation*) : based on bi-annual surveys – important to ensure these data continue to be produced in this form.
- **Level of VC** (*primary, enterprise*), **level of essential skills** (*primary, human quality*), **proportion of organisations with IIP 200+ employees, proportion of organisations with IIP 50+ employees** (*secondary, human quality*), **gas availability % of households, gas prices: small commercial plus industrial, gas prices: large commercial plus industrial, proportion of electricity produced from renewable sources** (*secondary, infrastructure*) **Growing small businesses into medium sized business** (*secondary, enterprise*): further work with data provider ongoing to establish time series data if possible
- **Invest NI company profitability** (*secondary, knowledge*) : data lag of two years, further work with data provider ongoing

These issues will be revisited in our next report when the complete data series will be constructed for all available years and each data provider engaged with to fully populate any data gaps.

² It has been established that the indicator refers to Gross Trading Profits from regional accounts, this will be examined further in future reports.

Targets with 'applicable' concerns

Turning to the more complex issue of the applicability of targets, the provisional examination carried out in this project, which stated earlier had focused on how meaningful the targets are in their current form reveals 1 targets failing the applicability test and 6 raising some concerns. These are discussed below:

Targets failing applicability test:

- **Failure rate** (*secondary, enterprise*): target for 2010 implies an increase in closures of new firms. Although 'churning' is often viewed as healthy, it is inadvisable to target policy towards higher failure unless government support for new firms is planned to be reduced. The 'fallout', or consequence, of increasing birth rates, which is targeted, will result in rising failure rates and as such the target could be discarded whilst still reviewing the data over time.

Targets raising some concerns:

- **Manufacturing productivity** (*primary, knowledge*): The definition of the targeted variable is unclear in published EDF reports. We believe the variable is GVA per employee in manufacturing. Unfortunately there are 2 data sources (regional accounts and the ABI) and these give widely differing estimates. The 2002 baseline value in the EDF documentation uses neither of these and is based on an unsatisfactory approximation using the index of production.
- **Invest NI client growth** (*primary, knowledge*): It is unclear whether this refers to a fixed population of INI client companies or includes new inward investment and new small firms.
- **Jobs from inward invest** (*primary, enterprise*): This target is repeated (in Primary, enterprise). One of the two occurrences should be dropped. Actual creation of jobs would be more appropriate than jobs promoted.
- **Level of essential skills** (*primary, human capital*): Definition of 'assessed needs in essential skills' unclear. Also unclear whether the definitions and measure will survive unchanged over the target period.
- **High income measure** (*secondary, human capital*): Data source is unclear. Best source is census of population but there will be no data for 2010 or for intervening years. The definition should refer to the private sector alone since NI's large public sector distorts comparisons with GB.
- **Proportion of organisations with IIP 50+ / 200+ employees** (*secondary, human quality*): This target would be more applicable if it were simply a NI level and not a comparison with GB.

Current target levels

Having provisionally reviewed the targets viability and developed the data collection system, this research project will then provide ongoing target monitoring. Although an exercise has just been completed by the Department to update the targets for 2003 a simultaneous exercise has been carried out by the RF team. Data was identical to that produced by the Department for most indicators, some targets require reconciliation to

ensure precise definitions are the same. This work is ongoing and will be reported on in the next forecast report.

Although no targets exist for the years prior to 2010 it is possible to interpolate to provide annual figures for monitoring purposes. Progress towards targets is unlikely to be linear in many cases. Business cycles, economies of scale etc, will affect progress and interpolated target paths can only be an approximate guide. Subsequent reports will explore this in more detail and present performance against target comparison in each year.

The monitoring table is presented in full in annex C which will be repeated in each quarterly report. Future reports will examine in detail the progress towards each target for each indicator.

Way forward for data collection

Each of the quarterly reports will provide a monitoring annex which reflects the current level of each target as presented in this report. In addition two of the reports will provide a forecast of the targets (where applicable) which can be used to view levels in any given year. This will provide a guide to progress with estimated values available for the current year in most cases. The project may also explore, using the time series data, some of the targets in more detail where specific divergence from target is apparent.

Data will be collected as they become available and data requests will be made prior to each report being compiled. The data requests will be organised so that a proforma for data requiring completion will be provided to each of the providers. This will minimise burden and summarise data provided in the past to ensure comparability.

3. FEATURE ARTICLE: Measuring and Understanding Productivity

What is Productivity and Why is it Important?

Productivity is usually defined as the volume, or value, of output (of a firm, sector, region etc.), divided by the resources used to produce that output. Output can be either gross output or net output (i.e. total output net of inputs of materials, components, fuel transport etc.). The resources are usually labour and capital, with labour measured in numbers of employees or hours worked and sometimes adjusted for labour quality. The major long-term influence on productivity in mature economies is technological progress. This is difficult to measure directly, not least because much technological progress is embodied in new machines and processes, and is often imputed as a residual in equations which take account of those factors that can be measured.

The earliest economic work on productivity was largely concerned with agriculture, and most empirical work has been on manufacturing where output and capital were relatively easy to measure. Service sector productivity has been more difficult, not least because measures of service output have been inadequate. This situation is changing and in the USA, at least, measurement has improved significantly. The great increase in IT investment in services has led to a situation in which much service sector productivity has risen in the USA at similar rates to those in manufacturing over recent years (Triplett and Bosworth, 2003)

Productivity is of intense interest to economic policy makers and others for two reasons:

- Firstly, policy makers wish to be able to compare the efficiency of their local economies with other countries or regions, especially those embodying current best practice.
- Secondly, efficiency is of concern because it is the major influence on living standards.

High productivity can be obtained across a whole economy either by concentrating resources in high value activities, or by superior efficiency within each individual activity. Living standards are raised over time through a process of raising the efficiency of production in individual sectors, thus freeing up labour and using that labour in additional, and often, but not always, higher value, production.

The chief benefit of capitalism lies in the raising of living standards by forcing up efficiency through competition, with more efficient producers replacing the less efficient. Labour is also reallocated in this process, from sectors with fast growing productivity (e.g. from manufacturing which needs less labour), to sectors with slower-growing productivity. The latter have mostly been in the service sectors, especially public

services. Although such changes are inevitably painful for some, they are essential to the process of raising living standards. The key failing of the Soviet system was that it failed both to replace less efficient producers with the more efficient, and because productivity failed to rise rapidly where there was potential to do so, labour was retained in traditional sectors and not redirected to more efficient sectors as in western economies. As a result, Soviet living standards lagged increasingly far behind those in the West

Interest in productivity among regional economic policy-makers within the UK stems from the persistent and growing disparities in productivity and living standards between regions. This problem has long been a major issue for Northern Ireland, but more recently policy makers have become increasingly concerned about widening gaps between English regions.

The reasons for low productivity, in NI and in other UK regions, are not generally well understood and more work is needed to improve understanding. This chapter can only make a start in this direction. We start by reviewing some key issues for Northern Ireland, and with a section on the measurement of productivity. This is followed by an analysis of productivity across NI sectors showing how this relates to living standards and to wage levels. Finally we suggest some reasons for the fact that productivity, measured by GVA per employee is well below the UK average in most of NI's main sectors.

Productivity Issues in Northern Ireland

Northern Ireland has traditionally had low productivity by UK and EU standards. This is partly due to the slow changing mix of industries leaving a relatively high concentration of traditional, low-productivity sectors including agriculture, food production and textiles and clothing. It is also due to a tendency to have relatively low productivity within its largest sectors. GVA per employee in agriculture is an extreme case at only 56% of the UK average.

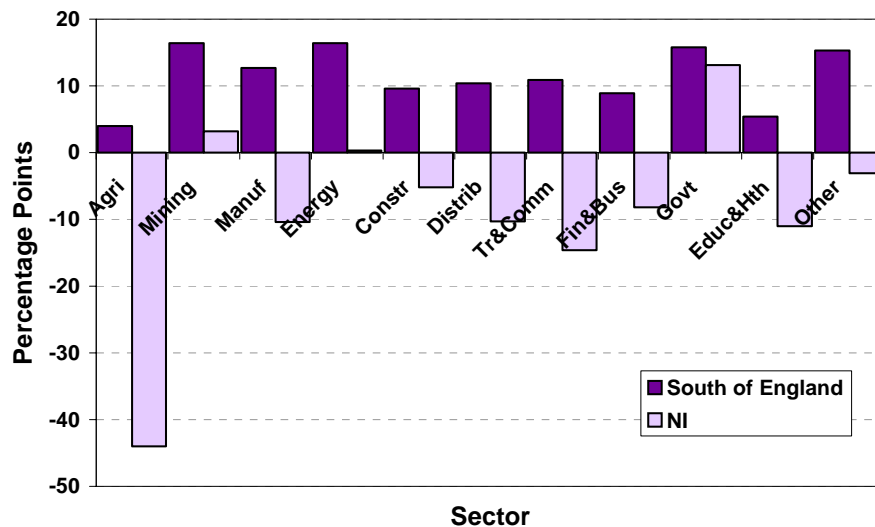
Because unemployment has traditionally been high, redundancies and closures have caused particular social problems, and have often been prevented by policy intervention and subsidies. Agriculture is very heavily subsidised through the CAP. Although this affects all EU economies, its impact is greatest on regions like NI where the sector had undergone less reform than elsewhere before joining the EU. Northern Ireland manufacturing is also more heavily subsidised than elsewhere in the UK³. The textile and clothing sector, for instance received large-scale support during the 'troubles' to protect jobs, but has subsequently declined rapidly once the level of support diminished, losing half of its employment over the last five years.

An important consequence is that NI has retained an economy that is concentrated in low productivity sectors, and in sectors which receive subsidies or are directly financed from

³ As evidenced by public expenditure per employee on industrial subsidies

public expenditure. Sectors like financial and business services which have generally high GVA per employee, and considerable export potential, but receive little subsidy, are greatly under-represented in NI.

**Figure 3.1: GVA per Employee by Sector Relative to UK – 2000
(Region – UK)**



Source: National Statistics, Regional Accounts, Regional Forecasts

There is a particular need to raise productivity across the NI economy to:

- Raise wages and living standards in NI
- Assist in raising the productivity and living standards of the UK as whole through a higher contribution to public revenue and lower needs for public expenditure
- Make NI better placed to benefit from UK macro-economic policy through having an economy closer in character to the UK average
- Improve regional equity across the UK

The issue of low productivity has traditionally taken second place to the pressing need to create jobs, at whatever level of productivity, to tackle the problem of high unemployment. The reduction of measured (but not hidden) unemployment over recent years has reduced these pressures leaving low wages and productivity as key remaining issues. This makes it more important than in the past to establish the facts rigorously and we now turn to measurement issues.

Measuring Productivity

Physical Productivity and Efficiency

In its purest form, productivity refers to physical measures of output divided by measures of the labour (numbers of workers or hours worked) and capital employed. This constitutes a measure of efficiency and has normally been applied to manufacturing, although international comparisons of UK productivity include construction projects and hotels.

For instance, in the run up to privatisation, Harland and Wolff undertook a series of productivity comparisons with the Kawasaki shipyard in Japan since both produced a very similar type of ship at that time (bulk tankers). The results showed that the Japanese produced five times the tonnage of H&W per worker even though the capital equipment was generally superior in Belfast (except that the Japanese workforce possessed more hand-tools per person).

Similarly, NIESR undertook a series of Anglo-German productivity comparisons in the 1980's showing how German firms in specific industries managed to produce greater levels of output per worker (Smith et al,1982, Daly et al,1985). This methodology was replicated in a series of Northern Ireland-Germany comparisons undertaken at NIERC for a series of industries including textiles and clothing, mechanical engineering and food products (Hitchens, Wagner and Birnie (1990), Roper and Hofman, (1993) . The results of both studies suggested that better trained workforces in Germany, resulting from the superior German occupational training system, allowed more efficient working practices. Such studies followed a long tradition of detailed comparisons of physical productivity over the last century prompted by concerns of lagging UK productivity compared with the USA, Germany and to a lesser extent France.

Value of Products or Services

Such studies are necessarily detailed and hence time consuming and expensive. Their applicability is also limited by the fact that only similar processes can be compared. To compare different products, processes or industries output has to be compared on the common basis of monetary value. Although different industries can then be compared, the comparison is no longer simply one of numbers of physical objects or transactions. Other factors influence value. These include product quality and originality, and aspects of marketing including brand recognition, consumer loyalty and market dominance.

In the modern world the complex influences on value may be of more importance than narrow issues of production efficiency. Value added through superior innovation, design, marketing etc. is as important as that added through productive efficiency as long as such gains can be sustained in competitive market conditions.

Even if measured in terms of value, output still needs to be compared with the resources that go into producing the product or service. Conventionally value of output is divided by the labour involved in its production, either in numbers of people or, better in numbers of person hours. While this is satisfactory for activities with broadly similar levels of capital employed, it is inappropriate for comparing activities with contrasting levels of capital intensity. The value of output per employee in energy production in Northern Ireland was, for instance, £330,000 per employee in 2001 compared with only £133,000 in manufacturing or £79,000 in transport and communications. The key factor in the energy and water sector is the large amount of capital employed in power stations and water treatment plants. Ideally, capital should be included in the calculation, but problems in measuring capital stock means that labour is often included alone.

When comparing countries or regions with similar proportions of activity in the various sectors, differences in capital stock are less important, and broad comparisons of the value of output per employee can have validity.

Value-Added

A widely used measure of productivity, especially in regional comparisons, is value-added per employee, or more broadly value-added per head of population. The latter is the most widely used measure of national and regional living standards and more generally of production levels. Per capita value-added is however not strictly a measure of productivity, but instead measures the income from production available (in principle) to support the living standards of the national or regional population.

Value-added (usually termed gross value-added or GVA) is the value of output in a company or organisation less the costs of bought-in goods and services. In other words it is the sum of wages and profits. It is thus a measure of the productivity of a business (or sector, or region) in generating income for the employees, creditors and owners. We should note that GVA per employee is just as heavily influenced by capital-intensity as is gross output per employee. Highly capital-intensive sectors aim to generate high levels of value-added relative to the number of employees. Most of this is a return to capital and thus takes the form of profits to be distributed to the owners and creditors of a business.

This in turn has an important consequence for the use of GVA per employee in comparing regional productivity. Regions with a heavy concentration of capital-intensive sectors may have high GVA per employee, but most of this may be profit to be distributed to banks, bond-holders and shareholders nationally or internationally. The main element of GVA accruing to local residents is usually the wage and salary element. As an area with mainly traditional labour-intensive sectors within manufacturing, Northern Ireland has a relatively high proportion of its manufacturing GVA remaining within the region. This is obviously important for comparisons with the Republic of Ireland, where the opposite is true, but also for comparisons with other small capital-intensive economies (e.g. Tee-side with its large chemicals industries).

Finally we should note that GVA may be a small proportion of the value of gross output in areas where production involves relatively simple assembly of complex or high-quality components bought-in from outside the region. In the service sectors the situation is more complex. Low value-added to turnover ratios in distribution may, for instance, indicate efficient operations in which staff handle high volumes of throughput. In professional and business services, local branches dependent on buying-in high value services from company offices in other regions will have relatively low value added per employee. Conversely simple consumer oriented services may involve little need for expensive IT equipment or high-cost advice.

In Northern Ireland the ratio of GVA to turnover in manufacturing is below the UK average and appears to have been falling further behind the UK over recent years. This suggests that NI plants undertake more assembly work than other regions and less in-house high value manufacturing. In distribution the pattern is unclear. In business services, however, it is clear that businesses in NI are in general more self contained than in GB.

Table: 3.1 Ratio of GVA to turnover

| | Manufacturing | | Distribution | | Business Services | |
|-------------|---------------|------|--------------|------|-------------------|------|
| | NI | UK | NI | UK | NI | UK |
| 1995 | | 32.8 | | 12.4 | | 43.8 |
| 1998 | 33.1 | 32.5 | 14.9 | 16.3 | 56.9 | 49.3 |
| 1999 | 31.2 | 32.6 | 15.1 | 17.0 | 66.7 | 50.1 |
| 2000 | 29.2 | 31.7 | 18.4 | 15.9 | 68.5 | 51.7 |
| 2001 | 28.8 | 31.4 | 18.9 | 16.6 | 63.7 | 50.4 |

Source: Annual Business Inquiry, Regional Forecasts

Data Issues

The Annual Business Inquiry has extended the scope of the former Census of Production in providing data on the value of turnover, GVA, production costs and employment for a wide, if not yet complete, range of service sectors as well as the production industries. Since the data is all drawn from the same companies at the same time, measures should be more reliable than other sources. Although output values are estimated for branches of multi-site companies, this should be less a problem in NI than in other UK regions since companies are required to report directly on their NI operations.

The ABI is relatively new and data series for NI extend back only to 1998 (although much longer series are available for manufacturing sectors). As a result we have based some of our preliminary analysis below on GVA or GDP data from the Regional Accounts divided by employment plus self-employment numbers from the Census of Employment and LFS sources. In principle these two approaches should give broadly similar results for NI, but in practice they do not always do so for reasons we have yet to understand.

Table 3.2: Regional accounts and employment data - manufacturing

| | NI | | | UK | | | Ratio |
|-------------|-------|-------|------------------|---------|-------|------------------|---------------------------|
| | GVA | Empl. | GVA per employee | GVA | Empl. | GVA per employee | <u>NI/UK</u> GVA/Empl. |
| 1998 | 3,423 | 114.7 | 29,843 | 153,412 | 4,407 | 34,809 | 0.86 |
| 1999 | 3,565 | 112.8 | 31,603 | 152,402 | 4,257 | 35,800 | 0.88 |
| 2000 | 3,732 | 110.7 | 33,708 | 153,671 | 4,113 | 37,359 | 0.90 |
| 2001 | na | 106.4 | na | 153,129 | 3,911 | 39,152 | na |

Table 3.3: ABI data - manufacturing

| | NI | | | UK | | | Ratio |
|-------------|-------|-------|------------------|---------|-------|------------------|---------------------------|
| | GVA | Empl. | GVA per employee | GVA | Empl. | GVA per employee | <u>NI/UK</u> GVA/Empl. |
| 1998 | 3,451 | 110.2 | 31,297 | 149,892 | 4,416 | 33,945 | 0.92 |
| 1999 | 3,895 | 111.2 | 35,029 | 150,449 | 4,269 | 35,242 | 0.99 |
| 2000 | 4,042 | 108.9 | 37,114 | 148,783 | 4,163 | 35,914 | 1.03 |
| 2001 | 3,970 | 103.1 | 38,507 | 145,179 | 3,968 | 38,831 | 0.99 |

The differences between the two sources are particularly large and important in the case of manufacturing. The ABI data shows that GVA per employee in manufacturing is now as high as in the UK as a whole. In 2000, the ABI indicates that NI manufacturing productivity was ahead of the UK average. The Regional Accounts and Employment data show GVA per employee at only 90% of the UK average in 2000. The main reason is the much lower level of manufacturing GVA in the NI Regional Accounts data when compared with the ABI. We cannot account for this difference at present, but propose to investigate the reasons later in this project.

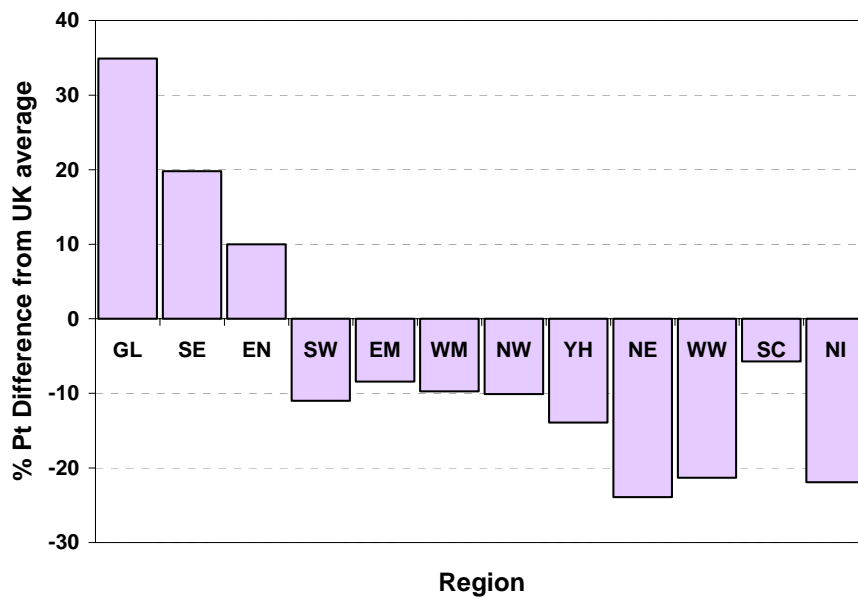
Disparities in GVA

The mostly commonly used single measure of national or regional productivity and living standards is GVA per head. This measures the value of net output in the economy divided by the number of people. As we have noted it is an inaccurate measure of living standards in economies like the Republic of Ireland because of large-scale repatriation of profits by foreign-owned multi-nationals. It is also inadequate in local economies with large capital intensive sectors. As we have also noted it is not a measure of labour productivity, but instead measures the success of an economy in generating income relative to the size of its population.

It is clear that Northern Ireland has a particularly poor record in generating income. NI has been one of the bottom dozen of EU regions in this respect for many years. This in turn reflects a wider UK problem. Regional disparities in GVA per head within the UK

are large for a geographically small country with large common institutions, education systems etc. The extreme difference is between London, at 35% above the UK average, and the North East and Northern Ireland at 24% and 22% below respectively. These residence-based figures may be distorted by commuting into London and it is more realistic to take an average of London and the South East. GVA per head for London plus the South East is 26.9% above the UK average. If the Eastern region is also added, the figure falls to 22.1% above the UK average. However it is measured, the gap between the south eastern regions and the North East or Northern Ireland is huge, equivalent to almost half of UK average GVA per head.

Figure 3.2: GVA per head relative to UK Average 2000



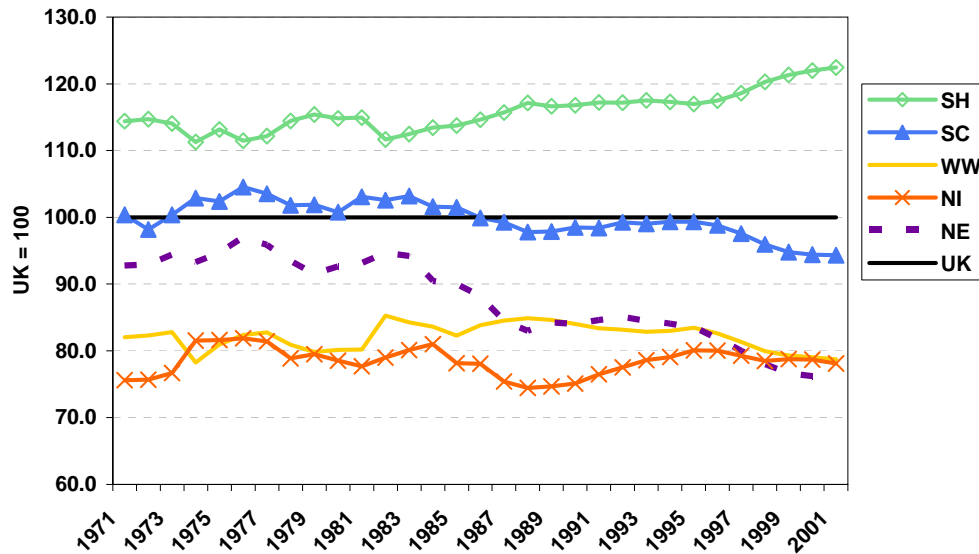
Source: *Regional Accounts, Regional Forecasts*

The decline in per capita GVA, outwards from London, is very marked, even if not completely uniform. At a distance of 100-200 miles from London average regional levels of GVA per head are around 10% below the UK average compared with 27% above the UK average in London and the South East. Beyond 200 miles the level falls again to 20% below the UK average. There are however occasional inliers and outliers within this generalised pattern. Wales has a rather lower GVA per head than expected given that much of its population lies within 100-200 miles from London. More striking is the case of Scotland where GVA per head is above the Midlands and the South West. Northern Ireland is not out of line with the overall trend.

There is increasing concern among policy-makers in GB about divergence over time in regional GVA per head. Looking at the trend in regional GVA over 30 years shows that there has been a general divergence, especially since the Thatcher revolution and with some acceleration over the last five years. At the extremes the divergence has been large. The gap between London plus the South East and the North East has, for instance, widened from around 20 percentage points in the 1970's to 50 percentage points today.

The gap between Northern Ireland and London plus South East England has always been wide but has also been increasing as south and east England has pulled further ahead of the UK average over the last two decades. Northern Ireland's position relative to the UK has waxed and waned over the cycles but has changed little in 30 years.

Figure: 3.3 GVA per head (UK = 100)



Source: National Statistics, Regional Accounts, Regional Forecasts

The Divergent 1990's

Over the last few years Northern Ireland has fallen further behind the UK average despite the notable improvements in the political situation and the favourable record of growth in output. Divergence has been caused by a strong tendency for GVA per head to grow fastest in, and especially around, London, and for Northern Ireland, in common with most northern and peripheral UK regions, to lag steadily further behind. This growing north-south divide within GB has been a marked trend over the 1990's, particularly since 1995. The 1990's might be termed the decade of the south east. Each of the three regions in south and east England raised their per capita GVA further above the UK average. Conversely, all of the other mainland regions saw their GVA per head fall further behind the UK average.

Northern Ireland's position initially improved in the early 1990's as it largely escaped the housing-debt-induced recession centred in southern England, but since 1995 it has joined the wider north-south trend of widening disparities.

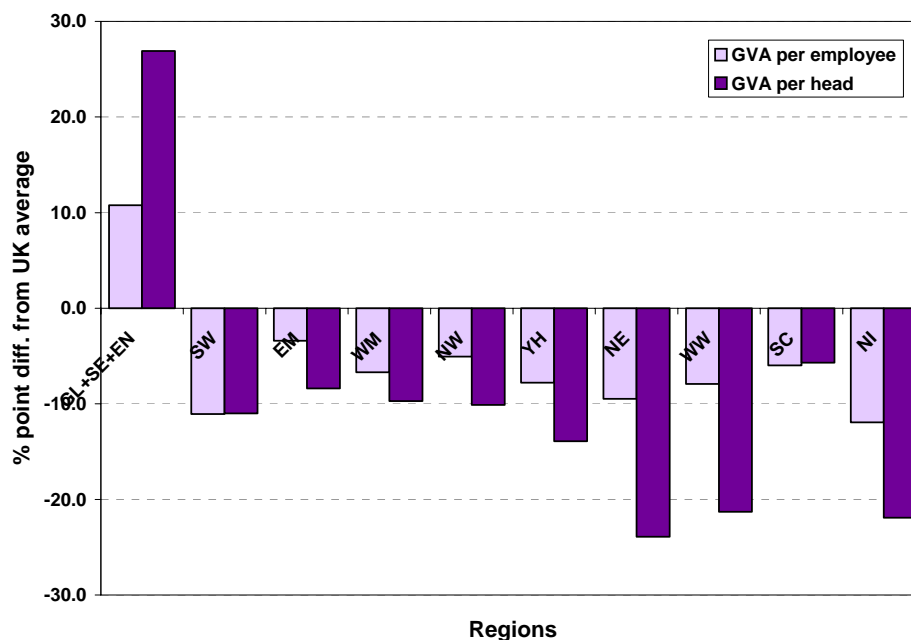
The gap between the three south-eastern regions and the rest of the UK has widened greatly over twenty years, but especially since 1996. The biggest loser has been the North East. As its former higher value-added energy, steel and chemicals sectors have declined,

and not been replaced by high value service sectors, GVA per head has slumped. The North East has now joined Wales and Northern Ireland as a distinct group of peripheral regions with the UK's lowest levels of regional GVA. The North East has now taken over NI's dubious distinction of being the UK's poorest region. Both now have a level of per capita GVA only marginally above the EU threshold for special "objective one" assistance. Wales has also suffered from closures of capital intensive industry and is little better placed than Northern Ireland or the North East.

The Role of Labour Productivity

Labour productivity is an important influence on per capita GVA, but within the UK it is only part of the story. Firstly, the regional gap in productivity, measured as GVA per employee⁴, is only half as wide as in GVA per head. The difference between the highest and lowest regions is 24 percentage points compared with twice that for GVA per head.

Figure 3.4: GVA per head & productivity compared 2000

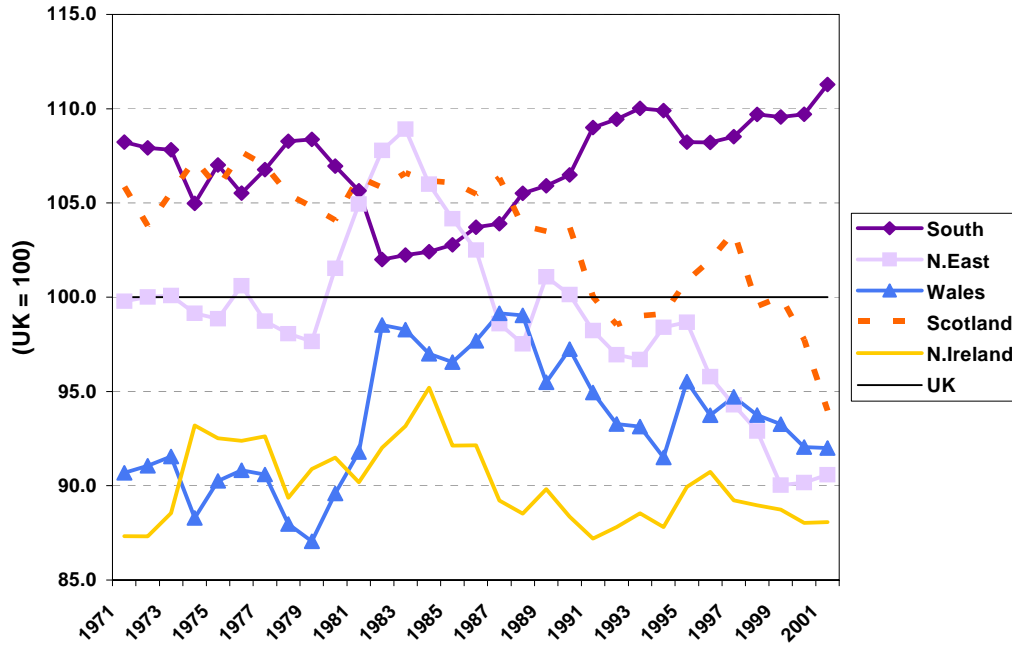


Source: National Statistics, Regional Accounts

The chief contrast in labour productivity within the UK is between the south eastern regions, in and around London, and the rest of the UK. Outside the south eastern regions there is less variation between regions. Northern Ireland productivity, measured as GVA per employee, has been a little below 90% of the UK average for almost 15 years. Northern Ireland has the lowest level of any UK region but Wales, the North East and Scotland are now not far above. In the case of Scotland and the North East, GVA per employee has fallen well behind the UK average since the 1980's.

⁴ Includes self-employment

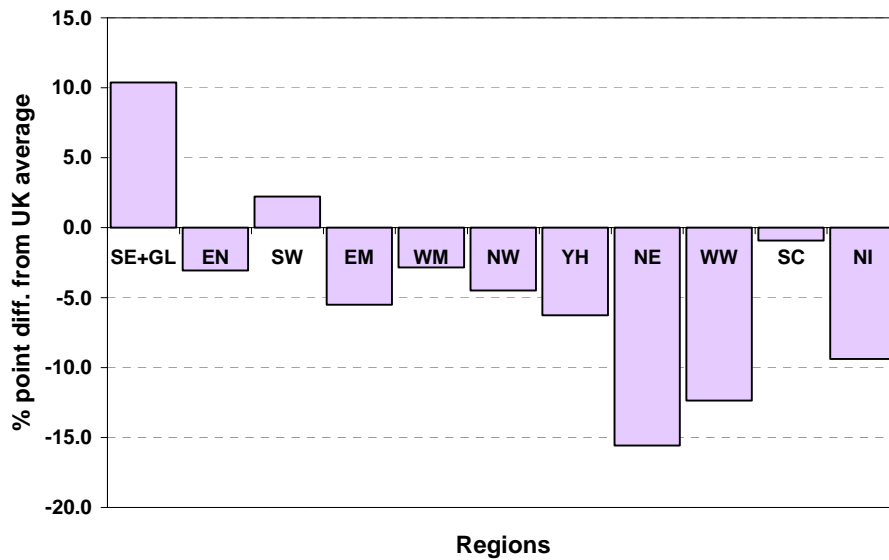
Figure 3.5: GVA per employee (UK = 100)



Source: National Statistics, Regional Accounts, Regional Forecasts

Most of the regional disparities in GVA per head not directly associated with productivity are due to differences in the proportions of the working-age population gainfully employed. Measured by the employment rate, (the employed plus self-employed as a proportion of those of working age), it is obvious that the gaps between regions are huge.

Figure 3.6: Employment rate – difference from UK average 2000



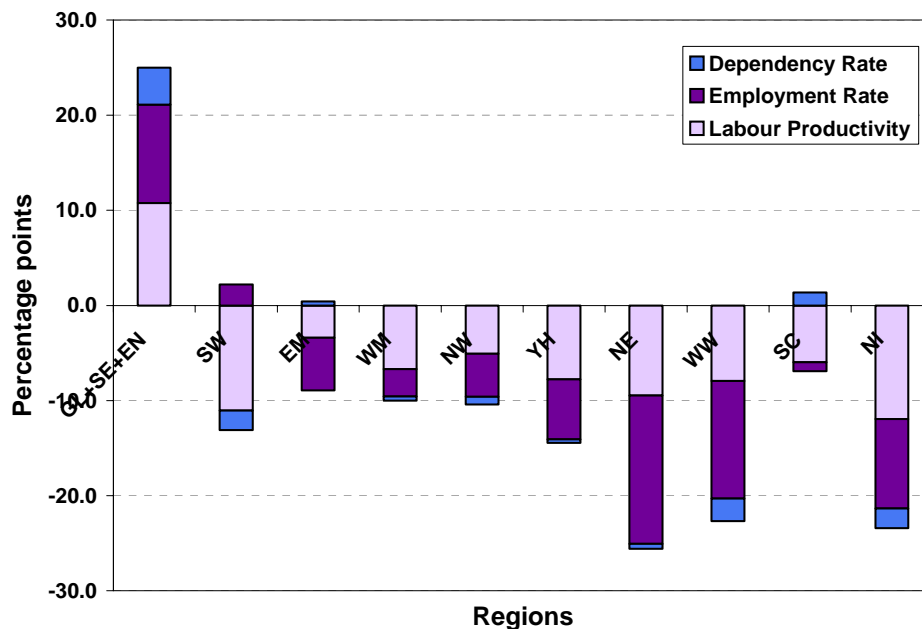
Source: National Statistics, Regional Forecasts

Taking the south eastern group of regions together, over 85% of the working age population are employed or self-employed. In Northern Ireland the figure is only 72%, although this is distinctly better than North East England at 67% i.e. around three-quarters of the south-eastern level. Only a little of this difference is accounted for by unemployment. More important are the large number of working-age people out of the workforce and on incapacity benefit, early retirement or training schemes (especially in former mining and steel areas within GB).

Although there has been some tendency for regions with large textile industries to fall further behind the UK average, most of the regional differences in employment rates are of long standing. Most emerged during the major restructuring of the early 1980's and have been maintained ever since. The corollary of this is that most of the more recent widening in disparities has been caused by increasing differences in labour productivity.

Components of per capita GVA

Figure 3.7: Components of relative GVA per head



Source: National Statistics, Regional Accounts, Regional Forecasts

The influence of labour productivity (GVA per employee) and employment rates can be combined in a formal decomposition of per capita GVA into its components. The third component, in addition to labour productivity and employment rates is the dependency ratio measured as the proportion of the total population who are in the working-age groups.

$$\frac{\text{GVA}}{\text{Pop}} = \frac{\text{GVA}}{\text{Emp}} \times \frac{\text{Emp}}{\text{Wpop}} \times \frac{\text{Wpop}}{\text{Pop}}$$

For illustration purposes this can be transformed into:

$$\frac{\text{GVA}}{\text{Pop}} = \frac{\text{GVA}}{\text{Emp}} + \frac{\text{Emp}}{\text{Wpop}} + \frac{\text{Wpop}}{\text{Pop}} + \text{interaction effects}$$

The interaction effects (described in annex C) are small and are omitted from the chart above which shows the joint influence of labour productivity, employment rates and dependency on disparities in GVA per head.

Why are disparities so large?

Regional disparities in per capita GVA are large in the UK because high productivity is associated with high employment rates in the same regions. London and the South East have both the highest employment rates and high productivity. Northern Ireland has the lowest GVA per employee and the third lowest employment rate. It also has the second least favourable dependency rate due to its high birth-rate and hence a high proportion of children, despite its low proportion of elderly people. However this is a smaller factor.

This all suggests that the south eastern regions have underlying advantages which combine to create both high productivity and high levels of employment, at the same time attracting high proportions of those in the working-age categories. With their traditions of high-value services, enterprising culture and well-educated and cosmopolitan workforce London and the South East, as the extreme cases, can generate large numbers of highly productive jobs. In doing so, they attract a well educated, young, workforce from across the UK and abroad. Of course, not every part of these regions fit this description. In particular, London contains areas of severe deprivation, where people have been unable to share in the boom in high paid jobs, and have also not gained fully from the expansion in other jobs.

It is our belief that the UK's past failure to produce enough graduates and other highly skilled personnel, has starved regions outside the south and east of both skills, innovation and enterprise. London and the South East have developed an economic base sufficiently strong to be able pay wages high enough to ensure that it attracts the skills it needs, as a result the proportion of graduates working in London is almost twice as high as in the rest of the UK.

This is of particular importance for Northern Ireland which has one the UK's best school education systems but is unable to retain enough of the highly educated products of the system to build a highly educated workforce. Indeed many of the best educated products of Northern Ireland's schools become part of the workforce of London and the South

East. The problem is one of generating sufficient demand (and high enough wages) for the flow of well educated pupils and graduates generated by NI's education system.

Generating a high wage, high productivity economy is an intensively difficult matter, and the experience of Northern Ireland appears to indicate that a good local education system has little impact on the local economy, (although it does a lot to raise the earnings of its pupils and graduates albeit often in other regions). In our view the task is also becoming more difficult as economies become more dependent on services rather than manufacturing. There is some evidence above that GVA per employment in NI manufacturing may have at last converged with the UK average. With manufacturing becoming a small part of the total economy this has less impact on the wider economy than might once have been the case.

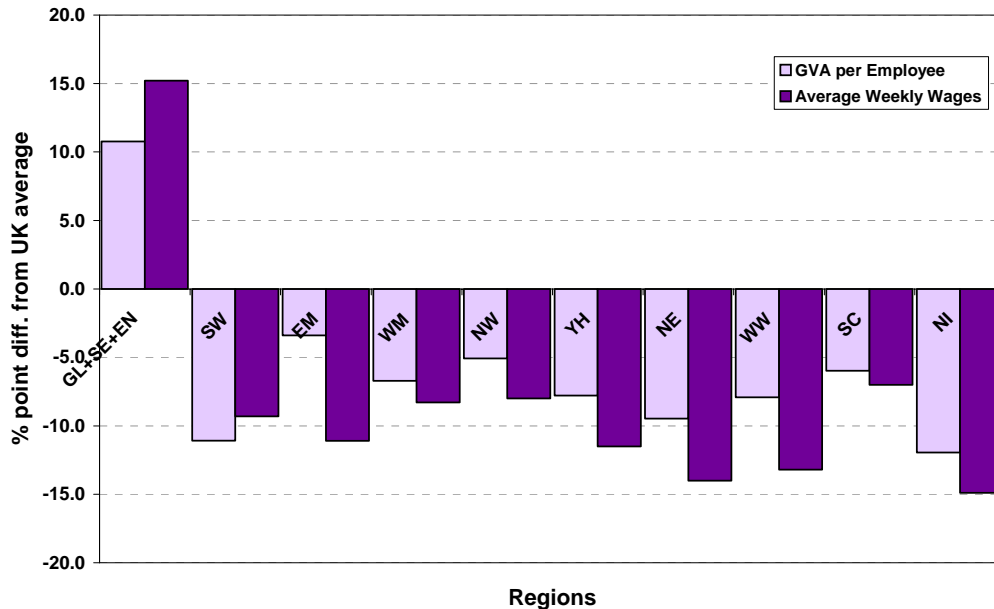
Does High per capita GVA mean high wages?

Wages levels tend to be higher in regions with above average levels of GVA per head and GVA per employee. There are two reasons why high wages will be associated with high GVA per head. One is that high productivity activities tend to pay high wages to attract the most productive labour. Secondly, wages are bid up in areas with tight labour markets.

In practice we find that wages levels are quite strongly correlated with productivity (GVA per employee). However, the stronger correlation is with GVA per head. This suggests that labour market tightness is a stronger influence on wages than high productivity, although both are important.

The chart shows that although there is broad regional consistency between wages and productivity, there are considerable discrepancies for individual regions. In general, wages are further above the UK average than productivity in successful regions. In the regions of south east England average wages in 2001 were 16% higher than the UK level while labour productivity was only 11% higher. However in every region outside southern England wages were further below the UK average than was labour productivity. Northern Ireland fits this pattern. Like every other region outside southern England, its wage level was further below the UK average than its labour productivity level. The difference was however small suggesting that labour productivity is the main factor. However, the connection is clouded by the presence of a large public sector paying wages at UK national rates.

Figure 3.8: Relative productivity and wages compared



Source: National Statistics, Regional Accounts, NES, Regional Forecasts

The Role of Sector Composition

Labour productivity differs hugely between sectors, mainly reflecting the amount of capital used in production. Capital intensive sectors like energy or water generate more than seven times more GVA for each employee than labour intensive activities like distribution, hotels and catering. A little of the additional GVA in a high productivity sector goes to pay higher wages, but most represents a return to the greater volume of capital invested. Not all manufacturing sectors have above average labour productivity, but on average, GVA per employee is 50% higher than the average for all UK sectors. Most service sectors have below average GVA per employee, but financial and business services is a clear exception. In this sector GVA per employee is 20% above the UK average mainly reflecting the high skills of much of the workforce, but also high rents in central London.

Despite these large differences between sectors, very little of the regional differences in GVA per employee are accounted for by differences in the mix of sectors. This is partly because most regions have relatively similar mixes of activity. It also reflects the fact that sectors like electricity production, or oil refining, with extremely high productivity form a very small proportion of activity in all regions.

Most regions have a mix of activities which would, by themselves, produce a level of GVA per employee within three per cent of the UK average. Northern Ireland's high representation in the public sector, agriculture and in labour intensive production

including textiles and clothing, in itself, depresses GVA per employee by 4.8% per cent. This is equivalent to a third of the overall disparity between NI and the UK average.

Other Factors

It is only the fact that regional productivity differs greatly within sectors that results in the observed regional disparities in total GVA per employee. As already noted, GVA per employee in London and the South East is around 10-15% above the UK sector average in almost every single sector. Conversely GVA per employee in Northern Ireland is well below the UK sector average in most large sectors (with the possible exception of manufacturing).

London and the South East's labour productivity remains high for a range of reasons. In finance and business services specialist activities demanding specialised skills and high wages command high prices. Because rents are bid up, lower productivity activities are driven out to cheaper locations. Essential occupations, without any local productivity advantages, are paid wage supplements to attract staff.

In Northern Ireland there is a lack of specialist activities able to command high prices and hence high prices on the national or international markets. This has contributed to a situation in which labour supply exceeds demand and drives down wages in other sectors where labour productivity might differ little from other regions including London and the South East. Examples are retailing and hotels where there is less reason to expect productivity to differ across regions, particularly when the same national companies dominate in all regions including NI. In these cases it is most likely that wages are depressed due to slack labour markets, and that profits do not absorb all of the consequent gains either because more labour is employed or because mark-ups on basic costs remain constant.

One conclusion is thus that GVA per employee in Northern Ireland is low partly because labour markets are slack and wages are depressed. Another factor in manufacturing and agriculture may be the need to compensate for high transport cross channel transport costs. In this case a 10% reduction in wages costs compensates for an addition to transport costs equivalent to 2% of turnover.

Workforce skills in Manufacturing

In manufacturing however, a succession of studies of Northern Ireland and GB industry have pointed to low workforce skills as a key factor explaining low industrial productivity relative to Germany. Such studies are less popular now that growth in the German economy has slowed and unemployment has risen. German wage costs are at very high levels due to high social overheads, the high exchange rate at which Germany entered the Euro and to the high level of the Euro itself. These are all major influences,

but beneath this unfavourable macro-economic context, labour productivity in manufacturing remains higher than the in GB or NI.

The reasons for lower productivity in NI compared to Germany are unlikely to have changed since the 1989 and 1993 NEIRC studies referred to earlier. The fact that 75% of workers in Germany were trained to the levels equivalent to NVQ3 and above, compared to 40% in NI, meant that many local firms could remain profitable only in activities demanding less labour skill. The conclusions of the 1989 Hitchens and Birnie study are worth quoting at length:

Some of the productivity shortfall could be traced to higher technology in some sectors in Germany and overall better use of known techniques (such as adapting machinery). Northern Ireland did have the advantage of generally more modern factory premises but in some cases this was nullified by a greater degree of untidiness.

Poor labour productivity also derived from over-manning, both in direct processes (such as machine manning levels) and indirect employees (such as maintenance). At almost every level of the hierarchy (managers, technicians, supervisors, maintenance, craftsmen and semi-skilled) Northern Ireland was outclassed in terms of the quality, quantity, width and intensity of skills, training and practical experience. Thirty one per cent of the Northern Ireland firms complained about labour force attitudes to work. In previous matched plant comparisons for small firms in five British Isles regions Northern Ireland emerged as the area with the most troublesome attitudes (Hitchens and O'Farrell, 1987; Hitchens and O'Farrell, 1988 a and b; O'Farrell and Hitchens, 1988). The only German plants to complain were those employing mainly Gastarbeiter. In this report the labour force in Northern Ireland had more in common with the unskilled workers in Germany though even most of the Gastarbeiter plants were able to achieve higher productivity than Northern Ireland counterparts.

With a few exceptions, such as the generally better levels of absenteeism and labour turnover, Northern Ireland's performance was at the very least disappointing. This provokes this question why this situation is able to continue especially when 73 per cent of the Northern Ireland managers recognised that their productivity level was lower than that in Germany.

The answer is likely to be that there is no strong market signal in the form of financial pressure would force Northern Ireland companies to raise productivity to German levels. Wages are much lower in Northern Ireland, and in addition firms benefit from the much more generous provision of financial assistance. As a result most firms are profitable, and some in our sample were more profitable than their German counterpart.

Government grant assistance in various forms has amounted to around one-fifth of manufacturing value-added in Northern Ireland through most of the 1980's (Hitchens and Birnie, 1989a). This represents a much higher rate of subsidy than that found in either West Germany or any other UK region and a rate of subsidy which cannot be justified by any inherent locational cost disadvantage suffered by Northern Ireland (Hitchens and Birnie, 1989a). Almost all of the firms in the Northern Ireland sample received capital grants among other subsidies at between 30 and 50 per cent of capital expenditure. In West Germany only nine firms, located in West Berlin received grants, and at a much lower rate than in Northern Ireland. Since grants in Northern Ireland are likely to have the effect of enhancing company profits, they are contributing to the failure of market signals to force higher levels of productivity in Northern Ireland. In

Northern Ireland, as in the rest of the UK, the relatively low level of labour costs as compared to those in West Germany also reduce the incentive to increase productivity levels. However, relatively low wages should in part be seen as the consequence of relatively low productivity and the notable thing about Northern Ireland is that the grants have enabled the survival of certain activities which would otherwise be unprofitable even at Northern Ireland wage levels. Thus public policy would appear to have reinforced market failure i.e. the firms in Northern Ireland lacked the incentive to train more, to invest more in R and D, and to aim for higher quality products, because they were already profitable enough partly because Northern Ireland wages are relatively low and also because of the subsidy to profits arising from grants from development agencies. This is not to say, however, that firms would necessarily improve productivity if grants were removed. While some firms might adapt successfully others might succumb to competitive pressures and go out of business. The mechanism by which productivity and grants are related is complex, but it is probable that a more effective allocation of grants could improve company competitiveness and productivity. It may be that an implication of such redirection would be that grants no longer be largely justified by job creation.

Whilst to some extent the problem of relatively low productivity identified in Northern Ireland manufacturing is general to the UK (Hitchens and Birnie, 1989b) there is evidence that the intensity of these problems is greater in Northern Ireland.

Although skills levels have risen in NI over the last decade, the gap with Germany still remains wide. It is however likely to be less than in 1989. More-over a lack of training in technical and manual skills is less important now than it was then. The rise of the service sectors, and particularly of financial, business and cultural services puts a greater premium on graduate rather than technician or manual skills.

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4. Conclusions and Recommendations

Conclusions

The welcome publishing of EDF targets for the NI economy identifies the nature and extent of the challenges which the NI economy needs to meet in order to prosper. The challenges need to be met by a range of stakeholders within the economy. Although no single of targets provide a guarantee of prosperity, they do represent markers against which to chart progress towards that goal.

In our view, targets are most effectively used if progress can be assessed in a timely fashion, permitting early warnings of deviations from the desired economic path, and identifying areas where policy action needs to be taken.

To be effective targets must be viable, that is must be regularly measurable and up to date. They must also be meaningful in the sense of being clearly related to widely accepted economic goals. It is also helpful if the relationships between individual targets and those wider goals are understood and if possible also quantified.

This report has begun the process of examining the targets in detail, identifying ways in which the current targets system could be tightened up, and developing a robust projection system to provide early warning of potential problems.

The research is also designed to provide an understanding of the wider context in which the targets are set, by looking at the economy, both currently and in the future. A number of conclusions can be drawn:

- NI economy has performed well over the last decade, and is the UK's fastest growing region in terms of generating jobs.
- Conversely, little progress is being made towards the Strategy 2010 aspiration of narrowing the wide gap in GVA per head between NI and the UK average.
- GVA per head grown more slowly than in GB since 1995 and the gap remains over 20 percentage points. The level is depressed by below average productivity in most sectors and by a still low employment rate.
- Average wage levels have also been on a slower growth trend than much of England and disparities are widening.
- Short term indicators suggest that 2003 has been a challenging year, through much of the UK although employment growth NI has been well above average at 1% as in 2002.
- The global economy continues to struggle but the USA recovery now looks more sustainable at least in the short term. The UK outlook also now appears stronger than previously thought with GVA forecasts for 2003 being revised upwards towards 2.5%.
- The outlook for 2004 and beyond looks cautiously optimistic with a GVA forecast for NI averaging 2.6% per annum.

- Our feature article on productivity also provides some valuable insights into the NI economy:

Recommendations

Although it is early in the research process there are some early recommendations emerging concerning the measurement of targets to facilitate a successful monitoring process:

- **Role of targets** – Consideration should be given to the definition and role of a number of targets. A tightly defined set of targets will prove essential in the monitoring exercise.
- **Approach to considering the nature and form of targets** - Consideration should be given as to what approach to take with respect to targets which do not currently meet the viability criteria. In particular, consideration should be given as to whether some of the targets should be dropped altogether and what form targets should take in the cases where an adjustment from their current specification is necessary.
- **Ensuring sustainable measures** - Efforts should be made to ensure data remain consistently measured and are available throughout the monitoring period. Consideration should be given to informing the providers of the target data, where it is not publicly available, that their data are important for EDF targets to attempt to ensure ongoing cooperation in providing it.
- **Completing the data map**- The gaps in the targets data dictionary should be explored within the department to ensure that any gaps are filled where possible

This project is designed to assist the EDF target monitoring and the RF team encourage feedback on any elements of the current or proposed research schedule. The challenge of determining the interaction within the economy, where policy can intervene and how the current targets accurately reflect the challenges, and record the successes, of the economy is a difficult one. An inclusive research process, with two-way communication, similar to the ethos embodied in the EDF itself, will greatly enhance the usefulness of the outcomes

Annex A: Detailed NI forecasts

The following annex presents the detailed commercially available NI forecasts presented in the bi-annual RF/OEF report. The current tables related to the Autumn 2003 report.

Table A.1: Economic and demographic indicators for Northern Ireland

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2013 |
|-------------------------------------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Personal Disp. Income (% pa) | 3.5 | 4.5 | 5.7 | 1.4 | 3.3 | 3.0 | 2.7 | 2.6 | 2.5 | 2.4 |
| Per Capita (UK=100) | 85.2 | 85.4 | 84.5 | 84.0 | 84.8 | 84.9 | 84.5 | 84.0 | 83.9 | 83.3 |
| Consumers' Expend. (% pa) | 4.8 | 4.5 | 3.7 | 3.7 | 3.2 | 2.6 | 2.7 | 4.4 | 4.2 | 4.0 |
| Per Capita (UK=100) | 81.3 | 81.1 | 81.0 | 81.1 | 80.9 | 80.9 | 81.1 | 82.1 | 83.4 | 84.1 |
| Population (000s) | 1679.0 | 1683.0 | 1689.0 | 1693.0 | 1701.0 | 1708.0 | 1715.0 | 1727.0 | 1732.0 | 1747.0 |
| (% pa) | 0.1 | 0.2 | 0.4 | 0.2 | 0.5 | 0.4 | 0.4 | 0.7 | 0.3 | 0.8 |
| Unemployment Rate | 6.5 | 5.3 | 5.0 | 4.5 | 4.3 | 4.3 | 4.2 | 4.3 | 4.5 | 4.8 |
| Migration ¹ | -2.6 | -2.2 | -0.9 | -0.9 | 1.7 | 0.2 | 0.6 | 5.1 | -1.9 | 6.9 |
| Participation Rate ² (%) | 77.5 | 77.5 | 76.7 | 77.9 | 76.6 | 77.7 | 77.4 | 76.9 | 77.2 | 76.8 |
| Self-Employed (000s) | 83.0 | 90.0 | 87.0 | 85.0 | 93.0 | 93.0 | 93.0 | 93.0 | 93.0 | 92.0 |
| (% pa) | -2.9 | 8.4 | -3.7 | -1.9 | 9.4 | 0.3 | -0.6 | -0.2 | 0.0 | 0.0 |
| Employment ³ | | | | | | | | | | |
| Total Employment (000s) | 736.0 | 753.0 | 767.0 | 771.0 | 777.0 | 784.0 | 789.0 | 795.0 | 799.0 | 804.0 |
| (% pa) | 2.1 | 2.3 | 2.0 | 0.4 | 0.8 | 1.0 | 0.7 | 0.6 | 0.6 | 0.6 |
| Manufacturing (000s) | 113.0 | 111.0 | 106.0 | 101.0 | 96.0 | 94.0 | 93.0 | 91.0 | 90.0 | 88.0 |
| Location Quotient ⁴ | 103.9 | 104.4 | 103.8 | 102.0 | 99.7 | 99.8 | 100.4 | 100.9 | 101.5 | 102.1 |
| Private Serv. (000s) | 261.0 | 272.0 | 284.0 | 288.0 | 293.0 | 296.0 | 302.0 | 307.0 | 312.0 | 317.0 |
| Location Quotient | 74.5 | 74.6 | 76.2 | 76.2 | 77.2 | 77.3 | 77.7 | 78.0 | 78.3 | 78.6 |
| Government Serv. (000s) | 227.0 | 230.0 | 235.0 | 240.0 | 247.0 | 250.0 | 252.0 | 253.0 | 254.0 | 256.0 |
| Location Quotient | 137.5 | 135.7 | 134.0 | 134.6 | 134.4 | 133.7 | 133.3 | 133.0 | 132.7 | 132.3 |
| Notes: | ¹ Per 1000 of the population of working-age. ² Labour force as a percentage of the working-age population. ³ Employees plus the self-employed. ⁴ Sector's share of total regional employment divided by sector's share in total UK employment. | | | | | | | | | |
| Source: | RF / OEF | | | | | | | | | |

Table A.2: Sectoral outlook in Northern Ireland: GDP

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2013 |
|-------------------------------|----------------------|-------|-------|-------|------|------|------|------|------|------|
| | (per cent per annum) | | | | | | | | | |
| Agriculture | -6.3 | -15.6 | -21.7 | 25.9 | -12 | -0.6 | -1.9 | -0.3 | 0.3 | 0.2 |
| Extraction | 9.3 | -3.4 | -4.4 | 1.9 | 3.7 | 4.1 | 0 | 0.5 | -0.5 | -0.1 |
| Manufacturing | 5.3 | 5.7 | -0.8 | -4.4 | -0.8 | 2.1 | 2.9 | 2.4 | 2.2 | 2.1 |
| Food Drink & Tobacco | 8.3 | 3.2 | 5.1 | -0.2 | 0.2 | -0.5 | 0.6 | 0.7 | 0.5 | 0.3 |
| Textiles | -10.7 | -8 | -14.3 | -7.5 | -7.3 | -1.1 | -2.7 | -3.9 | -3.4 | -3.5 |
| Wood Product Industries | -4.9 | 6.9 | -4.5 | -1.6 | -1.5 | 2.4 | -0.1 | -0.1 | -0.4 | -0.5 |
| Pulp Paper & Printing | -0.1 | -0.1 | -1.5 | 0 | -3.2 | 2 | 1.9 | 1.2 | 1.1 | 1 |
| Coke Oil Refin & Nucl. Fuel | 11 | 35.8 | -18.1 | 2.9 | -8.4 | 4.7 | 1.8 | 1.7 | 0.9 | 0.1 |
| Chemical Industries | 3.7 | 1.4 | 13 | 1.2 | -0.1 | 2.8 | 3.6 | 3.3 | 3.3 | 3.4 |
| Rubber & Plastic Industries | 3.9 | 1.9 | 0 | -3.3 | 0.6 | 3 | 3 | 3 | 3 | 2.8 |
| Other Non-Metal Min. Products | 4.8 | 7.9 | 5.2 | -1.7 | 6.2 | 2.8 | 2.9 | 3.2 | 3.4 | 3.1 |
| Metals | 0.8 | 3 | 5.7 | -6.9 | -2.8 | 6.7 | 3.8 | 1.8 | 2.3 | 2 |
| Machinery & Equipment | -8.2 | 4.2 | 5 | -3.9 | -0.7 | 3.8 | 3.8 | 1.9 | 0.9 | 0.6 |
| Electric & Optical Equipment | 30.6 | 35.1 | -18.5 | -15.8 | -1.2 | 6.2 | 9.3 | 7.1 | 6.4 | 6.2 |
| Transport Equipment | 3 | -6.1 | 7.5 | -8.6 | -0.5 | 1.7 | 4.1 | 3.9 | 2.8 | 3.4 |
| Other Manufacturing | 5.5 | 4.6 | 1.7 | 7 | -3.2 | 2.6 | 2.1 | 2.2 | 2.2 | 2 |
| Electricity Water & Gas Svs. | -1.2 | -0.5 | -7.9 | 1.6 | 3 | -5.4 | 1.8 | 1.9 | 2 | 1.8 |
| Construction | 6.2 | 6.2 | 6.7 | 1.7 | 8.4 | 2.5 | 2.6 | 1.7 | 1.4 | 1.4 |
| Distribution | 3.9 | 2.5 | 5.8 | 4 | 4.6 | 2.1 | 2.3 | 2.9 | 3 | 2.9 |
| Transport & Communication | 7.2 | 8.8 | 6.8 | 11.6 | 4.6 | 5 | 4 | 4.6 | 4.7 | 4.7 |
| Financial Services | 4.9 | 6.1 | 12.9 | 4.7 | 2.8 | 5.4 | 4.1 | 4.4 | 4.4 | 4.2 |
| Public Admin & Defence | -0.9 | -1.1 | 3.7 | -1 | 2.6 | 2.1 | 0.8 | 1 | 1.1 | 1.2 |
| Educ & Health & Social Work | -1 | -1.1 | 1.8 | 5.9 | 3.4 | 3.6 | 2.1 | 1.8 | 1.8 | 1.8 |
| Other Personal Services | 1.9 | 3.2 | 4.7 | 8.9 | 2.3 | 3.5 | 4.6 | 6.3 | 4.8 | 5.1 |
| Ownership of Dwellings | 3 | 2.7 | 1.9 | 2.3 | 1.9 | 3 | 2.8 | 3.2 | 2.7 | 3.2 |
| Financial Adjustment | 0.9 | 6.1 | 13.6 | 5.5 | 3.2 | 5.7 | 4.1 | 4.4 | 4.5 | 4.1 |
| All Industries | 2.6 | 2.2 | 2.7 | 3 | 2.4 | 2.8 | 2.5 | 2.7 | 2.6 | 2.6 |

Source: RF / OEF

Table A.3 Sectoral outlook in Northern Ireland: Employees

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2013 |
|-------------------------------|----------------------|------|------|------|------|-------|------|------|------|--------------|
| | (thousands) | | | | | | | | | |
| Agriculture | 15 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 12 | 10 |
| Extraction | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Manufacturing | 106 | 104 | 99 | 95 | 91 | 89 | 88 | 86 | 85 | 77 |
| Food Drink & Tobacco | 20 | 19 | 19 | 19 | 19 | 18 | 18 | 17 | 17 | 15 |
| Textiles | 19 | 15 | 13 | 12 | 10 | 10 | 9 | 8 | 8 | 5 |
| Wood Product Industries | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Pulp Paper & Printing | 7 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Coke Oil Refin. & Nucl. Fuel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chemical Industries | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| Rubber & Plastic Industries | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 6 |
| Other Non-Metal Min. Products | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 5 |
| Metals | 6 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 6 | 5 |
| Machinery & Equipment | 7 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 5 |
| Electric & Optical Equipment | 12 | 14 | 11 | 11 | 10 | 10 | 10 | 10 | 10 | 10 |
| Transport Equipment | 13 | 12 | 13 | 12 | 11 | 11 | 11 | 11 | 11 | 10 |
| Other Manufacturing | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Electricity Water & Gas Svs. | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| Construction | 34 | 36 | 36 | 35 | 36 | 38 | 38 | 39 | 39 | 41 |
| Distribution | 109 | 110 | 115 | 120 | 120 | 120 | 121 | 121 | 122 | 126 |
| Hotels & Restaurants | 38 | 39 | 40 | 40 | 41 | 42 | 43 | 45 | 46 | 54 |
| Transport & Communication | 26 | 27 | 28 | 29 | 28 | 28 | 29 | 29 | 29 | 31 |
| Financial Intermediation | 14 | 15 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 17 |
| Real Estate Renting & Ins. | 47 | 51 | 54 | 55 | 55 | 57 | 60 | 62 | 64 | 82 |
| Public Admin. & Defence | 59 | 59 | 60 | 61 | 62 | 63 | 63 | 63 | 63 | 66 |
| Educ. Health & Social Work | 160 | 162 | 166 | 171 | 176 | 178 | 180 | 181 | 182 | 187 |
| Other Personal Services | 27 | 28 | 29 | 30 | 31 | 31 | 32 | 32 | 33 | 35 |
| Total Employment | 641 | 652 | 664 | 673 | 674 | 680 | 686 | 691 | 696 | 728 |
| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 2013 |
| | (per cent per annum) | | | | | | | | | |
| Agriculture | -3.6 | 1.5 | -7.1 | -2.3 | -9.4 | -1.7 | -3.1 | -3.3 | -2.7 | -2.6 |
| Extraction | 1.1 | -2.1 | 0.5 | 3.2 | 2.4 | -1.6 | -2.4 | -2.1 | -3.1 | -2.9 |
| Manufacturing | -1.4 | -1.6 | -4.9 | -3.6 | -4.5 | -2.1 | -1.7 | -1.7 | -1.8 | -1.6 |
| Electricity Water & Gas Svs. | 4.4 | -8.9 | -3.4 | -2.8 | 0.7 | -10.4 | -3.2 | -3.1 | -3.0 | -2.9 |
| Construction | 11.8 | 4.6 | 2.5 | -2.7 | 2.2 | 4.0 | 2.0 | 1.7 | 1.2 | 0.4 |
| Distribution | 3.7 | 1.3 | 4.8 | 3.7 | 0.1 | 0.3 | 0.5 | 0.5 | 0.5 | 0.5 |
| Hotels & Restaurants | 4.6 | 3.8 | 2.5 | 1.1 | 1.5 | 2.8 | 3.2 | 3.1 | 3.0 | 2.8 |
| Transport & Communication | 5.5 | 3.2 | 4.7 | 1.5 | -1.9 | 0.9 | 1.0 | 0.9 | 1.0 | 1.0 |
| Financial Intermediation | 1.8 | 5.5 | 5.2 | 0.8 | -2.9 | 0.3 | 0.6 | 0.6 | 0.5 | 0.6 |
| Real Estate Renting & Ins. | 9.5 | 7.6 | 5.7 | 2.0 | 0.8 | 3.5 | 4.1 | 3.9 | 3.9 | 4.0 |
| Public Admin. & Defence | 0.6 | 1.2 | 0.2 | 3.0 | 2.0 | 0.4 | -0.1 | 0.5 | 0.6 | 0.8 |
| Educ. Health & Social Work | 2.0 | 1.1 | 2.6 | 2.8 | 2.8 | 1.5 | 1.0 | 0.6 | 0.5 | 0.4 |
| Other Personal Services | 2.8 | 3.7 | 3.5 | 4.0 | 0.8 | 0.1 | 2.7 | 2.0 | 1.0 | 1.2 |
| Total Employment | 2.7 | 1.8 | 1.7 | 1.4 | 0.2 | 0.8 | 0.9 | 0.8 | 0.7 | 0.8 |
| Source: | RF / OEF | | | | | | | | | |

Annex B: NI Targets – Detailed sources

| Primary Target | Precise Source |
|----------------------------------|---|
| Knowledge | |
| Manufacturing productivity | NI: DETI Labour Market Stats - Index of Production, Census of Employment UK: NS - Index of Production, Annual Business Inquiry |
| Private services productivity | NI/UK: NS - Regional Accounts, Census of Employment, ABI |
| MF employment | NI/UK: Annual Business Inquiry |
| Tradable services emp | NI/UK: Annual Business Inquiry |
| NI employment | DETI Labour Market Stats (civil employment jobs) |
| Invest NI client growth | Invest NI annual report |
| Inward investment | Invest NI annual report |
| Innovation | |
| Business R&D growth | DETI - Northern Ireland Research & Development Statistics |
| R&D per person employed | NI: TBC UK: TBC |
| % plants involved innovation | Innovation Lab |
| Average product changes | Innovation Lab |
| New products per employee | Innovation Lab |
| % sales from new products | Innovation Lab |
| Enterprise | |
| Birth rate per 10,000 businesses | NI/UK: DETI - Inter-Departmental Business Register |
| Jobs from inward invest | Invest NI annual report |
| Job quality | N/A |
| Level of VC | NI/UK: British Venture Capital Association |
| Outward Looking | |
| Export growth | DETI - NI Manufacturing Sales and Exports Survey 00/01-01/02 |
| Tourism numbers | Northern Ireland Tourist Board |
| Equality | |
| LTU % active | NI/UK: DETI - Labour Force Survey |
| TSN employment | Invest NI annual report |
| Low income measure | NI/UK: DETI - New Earnings Survey |
| Human Quality | |
| NVQ Level 2 | NI/UK: DETI - Labour Force Survey |
| NVQ Level 3 | NI/UK: DETI - Labour Force Survey |
| NVQ Level 4 | NI/UK: DETI - Labour Force Survey |
| No qualifications | NI/UK: DETI - Labour Force Survey |
| Level of essential skills | DEL |
| Infrastructure | |
| Broadband access | N/A |
| Electricity prices | Electricity Association Publication - International Electricity Prices |
| Development of roads | N/A |

| Secondary Target | Precise Source |
|--|--|
| Knowledge | |
| MF output growth | DETI - Index of Production |
| Average earnings | NI: DETI - New Earnings Survey GB: NS - New Earnings Survey |
| Whole profitability | N/A |
| Invest NI client company profitability | Invest NI annual report |
| Innovation | |
| % R&D devoted to commercialisation | DETI - Research & Development Statistics |
| Exp. development R&D per employee | DETI - Research & Development Statistics |
| % employment in business R&D | DETI - Research & Development Statistics |
| Enterprise | |
| Survival rate | NI: DETI - Inter-Departmental Business Register UK: Small Business Services |
| Failure rate | NI: DETI - Inter-Departmental Business Register UK: Small Business Services |
| No. of medium sized companies | DETI - NI Manufacturing Sales & Exports |
| Growing small businesses into med. | DETI - NI Manufacturing Sales & Exports |
| Outward Looking | |
| Value of exports of goods | HM Customs & Excise |
| Tradeable services exports | N/A |
| Tourism spend per visitor | NITB |
| Tourism expenditure | NITB |
| JV/SP % of stock of business | N/A |
| Equality | |
| Employment rate | NI: DETI - Labour Market Stats UK: NS - Labour Market Trends |
| Unemployment rate | NI/UK : DETI - Labour Force Survey |
| Economic inactivity rate | NI: DETI - Labour Market Stats UK: NS - Labour Market Trends |
| Human Quality | |
| High income measure | NI/UK : DETI - Labour Force Survey |
| Higher level jobs (% in SOC 1 - 3) | NI/UK : DETI - Labour Force Survey |
| Higher level jobs (% in SOC 1 - 2) | NI/UK : DETI - Labour Force Survey |
| Organisations with IIP 200+ | IIP UK |
| Organisations with IIP 50+ | IIP UK |
| Infrastructure | |
| Gas availability % of households | TBC |
| GP: small com. plus ind. | TBC |
| GP: large com plus ind | TBC |
| Electricity from renewable sources | TBC |

Annex C: Decomposition of Per Capita GDP into Major Components

Let:

| | | |
|---|---|---------------------------------|
| q | = | GDP in NI |
| Q | = | GDP in UK |
| e | = | Employment in NI |
| E | = | Employment in UK |
| w | = | Working age population in NI |
| W | = | Working age in population in UK |
| p | = | Total population in NI |
| P | = | Total population in UK |

Per capita GDP in NI relative to the UK average is the product of GVA per employee, employment rates and a measure of dependency:

$$\frac{q/p}{Q/P} = \left(\frac{q/e}{Q/E} \right) \left(\frac{e/w}{E/W} \right) \left(\frac{w/p}{W/P} \right)$$

and:

$$\left[\frac{q/p}{Q/P} - 1 \right] = \left[\left(\frac{q/e}{Q/E} \right) \left(\frac{e/w}{E/W} \right) \left(\frac{w/p}{W/P} \right) - 1 \right]$$

and:

$$(g-1) = (xyz-1)$$

where:

$$\begin{aligned} g &= (q/p) / (Q/P) \\ x &= (q/e) / (Q/E) \\ y &= (e/w) / (E/W) \\ z &= (w/p) / (W/P) \end{aligned}$$

and:

$$\begin{aligned} (xyz-1) &= (x-1) + (y-1) + (z-1) \\ &+ (x-1)(y-1) + (x-1)(z-1) + (y-1)(z-1) \\ &+ (x-1)(y-1)(z-1) \\ &= xyz - xy - xz - yz + 2x + 2y + 2z - 4 \\ &\quad + xy + xz + yz - 2x - 2y - 2z + 3 \\ &= xyz - 1 \end{aligned}$$

thus:

$$\left[\left(\frac{q/p}{Q/P} \right) - 1 \right] = \left(\frac{q/e}{Q/E} - 1 \right) + \left(\frac{e/w}{E/W} - 1 \right) + \left(\frac{w/p}{W/P} - 1 \right) + \text{interaction effects}$$

Annex D: NI targets – current performance

Table D.1: Performance Against Target: Strategic Area: Knowledge

| Target | Current data | Current level | | Target 2010 |
|---|--------------|-----------------------|---------|-----------------|
| Primary | | | | |
| Manufacturing productivity * ¹ | 2002 | NI/UK | 98.50% | 105% |
| Private services productivity * | 2000 | NI/UK | 83% | 95% |
| MF employment* | 2002 | Low tech | 39.3% | 27% |
| | | Medium tech | 26.1% | 26-34% |
| | | High tech | 34.6% | 39-47% |
| Tradable services emp* | 2002 | | 10.4% | 12.50% |
| NI employment | 2002 | | 751,100 | 795K – 815K |
| Invest NI client growth | 2001 | | -4,130 | >20,000 |
| Inward investment | 2001 | Cumulative | 4,688 | 20,000 – 30,000 |
| Secondary | | | | |
| MF output growth* | 2002 | 01-02 annual averages | -4.8% | 25% |
| Average earnings | 2002 | | 83.9% | 89% |
| Whole profitability | N/A | | N/A | N/A |
| Invest NI client company profitabilty | 2000 | Profit % of turnover | 4.5% | 5% |
| | 2000 | Profit per employee | £4,800 | £8,600 |

Notes: * slight divergence from Department figures

¹ based on Department approach

**Table D.2: Performance Against Target: Strategic Area :
Innovation**

| Target | Current data | Current level | | Target 2010 |
|---|--------------|---------------|-------|-------------|
| Primary | | | | |
| Business R&D growth ¹ | 2001 | 99-01 | 50.9% | Maintain |
| R&D per person employed | TBC | NI/UK | TBC | 100% |
| % plants involved product innovation | 2001 | | 54.0% | 70% |
| % plants involved process innovation | 2001 | | 50.0% | 70% |
| Average product changes | 2001 | | 27.8% | 30+ |
| New products per employee | 2001 | | 1.6 | 0.6+ |
| % sales from new products | 2001 | | 20.0% | 30+ |
| Secondary | | | | |
| % R&D devoted to commercialisation | TBC | NI/UK | TBC | Maintain |
| Experimental development R&D per employee | TBC | NI/UK | TBC | 100% |
| % employment in business R&D | TBC | NI/UK | TBC | 100% |

Notes: ¹ currently presented in nominal, not real terms

TBC – work is currently ongoing to establish more precisely the sources for R&D data

**Table D.3: Performance Against Target: Strategic Area :
Enterprise**

| Target | Current data | Current level | | Target 2010 |
|---|--------------|---------------|--------|-------------|
| Primary | | | | |
| Birth rate per 10,000 businesses ¹ | 2001 | NI/UK | 67.7% | 87% |
| Jobs from inward invest | 2001 | Cumulative | 4,688 | 20K-30K |
| Job quality | NA | NA | | 25%+ avg |
| Level of VC | 2002 | NI/UK | 58.0% | 100% |
| Secondary | | | | |
| Survival Rate | 2001 | NI/UK | 110.6% | Maintain |
| Failure rate | 2001 | NI/UK | 63.9% | 79% |
| No. of medium sized companies ² | NA | NA | | No target |
| Growing small businesses into medium sized business | 2002 | 9.5% | | 200% growth |

Notes: ¹ work ongoing to establish difference between NOMIS and SBS data

² not currently targeted, work ongoing to establish precise definition

**Table D.4: Performance Against Target: Strategic Area :
Outward Looking**

| Target | Current data | Current level | Target 2010 |
|--|--------------|---------------|-------------|
| Primary | | | |
| Export growth | 2001 | 00-02 -0.7% | 200% |
| Tourism numbers | 2001 | (mn) 1,741 | 3.34mn |
| Secondary | | | |
| Value of exports of goods | 2002 | 60.1% | 100% |
| Tradeable services exports | N/A | N/A | N/A |
| Tourism spend per visitor | 2002 | 31.0% | 100% |
| Tourism expenditure | 2001 | (mn) 282.0 | 530mn |
| Joint ventures/strategic partnerships % of stock of business | N/A | N/A | N/A |

**Table D.5: Performance Against Target: Strategic Area :
Equality**

| Target | Current data | Current level | Target 2010 |
|---------------------------|--------------|---------------|-------------|
| Primary | | | |
| LTU % active ¹ | 2002 | NI - UK 0.7 | 0% |
| TSN employment* | 2001 | 85.9% | 75% |
| Low income measure | 2002 | 26.6% | 27.7% |
| Secondary | | | |
| Employment rate | 2003 | NI - UK -5.5 | 4.7 |
| Unemployment rate | 2003 | NI - UK 0.2 | 0.0 |
| Economic inactivity rate | 2003 | NI - UK 6.1 | 4.9 |

Note: ¹ using claimant LTU figure and LFS activity data
* slight divergence from Department figures

**Table D.6: Performance Against Target: Strategic Area :
Human Capital**

| Target | Current data | Current level | | Target 2010 |
|---|--------------|---------------|-------|-------------|
| Primary | | | | |
| NVQ Level 2* | 2002 | NI / UK | 107% | DFES tar. |
| NVQ Level 3* | 2002 | NI / UK | 93% | DFES tar. |
| NVQ Level 4* | 2002 | NI / UK | 91% | DFES tar. |
| No qualifications* | 2002 | NI / UK | 154% | DFES tar. |
| Level of essential skills | 2003 | | 8,732 | 10,500 |
| Secondary | | | | |
| High income measure | 2002 | | 37.4% | 58.6% |
| Higher level jobs (% employees in SOC 1 - 3)* | 2000 | NI / UK | 84.2% | 100% |
| Higher level jobs (% employees in SOC 1 - 2)* | 2000 | NI / UK | 88.8% | 100% |
| Proportion of organisations with IIP 200+ employees | 2003 | NI / UK | 54.0% | 100% |
| Proportion of organisations with IIP 50+ employees | 2003 | NI / UK | 43.0% | 100% |

Note: * slight divergence from Department figures

**Table D.7: Performance Against Target: Strategic Area :
Infrastructure**

| Target | Current data | Current level | | Target 2010 |
|---|--------------|---------------|--------|-------------|
| Primary | | | | |
| Broadband access | N/A | N/A | | 10% (2005) |
| Electricity prices ¹ | 2001/02 | NI / UK* | 127.1% | UK levels |
| | | ind. s | 222.9% | |
| | | ind. m | 167.1% | |
| | | ind. l | 169.7% | |
| Development of roads | N/A | NA | | NA |
| Secondary | | | | |
| Gas availability % of households | 2002 | 42% | | 75% |
| Gas prices: small commercial plus industrial | 2002 | NI / UK | 115% | 100% |
| Gas prices: large commercial plus industrial | 2002 | NI / UK | 114% | 100% |
| Proportion of electricity produced from renewable sources | 2002 | 2% | | Rising |

Notes: * slight divergence from Department figures

¹ it has not yet been possible to mirror the presented data for 'industrial small'