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EVALUATING THE BENEFITS OF CAREERS GUIDANCE

by

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SUMMARY

Education and training for post-16 year olds represent a major item of public expenditure. The budget of the new Learning and Skills Council (LSC), that is responsible for all post-16 education and training, excluding higher education, itself totals £ 7.315 billion for 2002-2003, including £1.355 billion for Sixth Form funding. Careers guidance to assist individuals in making improved career choices can play a significant role in helping to ensure that good use is made of the expenditure on education and training, and of the nation's skills base.

There are several reasons why it is becoming increasingly desirable to be able to assess and optimise the benefits of expenditure on careers guidance. One is that the top-level process of Comprehensive Spending Reviews, and Public Service Agreements, through which HM Treasury provides funding for public services, increasingly requires that the benefits which specific public services provide can be quantified, in order to justify their funding. Another is that ensuring best value in the management of public funds, and in the development of evidence-based practice, requires evidence to exist on the extent to which different forms of service provision do provide benefits to their recipients. A third is that the setting of optimal quality standards for the provision of careers guidance by individual providers requires judgements to be made on the levels of service quality which maximise its benefits net of costs. A fourth is that the process of performance review, and monitoring the extent to which individual service providers do achieve best value, requires suitable quantitative performance indicators to be available that can reflect the benefits which recipients derive from the service provided.

The role of careers guidance, and the careers guidance interview in particular, in our present context we take to be threefold. The first is to provide information to the individual careers advisee on the changes in net income and other possible payoffs that are likely to result from successfully completing different possible career moves. The second is to elicit information from the individual advisee on their preferences over different possible characteristics of the payoffs, including those relating to quality of life, that are associated with different possible career choices. The third is to assist in assessing the suitability of the individual career advisee for successfully completing the additional training and/or further education or other investment that

is required for different possible career moves, based upon information on the individual's skills, talents and aptitudes.

A central concept in the economic evaluation of the benefits of careers guidance is that of human capital. The value of an individual's human capital is that resulting from the individual's current and future life-time earnings. To reduce this whole stream of income to a single value, the flow of annual income is discounted by the relevant rate of interest to yield a present value. The future earning-power which this present value reflects itself results from the skills and abilities of the individual. Investments in human capital by the individual may take the form of further education or training which boost the future life-time income of the individual through enhancing their skills and abilities. The process of further education and training may involve an initial reduction in the income of the individual, because of foregone earnings which the individual does not receive if they are not working full-time during the period of further education and training. In addition, it may involve other tuition fees or study costs which the individual incurs. To produce a rate of return higher than the relevant rate of interest, the present value of the negative initial change in income resulting from these foregone earnings and the later positive boosts to future income must be positive overall, thereby raising the value of the individual's human capital.

A career move to a new job may similarly involve some initial costs in moving, followed by increased future earnings. Where career moves involve geographical relocation, account needs to be taken of possible differences in the cost of living between different geographical areas. The direct cost of housing and accommodation varies substantially across different parts of the UK. Similarly the cost of commuting to work may vary geographically, once the economic ability to live close to the workplace differs across the country. Such differences in the cost of living underline the need to achieve comparability in the income figures before and after a geographical relocation associated with a career move. This may be achieved by deflating the income figures by a relevant price index that reflects local variations in the cost of living to produce a measure of real income, rather than simply money income.

A framework theory for assessing the benefits of careers guidance can be based

upon the concept of value added to the value of individual human capital achieved by the careers guidance, as in Section 2 below. The value added is computed from the net present value of changes in the time stream of future net income the individual will experience as a result of the careers guidance. The concept of value added is an important indicator of performance and organisational success in education and elsewhere. It enables an allowance to be made for differences in the initial characteristics of the client groups which different careers providers may face. This can be done by examining the extent of the improvement in the value of their human capital which results from different providers, after netting off the prior attainments achieved in their existing careers, as reflected in their initial net income streams in their existing careers. Careers guidance may then succeed in achieving a higher value added to individuals who are initially under-informed about the career opportunities that are available to them, and who have a low initial income, than it does to individuals who are already well-informed and have a high initial income. Moreover, if policy-makers are concerned about social exclusion and making less unequal the distribution of income, there is a case in computing the overall social value added by careers guidance for placing a higher social weight upon the same absolute increase in income achieved by a poorer individual compared to that placed upon its receipt by a richer individual.

An important further dimension of investment in human capital is that of risk and uncertainty. Section 3 analyses the benefits of different levels of quality of careers guidance in improving the career choices of individual careers advisees in the face of such uncertainty, based upon a decision analysis of individual career choices. Investment in human capital, in the form of additional training or further education or other significant changes in career direction, may involve a large element of sunk cost that cannot easily be recovered if wrong career choices are made. Such investment typically takes place in the presence of some significant degree of uncertainty at the time the initial investment decision is made about the future outcomes and future degree of success of the investment decision. Whilst the costs of the additional training or further education may be ascertained with reasonable certainty, the probability of any given individual advisee achieving any given target level of success in completing the training or education, given the individual advisee's initial skills, education, training and aptitudes, needs to be carefully assessed by the

careers guidance provider in formulating their careers advice.

We would expect in general higher quality careers guidance to be characterised by more accurate assessments of the chances of success of individual advisees in achieving different possible levels of performance in additional training and education, and in helping to equip individual advisees with the motivation and preparation to have a high probability of success in the goals they choose following the careers guidance. Similarly, we would expect high quality careers guidance to be characterised by more accurate assessments of the likely economic prospects for career moves in different possible directions.

As a benchmark for the assessing the quality of careers guidance offered in practice, we analyse first the case of perfect careers guidance. This is defined in terms of the careers guidance interview, and any related tests, being able to fully assess the abilities, skills and attributes of the individual, so that as a result of this assessment the individual can be accurately advised as to whether or not they will succeed in the career move. We will also assume that perfect careers guidance can accurately assess the future state of the economy, so as to be able to perfectly predict the future net income the individual advisee will receive if they do make a successful career move.

Against the benchmark of perfect careers guidance, we analyse the concept of Type I and Type II errors which individuals will make in their career choices in the absence of such perfect careers guidance. In the case of a single possible career move, a Type I error occurs if the individual rejects a career move even though it would have been beneficial for the individual. In the case of multiple possible career moves for an individual advisee, perfect careers guidance would by definition be able to guide the individual advisee to their optimal career move, that maximises the value of their human capital from amongst all the possible career moves for which the individual has the capability to succeed. In the case of imperfect careers guidance, there is a risk that the careers guidance may imperfectly assess the suitability of any given individual advisee for a particular career move. In addition, there is a risk that the information given by imperfect careers guidance on the changes in net income that result from a given career move will be inaccurate. As a result, there is a risk that the

individual will chose a career move which is not the optimal career move for them. A Type I error in the case of multiple possible career moves is one where the individual rejects the career move which would be optimal for them, and instead chooses another career option in which they have the capability to succeed, albeit at a lower level of overall payoff to them than the optimal career move for them would yield.

A Type II error occurs if an individual decides to make a career move for which they do not have the capability to succeed. They then incur the investment costs involved in the career move, but do not received a positive return on this investment. The costs which the individual incurs through making Type I and Type II errors are analysed in Section 3 of this Report. The value of the benefits generated by any given level of quality of careers guidance is measured by the reduction in the frequency and costs of Type I and Type II errors which individuals make in their career choices, compared to those which they would make in the absence of careers guidance. If many individuals are making significant Type I and Type II errors in the career choices which they make in the absence of careers guidance, there is greater scope for beneficial careers guidance to be provided to them. In contrast, if all clients of a careers guidance provider would have made no Type I and Type II errors in the absence of any careers guidance, the value added to their human capital by the provider would be zero. Providing high quality careers guidance to those who would otherwise make poor career decisions on their own can then have substantial benefits.

Perfect careers guidance, as the benchmark for the highest possible quality of careers guidance, involves reducing the Type I and Type II errors down to zero. An index of the quality of careers guidance which a given careers guidance provider offers is given by the proportion which the provider actually achieves of the total potential benefit which would be obtained by perfect careers guidance reducing the frequency of these errors down to zero. When we take into account the costs of providing different levels of quality of careers guidance, we can derive an optimal quality of guidance, against which different providers can also be judged.

In Section 4 of this Report, we extend our development of a framework theory for

evaluating the benefits of careers guidance to include considerations of changes in the quality of life for the individual which result from career moves and associated guidance, other than those which result simply from changes in net income. One important existing approach to incorporating quality of life assessments into the measurement of overall net benefits is that provided by the concept of the Quality Adjusted Life Year (QALY) in health economics. We examine different approaches to deriving quantitative assessments of the QALY improvements which health care may achieve. The most suitable approach for our present context is that which takes account of the individual's own preferences . This can be done by examining the trade-offs which the individual is prepared to make between changes in quality of life variables away from a standard level and changes in net income. Thus, if an individual has a strong preference against spending long hours in commuting to work, they will be prepared to give up a significant amount of monetary income to reduce their commuting level down to a more basic level. This enables a monetary value to be given to the benefits of quality of life changes alongside changes in net income resulting from different career moves and qualities of careers guidance. This monetary value can be further adjusted for considerations of distributional equity and differences in the initial income level of different careers advisees through the concept of social aversion to inequality discussed in Section 4.

In Section 5, we incorporate into our cost-benefit analysis several wider social benefits that may result from improved quality of careers guidance. These include increased tax yields and reductions in unemployment and other social security costs to the Exchequer, which recognise the monetary gain to the public purse over all future years which may result from improved career and employment prospects for the recipients of high quality careers guidance. The resulting improvements in the tax base, and reduction in the burden of social security benefits on the public finances, reflect the fact that the Exchequer is essentially a stakeholder in the human capital of the individual career advisee, and gains from increases in its value.

Similar remarks apply to reductions in health care costs on the National Health Service which result from an improved quality of life and health status for those who make beneficial career moves which reduce their risk exposure to job-related ill-health. Improved training and job prospects as a result of careers guidance may also

reduce the individual risk factors of unemployment and low skill levels which contribute towards individual participation in crime. Several studies indicate the costs of crime, and of individual histories of crime, are substantial, with much of this cost falling on the public purse. A further monetary benefit from high quality careers guidance to individuals who are at risk of committing crimes in future is then measured by the extent of the reduction in the expected value of the costs of crime which would be implied by a reduction in the above risk factors.

In addition to securing the above beneficial micro-economic outcomes, high quality careers guidance can result in macro-economic benefits. These can result from the initial existence of a significant degree of mismatch, between the demand for labour in different occupations and geographical areas and the available supply. The level of mismatch within the British economy has been estimated to account for at least a third of all unemployment in Britain. Careers guidance, in conjunction with training and further education opportunities, can help to reduce this mismatch by making individuals who are unemployed in one particular geographic location, industry and/or occupation more aware of the increased employment opportunities which are available to them through geographical re-location and/or re-training.

Reducing the degree of mismatch in labour markets can facilitate an improvement in the Phillips curve trade-off between unemployment and inflation, enabling any given inflation target for the economy at large to be achieved with a lower level of overall unemployment and a higher level of aggregate demand. The higher level of aggregate demand can result in not only an increase in the future net income stream of individuals whose skill level or location is improved by the careers guidance. It can also result in increases in the future net income stream of others, such as unskilled workers, who are complementary in the production process to more skilled workers, whose demand can be increased without the risk of higher inflation when the degree of mismatch in the economy is reduced by the careers guidance. Careers guidance can also reduce the degree of transitional unemployment by enabling individuals to form more realistic expectations in the setting of the reservation wage at which they are just willing to accept a job in their search process for employment.

The framework theory developed in this Report can be used as the basis for the

specification of the associated informational requirements to formulate detailed quantitative estimates of the costs and benefits of achieving different quality standards in the provision of careers guidance. This in turn can support the development of a well-designed database on client characteristics, local economic and other environmental variables, and the improvements in the net income and quality of life which result from the careers guidance provided by different individual providers. The above focus on the frequency and magnitude of Type I and Type II errors as indicators of the scope for beneficially improving the quality of existing careers guidance provision can itself, for instance, be related to quality of service indicators, such as the degree of access to the careers guidance which is available to potential client groups who could benefit from high quality careers guidance by reducing the extent of Type I and Type II errors in their existing career choices, and of the quality of information which is available to them.

The development of a well-designed database based upon such analytical foundations can assist careers guidance providers in identifying beneficial career moves for individual advisees. In addition, it can generate well-designed performance indicators which demonstrate the scope for further progress in improving the quality of careers guidance provision, and the quantitative benefits of this improvement in quality. The conceptual framework theory we have developed can be linked to analytical techniques, such as Data Envelopment Analysis and Stochastic Frontier Analysis, which can identify current best practice providers of careers guidance, after taking into account the nature of the client groups which they serve. In addition, they can be used to assess the relative effectiveness and value for money of other existing providers and the quantitative scope that exists for securing benefits from improving the quality of their provision. The identification of best practice can itself be used to define standards of delivery and targets for service delivery and the quantitative benefits associated with these targets.

The above framework theory can also be used to support the detailed appraisal of the case for different levels of financial support for individual careers guidance providers, and for the careers guidance system as a whole, to achieve different possible standards of service delivery. In addition, it can assist in the appraisal of the optimal level of fees to careers guidance advisees.

If the economic benefits of careers guidance and associated educational and training expenditure are to be maximised, there is a strong case for making the most efficient use of the available information to ensure that this objective is achieved. Information is itself costly to collect and analyse, with a value that depends upon its timely and effective use. As we have stressed above, there is a need to recognise that the future is to a significant extent inherently uncertain, with differences likely to prevail between what can currently be expected *ex ante* about the future, on the basis of the best use of the information currently available, and what may actually prevail *ex post* in the future regarding future earnings levels and other payoffs from different current career choices. Adding value to current career decisions therefore means making better use now of the information that could currently be made available, than would otherwise occur in the absence of high quality careers guidance. As with the regulatory requirements upon Independent Financial Advisers for financial products, it is reasonable to expect high standards of *ex ante* information provision on the relative merits of different career options, and their different characteristics, and exploration of the risk and other preferences of the individual advisee, even when information on future *ex post* outturns is not yet available. The value of human capital at stake in many individual career decisions is likely to be at least as great as that for many other decisions with financial consequences that the individual may face.

Information also has many characteristics of a public good, with the user information needs of many different potential users often overlapping. If it is to be used efficiently and effectively, there is a need to ensure good design and coordination in the overall system for producing and utilising the type of information that can help to maximise the benefits of careers guidance and associated education and training expenditure. The different *interacting levels* at which this can occur are discussed in Section 6 of this Report.

Reaping the potential benefits of high quality careers guidance, through reducing the frequency and magnitude of Type I and Type II errors by individuals in their career choices, can itself contribute directly to the Government's own central policy aim in the field of education and education and skills, namely "to help build a competitive economy and inclusive society by .. enabling all young people to develop and to equip themselves with the skills, knowledge and personal qualities needed

for life and work; and …. encourage and enable adults to learn, improve their skills and enrich their lives" (DfES, 2002), and to the proposed National Skills Agenda (Skills Task Force, 2001). However, monitoring the extent to which these benefits are achieved, and maximising the value of the careers guidance provided, both depend critically upon the effective deployment of detailed information at national and local level by Learning and Skill Councils and individual guidance providers.

1. INTRODUCTION

Education and training for post-16 year olds represent a major item of public expenditure. The budget of the new Learning and Skills Council (LSC), that is responsible for all post-16 education and training, excluding higher education, itself totals £7.315 billion for 2002-2003, including £1.355 billion for Sixth Form funding. Careers guidance to assist individuals in making improved career choices can play a significant role in helping to ensure that good use is made of the expenditure on education and training, and of the nation's resultant skills base.

There are several reasons why it is becoming increasingly desirable to be able to assess and optimise the benefits of expenditure on careers guidance:

a. careers guidance competes with many other forms of public expenditure, such as that on the National Health Service, for the finite total funds which the Chancellor of the Exchequer decides periodically to make available in each Comprehensive Spending Review. An inability to demonstrate quantifiable levels of benefits from the substantial current levels of expenditure on it will leave careers guidance in a weaker competitive position for continuing to secure this level of public funding. A failure to organise well the case for adequate funding for careers guidance is likely to result in inadequate levels of service provision, and a failure to reap the potential benefits which well-funded careers guidance could achieve. If higher levels of public expenditure on careers guidance are to be justified, an ability to demonstrate and, as far as possible, quantify the additional benefits which such additional expenditure can achieve becomes an even stronger requirement in the competition for public funding.

b. Each Comprehensive Spending Review is now accompanied by Public Service Agreements, and more detailed Service Delivery Agreements, between individual Government Departments, such as the Department for Education and Skills (DfES), and HM Treasury. These specify quantitative targets for service achievements which each main area of public expenditure is expected to deliver in return for the public funding provided. Being able to clearly identify service achievements in quantitative

terms becomes a key part of this process. There is a strong case for seeking to ensure that the agreed targets for service achievements align well with the underlying objectives that careers guidance can help achieve. If these are to be realistic targets, they should also reflect the ability of careers guidance providers to deliver the intended levels of achievement for the proposed level of public funding. Being able to assess the magnitude, and relative importance, of the different quantitative deliverables which careers guidance might achieve in return for different levels of public funding is a key task in the development of evidence-based policy. The 2002 Comprehensive Spending Review is itself placing increased emphasis on the development of the evidence base for policy-making (HM Treasury, 2002), in line with the earlier *Modernising Government* White Paper (Cabinet Office, 1999). This task would be assisted by greater knowledge of the quantitative benefits that careers guidance can achieve in each relevant direction in return for different levels of public funding.

c. There is a need to ensure efficiency and effectiveness in resource allocation, from any given total level of public funding for careers guidance services through the national agency of the Learning and Skills Council, down to the local devolved agencies of the local LSCs. Each local agency will typically face varying local socio-economic circumstances for its intended careers guidance recipients. These varying circumstances are likely to impact upon the costs and the benefits associated with different levels of careers guidance provision in the localities concerned. Being able to assess these respective costs and benefits can assist in ensuring that efficiency and effectiveness are achieved in how the available national funds are distributed across different localities.

d. Each individual local LSC, in conjunction with its local careers guidance providers, will need to decide on how best to allocate its devolved budget across different possible forms of service provision. The need for evidence-based practice in careers guidance is emphasised in Connexions (2001), where evidence-based practice forms one of the key principles for Connexions Service Delivery Planning. Being able to assess both the costs and the benefits of different levels of careers guidance for different target groups can assist in the development of resource management

policies that can ensure that the total available local funds are deployed in the most efficient and effective ways.

e. Issues of the appropriate levels of service quality which individual careers guidance providers should achieve are relevant to the process of accreditation of these providers by the Guidance Accreditation Board (GAB). Knowledge of the benefits which different levels of service quality can achieve compared to their cost could assist in the setting of target levels of service quality which individual service providers should achieve.

f. Achieving best value in the use of public funds is a statutory requirement for local authorities in England under the Local Government Act 1999 (see DETR, 1998). Being able to demonstrate that best value is being achieved is the key task of Best Value reviews that are now a requirement for Connexions partnerships every three years (see Connexions, 2001, Section 0; CSNU, 2002). Best value can itself be interpreted as the achievement of the highest possible level of benefits for service recipients from the available funds. Being able to assess and quantify these benefits at the local level is likely to become an increasingly requirement within the best value regime. Similarly the process of performance review (see Connexions, 2001, Section A) requires the development of appropriate quantitative performance indicators of local service achievements. If the quantitative indicators are poorly designed, they may not align well with the underlying objectives of careers guidance and the potential benefits which guidance can achieve. There is then a risk that the indicators will create perverse incentives for local managers simply to manage the indicators, rather than maximise the benefits of their guidance provision. Well-designed quantitative performance indicators therefore need to be closely aligned to the benefits which good careers guidance can achieve for its recipients (see Mayston, 1985, 2000a).

There are thus many ways in which an assessment of the benefits of careers guidance can play an important role in policy making and in the management of effective careers guidance. There is a strong case for ensuring that the response to each of the above pressures for the development of performance and outcome

measures is a well-coordinated system that helps to maximise the benefits that are achieved from the resources deployed in careers guidance. Information and performance measures need to be part of an integrated management system for careers guidance, information and advice that is carefully designed to achieve optimal overall outcomes.

The challenge which faces the careers guidance sector from the above developments is in large part a financial and economic one. A greater recognition of the economic role of careers guidance can help to meet this challenge, whilst complementing other perspectives on the role of careers guidance, such as those from cognitive psychologists. The need for this recognition is underlined by the economic policy importance of a well-functioning labour market and a reduction in the extent of social exclusion, to which high quality careers guidance can make positive contributions. As we emphasise below, there is a need to incorporate explicit consideration of the role of risk, uncertainty and imperfect information into the economic assessment of the benefits of careers guidance, alongside quality of life issues and wider social benefits.

The role of careers guidance, and of the careers guidance interview in particular, in our present context we take to be:

i. to provide information to the individual careers advisee on the changes in net income and other possible payoffs that are likely to result from successfully completing different possible career moves

ii. to elicit information from the individual advisee on their preferences over different possible characteristics of the payoffs, including those relating to quality of life, that are associated with different possible career choices

iii. to make progress in assessing the suitability of the individual career advisee for successfully completing the additional training and/or further education or other investment that is required for different possible career moves, based upon information on the individual's skills, talents and aptitudes.

A framework theory for assessing the benefits of careers guidance can itself help to facilitate progress in the following directions:

a. the attachment of monetary values to the benefits generated by the careers guidance interview

b. the assessment of the enhanced monetary and other benefits generated by improved levels of quality in the careers guidance given in the careers guidance interview

c. the assessment of the value for money in service delivery that is provided by different levels of quality in the careers guidance given in the careers guidance interview

d. assisting in the development of cost-effective standards of service delivery in careers guidance

e. providing the analytical framework for the development of an information base on the contributions made by different individual careers guidance providers.

In Sections 2 - 4 of this Report, we will seek to identify micro-economic outcomes and concepts which are relevant to assessing the benefits of different levels of quality of the advice provided by the careers guidance interview. This includes relevant aspects of the theory of human capital formation in Section 2, and the value of information in Section 3. The benefits associated from enhancements in quality of life resulting from good quality careers advice are discussed in Section 4. In Section 5, we examine the benefits from good quality careers guidance from wider perspectives than those benefits which accrue directly to the individual recipient of the careers advice. These wider perspectives include macro-economic benefits, taxation and social security benefits, public expenditure benefits and other externalities flowing from improved career choices and higher quality careers guidance.

2. INVESTING IN HUMAN CAPITAL

In Sections 2 -3 we will initially assume that an individual's monetary income is the only variable which affects the individual's welfare, before turning to the incorporation of other quality of life variables in Sections 4 and 5. Under this assumption, the value of the individual's human capital at the present time may be expressed as the net present value of their future flow of net income (see Becker, 1993). Net income at time t for an individual is itself the difference between the individual's gross income at time t and their expenditures at time t in securing this flow of gross income. These expenditures may include the cost of job-related travel, job-related clothing and any education and training costs which fall upon the individual. In addition, they may include the cost of moving house to locate closer to the new job, and any higher levels of accommodation expenses, such as rents and mortgage payments, in living closer to the location of the new job. These additional expenditure items may be significant if job opportunities and pay levels are greater in some parts of the UK, such as the South East of England, than others, but are also accompanied by higher accommodation, commuting or other such job-related costs. Adjustment for these geographical variation may be aided by making use of suitable geographical indices for housing and other costs.

The value of human capital for the individual may be expressed as the present value of the future flow of net income for individual i for the next n years (see Becker, 1963; Mayston, 2002a). If we measure each period's net income in money terms at the price level prevailing in year t, allowing for general inflation, the relevant discount rate should be in money terms, such as the money rate of interest. Alternatively, if we measure each period's net income in real constant-price terms, after netting out the effects of general inflation, the relevant discount rate should be in real terms, such as the real rate of interest (equal to the annual money rate of interest less the annual rate of inflation).

Since career choices may well affect an individual's pension income in retirement, another question which arises here is the time horizon, n, over which the above net present value is taken. One choice would be for n to be the remaining total life-time

of the individual, including their period of retirement from work. Their gross income during their retirement years would then be included within the calculation of their human capital, but so too would their pension contributions during their working life-times, as expenditures associated with securing their future pension income. An alternative approach would be to treat n as referring only to the period of time before retirement, without deducting pension contributions in the calculation of their net income. However, this would be to neglect potentially large employers' contributions and other factors which might affect the individual's future pension income. Whilst employers' pension contributions might be included as part of the individual's accrued income over their working life, once uncertainty and other factors are taken into account it may be more accurate to consider n as referring to the future life-time of the individual. An individual's actual standard of living in their retirement years may be an increasingly important consideration in making good life-time career choices, to which high quality careers guidance can make a positive contribution.

In the simple case where there is no uncertainty, careers guidance may seek to increase the value of the individual's human capital by helping them to realise a higher level of the net present value of future life-time income. In some cases, such as where careers guidance results in a move directly into a better paid job, this may boost the individual's net income in each future time period. However, in other cases, the careers guidance may result in the individual undertaking a period of further education or training which may cause their net income initially to decline. There is then an element of foregone earnings. In addition, there may be other costs, in the form of fees, books, and other expenses they would not otherwise have incurred, to the individual in undertaking the future education or training. Both these factors may make the initial values of the changes in net income negative in value. However, if the training or education is successful in securing a better-paid job for the individual, later changes in the individual's net income will be positive. Figure 2.1 below illustrates the case where, in the absence of careers guidance, the individual would remain at a constant level of net income, Y^o, throughout their life. However, as a result of careers guidance, the individual experiences a new time path of net income Y'.

If the rate of return to the individual on this investment in additional education or training exceeds the rate of interest, r, the result will be an overall increase in the net present value, NPV, of future earnings, after taking into account the discounted value of these positive and vertical elements. The differences in the time path of earnings, Y', after the careers guidance, and the time path of earnings in the absence of careers guidance in Figure 2.1, when discounted using the prevailing rate of interest will then be positive overall. There is then an increase in the value of the individual's human capital (see Mayston, 2002a).

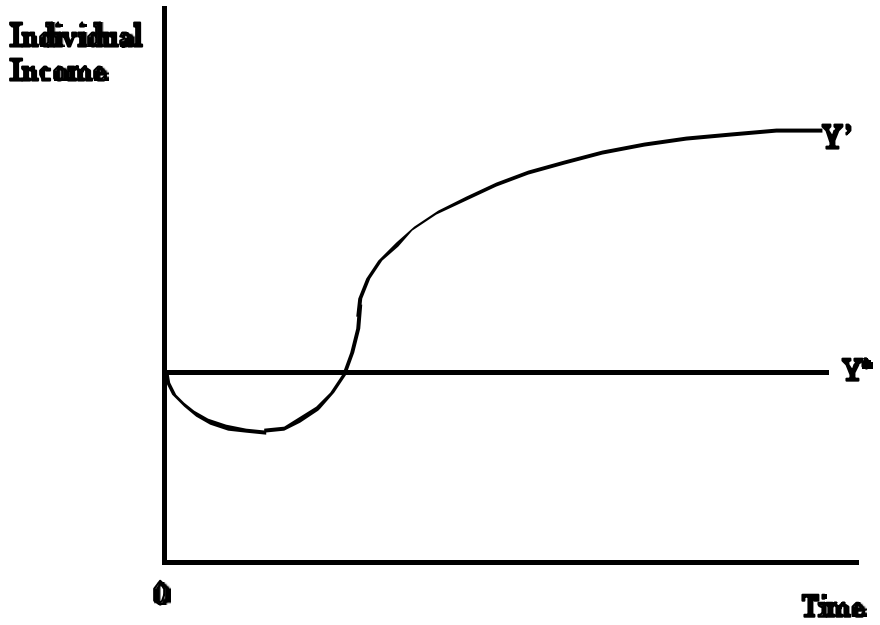

FIGURE 2.1

The increase corresponds to the monetary value of the value added to the individual's human capital. The concept of *value added* is an important indicator of performance and organisational success in education (see e.g. Jesson, 2001) and elsewhere (see Kay, 1993). In contrast to standard League Tables of the unadjusted examination performance achieved by the pupils in different schools, value added measures in secondary and primary education (see Mayston and Jesson, 1999) provide quantitative measures of the educational progress which each school achieves for its pupils, after adjusting for their prior attainment at earlier stages in

the educational process. Schools which achieve high levels of examination passes for pupils who have an advantaged social background and strong prior attainments in earlier stages of the educational process may then achieve a smaller value added than a school which achieves slightly lower levels of examination passes for pupils who are disadvantaged in their social background, and who have weaker prior attainments in earlier stages of the educational process.

Similarly, different careers guidance providers may have client groups who differ significantly in their initial characteristics. A provider that helps to secure well-paid jobs for those from advantaged social and educational backgrounds may achieve less value added than a provider who secures more moderately-paid jobs for those from disadvantaged backgrounds. The value added measure is based upon the change in the value of human capital which results from the provision of the careers guidance. As we shall see later, if there is a policy stance of social aversion to inequality, the monetary measure may be further adjusted to reflect diminishing marginal utility of income to take account of such inequality aversion.

Since the further education and training may involve an element of subsidy from the government, and careers guidance itself costs money to provide, we need also to take these additional costs into account in deriving the overall net benefit from the careers guidance and associated further education and/or training. The overall net benefit from the careers guidance results from subtracting from the increase in the individual's human capital the level of public subsidy in the additional training and/or education which the individual receives, and the cost of the careers guidance which individual i receives.

The social rate of return on these investments is given by the value of the discount rate that yields an overall value of zero to the net benefit. This is then in the form of an internal rate of return on these investments. However, it is well known (see Brealey and Myers, 2000) that internal rates of return are not well-behaved indicators of the benefits of investment when some of the future annual benefits, here of changes in the individual's income stream, can be negative in value. Careers guidance may result in the individual incurring initial costs of foregone earnings and

other costs associated with additional training or further education that cause the initial changes in their incomes to become negative in value. However, in general we expect the change in future income after this initial investment period to be positive, so that internal rates of return may be valid investment criteria. A further circumstance under which internal rates of return are not well behaved indicators of the benefits of investment occurs when the investments to be compared are mutually exclusive. One form of mutually exclusive investment does indeed occur when we consider different possible levels of quality in the provision of careers guidance. Use of the rate of return on careers guidance derived from internal rate of return calculations will then be inappropriate, unless the time streams of future income associated with different quality levels of careers guidance follow a similar time profile to each other.

In order to consider explicitly different levels of quality in the careers guidance offered to the individual, we may examine the way in which the variables which influence the net benefit from careers guidance are likely to depend upon the level, Q, of quality in the careers guidance provided to the individual. We would expect firstly that the new time path, Y', of theindividual's net income will change with the quality of careers guidance offered, making each Y' dependent upon Q. Since higher quality careers advice may result in the individual advisee undergoing higher initial levels of training and/ further education, each of the new levels of income, however, may not increase with the quality of careers advice, Q. Nevertheless, we would expect that the value of the individual's human capital, as reflected in the net present value of the changes in their net income which they experience as a result of the careers guidance, would increase with the quality of careers guidance offered beyond some point.

However, recognition needs to be given here to the fact that some individuals may well be already well-informed about the pay-offs which are associated with different possible careers moves that they might make, and about own preferences and capabilities. In such a world, career guidance would be of no value to them, and contribute zero value added to their human capital, unless the quality of the careers guidance offered reaches a point (which we will denote by Q_o) where the guidance

can make the individual better informed than they already are about these relevant parameters. Once this minimum level of useful quality of guidance is achieved, increases in the quality of advice offered beyond this point may nevertheless succeed in adding value to the individual's human capital. The positive contribution which high quality careers guidance can make to the individual's human capital arises here from the imperfect information which individuals initially possess concerning their own preferences, capabilities and opportunities for beneficial career moves. Careers guidance can play a valuable economic role in providing individuals with better information than they already have on the career opportunities available to them and their suitability to successfully pursue them in conjunction with possible further education and training, given their existing skills and abilities. In doing so, it can help to boost the value of the individual's human capital beyond what it would have been in the absence of careers guidance. The extent of this positive contribution will, moreover, be greater (other things being equal) the less well-informed the individual advisee is initially.

We would expect that the cost of the careers guidance would also increase with the quality of the guidance. Thus if the guidance involves the provision of more information, more detailed research and more staff time spent in giving advice to the individual, the associated cost is likely to increase. Higher quality advice may also affect the nature of the additional training and/or further education which the individual undertakes, so that their total cost to the individual also depends upon the quality level Q . Because good quality careers guidance may involve avoiding unnecessary high costs of some programmes of further training and education, these costs may not, however, be a simple increasing function of the quality level Q.

As noted above, there is a zero value added to the individual's human capital for levels of quality of careers guidance less than the minimum useful level of quality, Q_o, that makes them better informed than they already are without the careers guidance. Up to this point, increasing the level of quality incurs additional costs but no benefit. Beyond this point, the careers guidance needs to offer the individual significantly more than they know already, if it is to justify the cost of its provision. The quality of the careers guidance where the benefit to the individual does just

equal the cost of providing the careers guidance, and hence where its net benefit, NB, is equal to zero, is denoted by Q' in Figure 2.2 below.

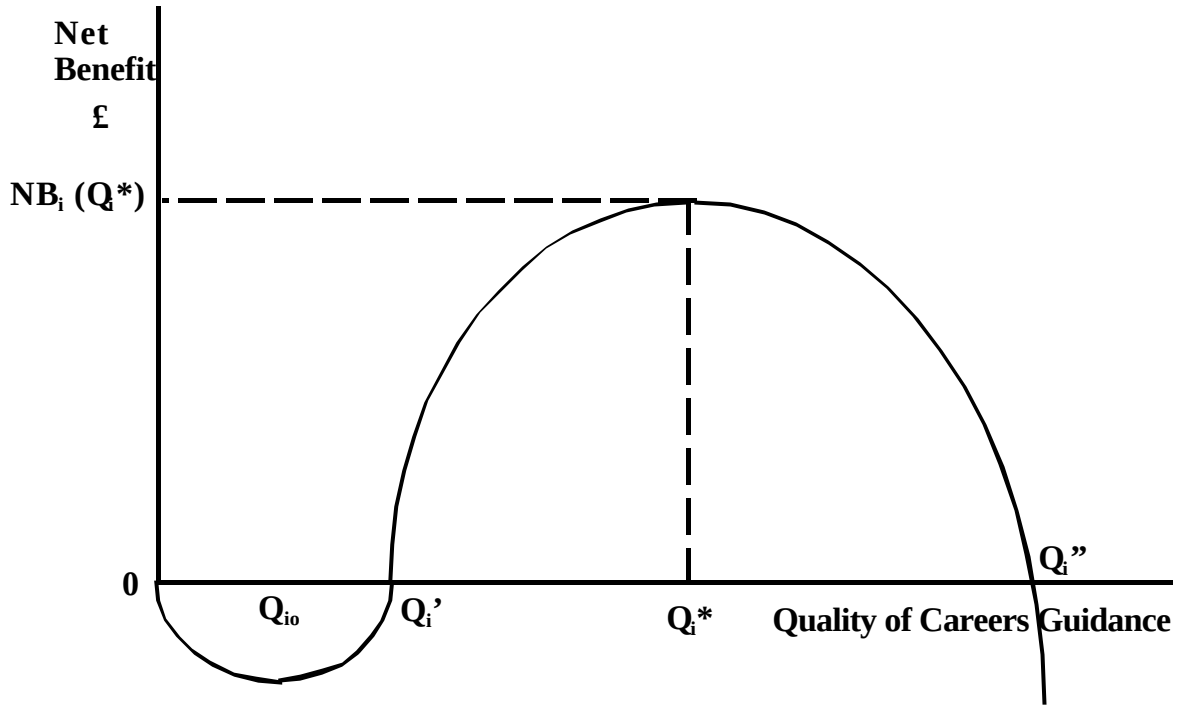

FIGURE 2.2

Once this level of quality, Q', is reached, we would expect the net benefit, NB, of careers guidance to the individual to initially increase further with the quality level, Q, of the guidance offered. Better quality careers guidance should be able to point the individual in the directions of greater increases in the net present value of future increases in net earnings than poorer quality careers advice. In addition, good quality careers advice may initially be feasible without significant increases in its costs of provision compared to those involved in the provision of poorer quality careers advice. Similarly, higher quality of careers guidance may discover more appropriate avenues of additional training or further education from the individual concerned for the same, or lower, level of public subsidy. All these factors will make the net benefit, NB, of the careers guidance to be an increasing function of the quality of the careers guidance over an initial range of increasing quality beyond Q_o, as in Figure 2.2 above.

However, after some point, we might expect **diminishing returns** to set in, causing the additional net present value of future earnings which results from increases in the quality of careers guidance to become smaller in value. Achieving successive increases in this net present value may also involve more expensive programmes of training and/or further education that cause the net return on their investment to decline further. Providing higher quality of careers guidance after any initial inefficiencies and ineffective forms of guidance have been eliminated is likely to involve increasing costs of provision. These factors mean that at some optimal level of quality, Q*, the net benefit of the careers guidance is likely to reach its maximum value NB(Q*), as in Figure 2.2.

Figure 2.3 below shows the net present value of the marginal increases in the individual's future net income, NPVM , declining after Q' with the quality of careers guidance as diminishing returns set in. At the optimal level of quality, Q*, in Figure 2.3, NPVM equals the marginal cost of greater quality in the careers guidance, MCQ , plus the marginal cost, MCD, of the subsidy for any additional training or further education for the individual that results from the additional quality of careers guidance. The maximum value NB(Q*) of the net benefit that is attained when the quality of the careers guidance is at its optimal level can be used as a **benchmark** by which to compare the **outcomes achieved** by different careers guidance service providers for this type of individual. It also forms an essential part of a **cost-benefit analysis** of the net benefits that result from providing optimal levels of quality of careers guidance to individual advisees.

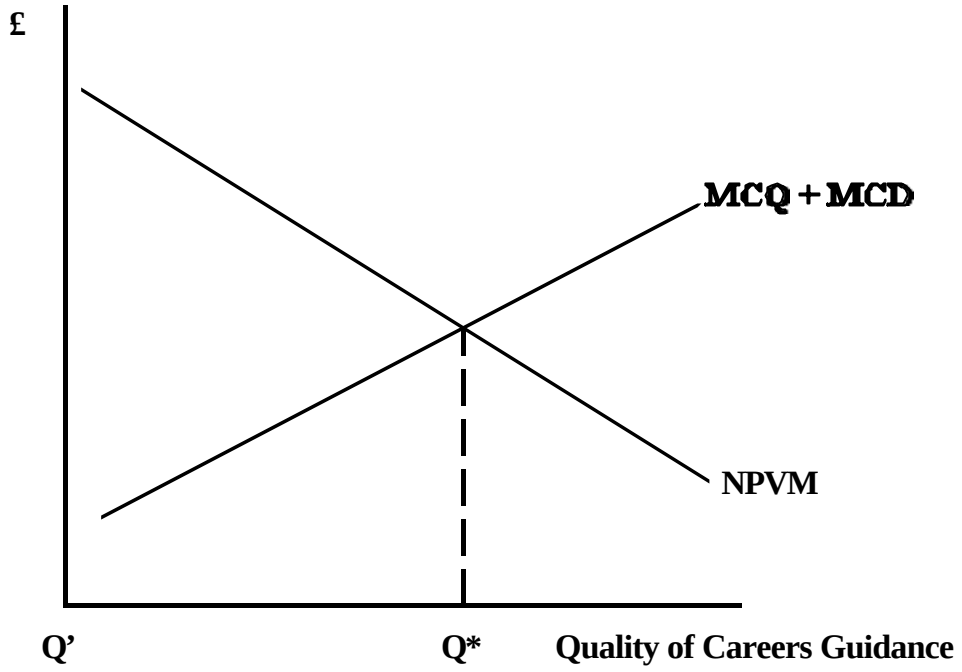

FIGURE 2.3

This implies that careers guidance service providers should **record and monitor** as far as possible the levels of **income** that the individual advisee is likely to receive over their future years if no careers guidance is given, and the levels of income they are likely to receive if they follow the careers guidance. These income figures should ideally be adjusted for any additional **job-related expenditures** they are likely to incur, and any variations in the cost of living which may result from geographical re-locations. Predictions of the levels of future income that the individual might achieve as a result of their careers advice might draw upon existing **statistical databases**, such as that provided by the New Earnings Survey (DfEE, 2001).The need for substantial improvements in the organisation and coverage of existing statistical databases on earnings and likely future employment prospects in different occupations to better serve the needs of individuals and their careers advisers has been stressed by the Skills Task Force (1999). This has noted that "too many young people make career choices without a good understanding of where job opportunities will be, and the likely returns to those opportunities".

In order to make this process operational, recognition would also need to be given to the **different factors** which impact upon the maximum value that are **outside the control** of individual careers guidance service providers. These factors will include:

i. The general **state of the economy**, nationally, regionally and locally, in the current and future time periods, as measured by relevant economic indicators, such as national, regional and local rates of unemployment and vacancies in occupations relevant to the careers prospects of the individual advisee

ii. the **initial skills, education, training and aptitudes** of the individual to whom careers guidance is being given.

The development of a systematic database of these variables would facilitate the assessment of the **relative efficiency and effectiveness** of different careers guidance providers in generating improvements in the future time paths of net earnings, and associated human capital, of their advisees, after adjusting for differences in the above exogenous factors across individual providers and over time. There are a number of statistical techniques which could be used in this assessment, such as **multivariate regression analysis** (see e.g. Mayston and Jesson, 1999), **stochastic frontier analysis** (see e.g. Mayston, 2002b), and **Data Envelopment Analysis** (see e.g. Mayston and Jesson, 1988). Such an assessment could assist in the evaluation of the relative efficiency and effectiveness of individual careers guidance providers. It could also assist in the identification of **best practice value for money** in the provision of high quality careers guidance.

3. INDIVIDUAL CAREER DECISIONS AND THE VALUE OF CAREERS GUIDANCE

3a. Careers Decisions Under Uncertainty

An important further dimension of investment in human capital that has implications for the evaluation of the quality of careers guidance is that of **risk and uncertainty**. Investment in human capital in the form of additional training or further education or other significant changes in career direction may involve a large element of **sunk cost** that cannot easily be recovered if wrong career choices are made. Before a career choice is made, the individual may face a wide range of options for further education and training or other career moves, which, before they are undertaken, can easily be changed, with a high degree of malleability. However, after a career choice has been made, the flexibility of the individual to costlessly reverse their inital choice is lost, to an extent that typically reduces with the passage of time. Career choices, like other forms of investment, often therefore have the features of "**putty-clay**". Before the choice is made they are highly malleable into different forms, but after they have been made they cannot so easily be reversed.

Career investment typically takes place in the presence of some significant degree of **uncertainty at the time the initial investment** decision is made about the **future outcomes and future degree of success** of the investment decision. Whilst the costs of the additional training or further education may be ascertained with reasonable certainty, the **probability** of any given individual advisee **achieving any given target level of success** after completing the training or education (given the individual advisee's initial skills, education, training and aptitudes) needs ideally to be carefully assessed by the careers guidance provider in formulating their careers advice. We would expect in general higher quality careers guidance to be characterised by **more accurate assessments** of the chances of success of individual advisees in achieving different possible levels of performance in additional training and education. We would also expect it to help equip individual advisees with the **motivation and preparation** to have **a high probability of success** in the goals they choose following the careers guidance.

Similarly, we would expect high quality careers guidance to be characterised by more accurate assessments of the likely **economic prospects** for career moves in different possible directions. The sunk cost nature of many investments in human capital means that the foregone earnings and other costs that may be incurred in undertaking new training or education may prove to be a costly mistake, if the anticipated boost to future net income does not occur, because of economy-wide, industry-specific, or other reasons. These costs will also typically involve a large element of **opportunity costs**. These arise from the opportunities foregone when the individual devotes scarce time in additional training and further education or other career changes, which might otherwise have been invested more productively with greater long-term gains, had higher quality careers guidance have been given.

Another important feature of investment in human capital by an individual is that it typically involves a high level of **specific and undiversifiable risk**. An investor in the Stock Exchange is able to **spread their risk** over many different shares through diversifying their individual portfolio. As a result they need only bear general **systematic risk** that results from **economy-wide uncertainties**. They can achieve this holding a market portfolio of shares, such as through an index fund, in combination with a riskless asset, as in the Capital Asset Pricing Model of finance theory (see Brealey and Myers, 2000). In contrast, an individual investing in **their own specialised human capital** makes more specific investments in **particular skills and knowledge acquisition** that make them exposed to many **specific factors** that affect particular jobs and industries, such as specific technological changes. Particular jobs and industries will also be exposed **in different degrees** to the risk of **economy-wide fluctuations** in such macro-economic variables as interest rates, the rate of economic growth, and exchange rates. Careers in the civil service may, for example, involve a lower degree of exposure to such risks than ones in manufacturing industry.

If individuals are to be able to make their own optimal career choices in the face of these risks, they need to be informed as far as possible about **the nature of these risks and how best to manage them**. Undertaking highly specialised training in an occupation with only a few potential employers in the same sector of the economy is likely to involve a more risky career strategy than investing in skills and training

with a wide range of future potential employers in different sectors of the economy. Risk and uncertainty are unlikely to disappear as important features of career outcomes, and may indeed increase with increased rates of **technological change**, **corporate restructuring**, **public sector re-organisation**, **global competition**, and **company indebtedness** and failure. Being able to provide individuals with well-informed careers advice as to the career choices and risk management strategies they should adopt in the face of these uncertainties is a challenge for high quality careers guidance. If the challenge is avoided, the value of the careers guidance provided will be correspondingly reduced.

The importance of both uncertainty and high quality careers guidance is reinforced by the **time lag** which is likely to occur between the initial decision to make new investments in human capital and the pay-off time when the full benefits of the investment are realised. In a stylised Arrow-Debreu world of economic theory (see Gravelle and Rees, 1992) individuals could in advance of their investment enter into **forward contracts** with known pay-offs from their planned investment in additional training or further education, given different future circumstances. These forward contracts would be to deliver their labour in advance for a price which is agreed in advance. However, in practice, employment contracts are often only available once the initial investment in new human capital has been made. In the meantime, the pay-off from the investment may change due to many economy-wide and career specific changes taking place during the time lag. High quality careers guidance can play an important economic role in providing the individual career advisee with **information** with which they can form **realistic expectations** of the future changes in net income which are likely to result from different possible career moves.

The careers guidance also needs to take a broad view of **economic trends and changes** which will influence future levels of wages resulting from different career moves. Moreover it needs to take account of the following additional complication. The level of future wages for a given career will depend upon how many individuals across the economy as a whole are advised and attracted to move into it. If a career initially looks very attractive, many individuals may invest in pursing it, so that by they time they qualify there is an **excess supply** of qualified individuals chasing the

available jobs. As a result, their earnings may be **depressed below their expected level**, and the rate of return on their investment in human capital prove to be lower than anticipated. In the limit, this may produce a **potentially unstable cob-web cycle** where the relevant labour market goes from **high wages to low wages**, and then **with a lag** back to high wages, as the supply of new recruits dries up in the face of low wages. Being able to advise individuals on careers where there is a danger of there developing an **excess supply of well-qualified individuals** would form another valuable economic role for high quality careers guidance.

We can incorporate risk and uncertainty into our analysis of the benefits of careers guidance through the concepts associated with the theory of **decision analysis** (see Bunn, 1984; French, 1989). This can in particular incorporate the concept of **risk aversion** by individuals. Such risk aversion will arise if individuals display diminishing marginal utility to additional increases in their income (see Mayston, 2002a).

We may now proceed to analyse **the value of careers guidance to an individual advisee**. To do so, we need first to recognise that some individuals may make a career move even in the absence of careers guidance. For the sake of simplicity, we will consider a two-period analysis. If the individual makes the career move career move, they must incur at time t = 0 an initial investment cost of I. This may include foregone earnings during a period of additional training or further education, and/or costs of relocation to search for a new job in a different geographic area. If the investment in the career move proves to be successful, the individual will receive a new higher level of net income, equal to Y^s_1, at time t = 1, with an associated welfare level of U^s. If it proves to be unsuccessful, they will receive a lower level of net income, equal to Y^f_t, with an associated welfare level of U^f. The chances of their being successful in the absence of a detailed assessment of their skills, aptitudes and abilities by a careers adviser are given by the probability p^s, with the chances of their being unsuccessful in the career move given by $(1- p^s)$.

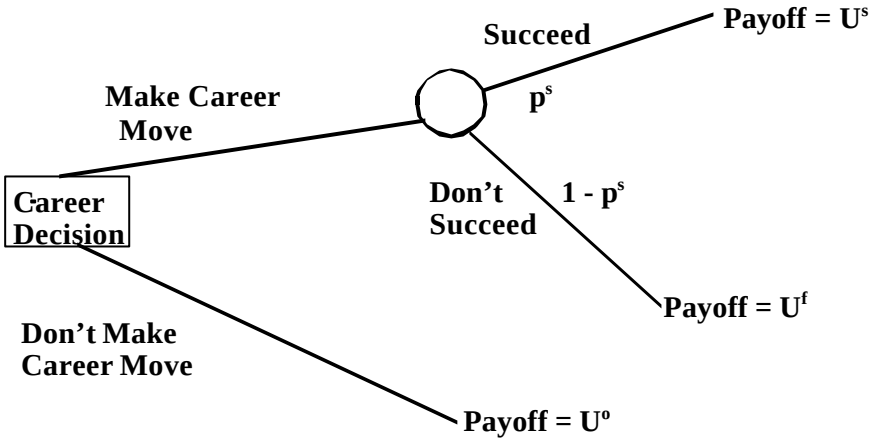

FIGURE 3.1

The overall position in the absence of careers guidance is illustrated by the **decision tree** in Figure 3.1 above. This illustrates the choices and possible outcomes and payoffs facing the careers advisee. If the investment in the career move proves to be successful, the individual will receive a new higher level of net income, equal to Y^s_1, at time t = 1, with an associated welfare level of U^s. If it proves to be unsuccessful, they will receive a lower level of net income, equal to Y^f_t, with an associated welfare level of U^f. The chances of their being successful in the absence of a detailed assessment of their skills, aptitudes and abilities by a careers adviser are given by the probability p^s, with the chances of their being unsuccessful in the career move given by $(1- p^s)$.

An illustrative numerical example of Figure 3.1 is provided by the case where the probability of success in the career move without careers guidance, is 40 per cent, i.e. $p^s = 0.4$, the level of net income of the individual if they do not make the career move is $Y^o_o = Y^o_1 =$ £10,000, the initial investment cost in making the career move is £2,000, and the level of income which they will receive if the career move succeeds is $Y^s_1 =$ £19,000. If they do not succeed they will have net income of $Y^f_1 =$ £10,000 in period one. If the individual is risk neutral with zero time preference, there is an expected benefit if they make the career move of:

$$E^a(U^m) = 0.4\,(£8{,}000 + £19{,}000) + 0.6\,(£8{,}000 + £10{,}000) = £21{,}600 \qquad (3.1)$$

If the individual does not make the career move, they receive $Y^o_0 = Y^o_1 = £10{,}000$ in both periods, with a total benefit (assuming for simplicity a zero discount rate) of:

$$U^o = £20{,}000 \qquad (3.2)$$

implying that the individual would be better off here making the career move.

3b. The Value of Perfect Careers Guidance

The case of **perfect careers guidance** can be defined in terms of the careers guidance interview, and any related tests, being able to **fully assess** the abilities, skills and attributes of the individual so that as a result of this assessment the individual can be accurately advised as to whether or not they will succeed in the career move. In addition, it is useful to define perfect careers guidance as involving an ability to accurately assess the future state of the economy, so as to be able to **perfectly predict** the payoffs the individual advisee will receive if they do make a successful career move. The **advantage of such careers guidance** is that the individual may **defer their career decision** until they have received this guidance on the desirability of any given career move, and their suitability for it.

In the case of perfect careers guidance, if the individual receives a positive assessment, they may proceed to make their career decision in the knowledge that the career move will be successful. Since the payoff, U^s, the individual receives if the career move is successful here exceeds the payoff, U^o, the individual receives if they do not make the career move, the individual will decide in this case to make the career move, with a resultant payoff of U^s. If, however, the individual receives a negative assessment, they will proceed to make their career decision in the knowledge that the career move will be unsuccessful. Since the payoff, U^f, the individual receives if the career move is unsuccessful is lower than the payoff, U^o, the

individual receives if they do not make the career move, the individual will decide here not to make the career move, with a resultant payoff of U^o .

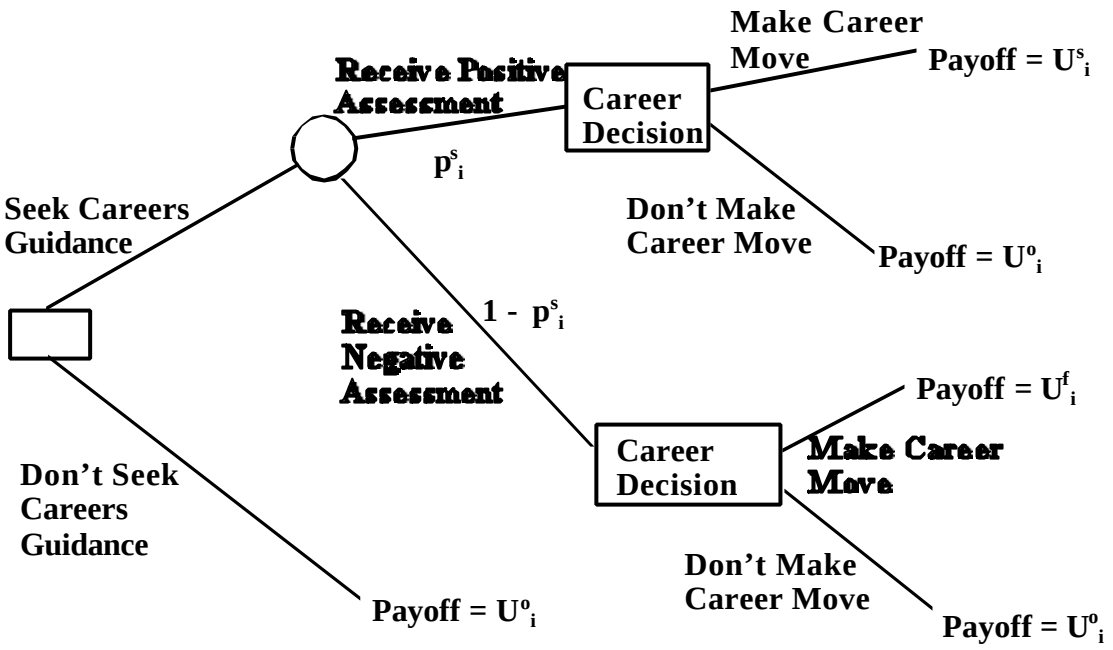

FIGURE 3.2

The expected benefit to the individual advisee if they seek the careers guidance then depends upon the probability of their receiving a positive assessment. Before the detailed assessment of their aptitudes, skills and abilities by the careers service, this probability is p^s, the probability of their being successful in the absence of detailed careers assessment of whether or not they will succeed in the career move. The expected benefit to the individual advisee if they seek the perfect careers guidance is then given by:

$$E^g_p(U) = p^s . U^s + (1 - p^s) . U^o \qquad (3.3)$$

In our above numerical example, we have $p^s = 0.4$, U^s = (£8,000 + £19,000) = £27,000, and U^o = £20,000. Hence in this example:

$$E^{g}_{P}(U) = 0.4 \,.\, £27{,}000 + 0.6 \,.\, £20{,}000 = £22{,}800 \qquad (3.4)$$

The value, or expected net benefit, of the perfect careers guidance in this case is then £1,200. It is equal to the difference between the expected benefit of £21,600 in (3.1) of their career decision without the careers guidance and their expected benefit of £22,800 if they seek the careers guidance. In this example, the net benefit from the careers guidance results from the individual avoiding making the careers investment of £2,000 in those cases where they would not make a success of the career move, with these cases occurring with a probability of 0.6, making an expected net benefit of £1,200.

In other cases, the value of the careers guidance derives from the individual making a beneficial career move they would not otherwise have made. Thus if the investment cost in making the career move had been £4,000, the individual in the absence of careers guidance would have an expected benefit from making the career move of:

$$E^{a}(U^{m}) = 0.4\,(£6{,}000 + £19{,}000) + 0.6\,(£6{,}000 + £10{,}000) = £19{,}600 \qquad (3.5)$$

In the absence of careers guidance, the individual would not have made the career move. Instead, they would have remained with the benefit of U^{o}_{i} = £20,000 in (3.2) from not making the career move. However, if they had received perfect careers guidance, they would have been able to invest with confidence in the career move knowing that they would succeed in increasing their total payoff to £25,000. The expected benefit from the careers guidance in advance of knowing its assessment of the individual when the investment cost rises to £4,000 would now be:

$$E^{g}_{P}(U) = 0.4 \,.\, £25{,}000 + 0.6 \,.\, £20{,}000 = £22{,}000 \qquad (3.6)$$

This exceeds the benefit of U^{o} = £20,000 in (3.2) from the individual on their own deciding not to make the career move by £2,000. The **expected net benefit from the careers guidance improving the individual's career choice** is now therefore equal to £2,000. This in turn equals the net gain of £5,000 (= £9,000 - £4,000) which the individual makes from their investment in the career move if they receive a positive

assessment times the probability of 0.4 of their receiving a positive assessment in the careers guidance. More generally**, the value, VPG, of the perfect careers guidance** to an individual who seeks the careers guidance is equal to the difference between their expected benefit, E^{g}_{P} (U), with the perfect careers guidance, and their expected benefit in the absence of the careers guidance, where the latter results from a comparison of their payoff if they do not make the career move with their expected payoff in the absence of career guidance if they do make the career move.

3c. The Value of Imperfect Careers Guidance

Whilst perfect careers guidance may be a useful benchmark for comparing performance, the careers guidance offered in practice may provide an imperfect assessment of the skills, abilities and aptitudes of the individual for meeting the needs of the proposed career move. Thus, imperfect careers guidance would give a positive assessment to the individual, even when the individual possesses the attributes which would lead them to succeed in the career move, in less than 100 per cent of such cases. The chances of the imperfect careers guidance correctly identifying that the individual has the attributes to succeed in the career move is then less than one. There is also then a positive probability of the imperfect careers guidance giving a negative assessment to the individual, even though they have the attributes to succeed in the career move. Similarly, imperfect careers guidance would have a probability of less than one of giving a negative assessment to individuals who lacked the ability to make a success of the career move. There is then a positive probability of the imperfect careers guidance giving a positive assessment to the individual even though they do not have the attributes to succeed in the career move.

As a result of such imperfect careers guidance, the probability, p (S*P), of the individual succeeding in the career move following a positive assessment by the careers guidance service is now less than one. Rather, there is some positive probability p (F;P) = (1- p (S;P)) of the individual failing in the career move even if they are given a positive assessment. Similarly, imperfect careers guidance means that the probability, p (F;N), of an individual who has received a negative assessment

failing in the career move is less than one. Rather, there is some positive probability, p (S;N) = (1- p (F;N)), of the individual who receives a negative assessment succeeding in the career move if they attempt it.

The benefit of the imperfect careers guidance can be computed in our numerical example and the associated Figure 3.3 below.

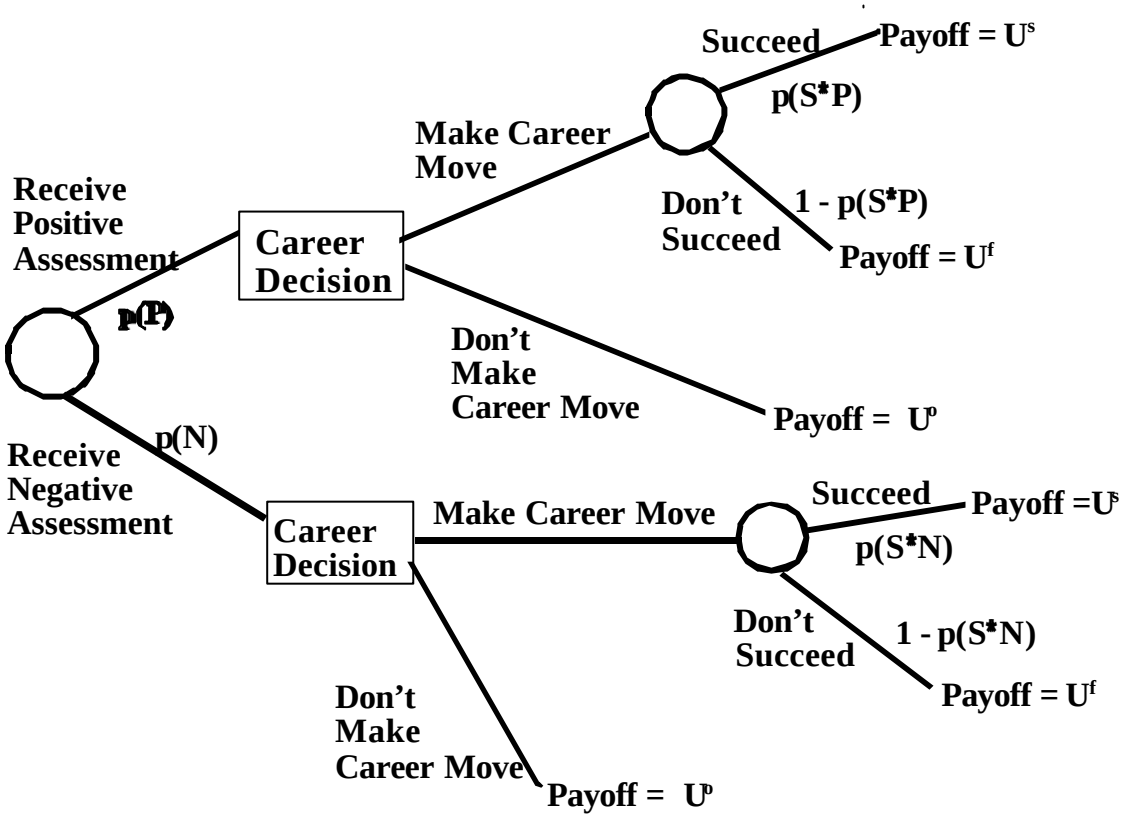

FIGURE 3.3

The individual making their career choice is now faced with poorer quality information and advice as a result of the imperfect careers guidance. If they are given a positive career assessment, rather than face a known payoff from a career move of U^s, the career move has an uncertain expected benefit of:

$$E^m (U;P) = p (S;P). U^s + p_i (F;P). U^f \quad (3.7)$$

This can be shown to be less than the value of U^s which they would have had if they had received a positive assessment under perfect careers advice. The individual will now decide against the career move if its expected benefit is less than the level U^o they would receive by not making the career move.

Compared to perfect careers advice, **imperfect careers advice has the following disbenefits** which will reduce its value compared to perfect careers advice:

a. When given a positive recommendation to make a career move, some individual advisees will decide not to make the career move because they know that there is some positive probability, here of p(F;P), of the career move failing to be a success for them, even though they have received a positive recommendation to make the move. As a result, they will lose the chance of the benefit, U^s, which they would have received had the career move been a success for them, but instead remain with the smaller payoff, U^o, from not making the career move. This will result in **a Type I error** of the individual **rejecting the career move even though it would have been beneficial for them**.

b. When given a positive recommendation to make a career move, some individual advisees will decide to make the career move, but will find later that the career move was not successful for them. Instead it will have the worse outcome U^f, which may involve them later **dropping** out of, or **failing**, educational or training courses which they have been recommended to undertake. They will then have incurred the investment cost involved in the career move following the positive recommendation from the careers guidance, but not received a positive return on this investment. This will result in **a Type II error** of **the individual investing in the career move even though it is unsuitable for them**.

c. When given a negative recommendation to make a career move, some individuals will decide to make the career move because they know that there is some positive probability, here equal to p (S;N), less than one that they may still be successful, but will find later that the career move is not successful for them, ending up with the worse outcome U^f. This will be a further source of **a Type II error,** of the individual

investing in the career move even though it is unsuitable for them.

d. When given a negative recommendation to make a career move, some individuals will decide not to make the career move, even though there is a positive probability, here equal to p (S;N), that they may still be successful. Because the imperfect careers guidance cannot distinguish perfectly between individuals who will be successful in the career move and those who will be unsuccessful, it will give a negative assessment to some who would have been successful in the career move. As a result, those individuals who decide not to make the career move because of the negative assessment they have been given, even though they would have been successful in the career move, lose out on the benefit, U^s, they would have received. Instead they will stay with the smaller payoff, U^o, from not making the career move. This will be a further source of **a Type I error** of the individual rejecting the career move even though it would have been beneficial for them.

The **cost, or dis-benefit, of making a Type I error** is given by the loss of the potential benefit:

$$U^s - U^o \qquad (3.8)$$

the individual would have gained had they made the career move when they had the attributes to be successful in it. The **cost, or dis-benefit, of making a Type II error** is given by the loss of the benefit from not making the career move compared to unsuccessfully investing in the career move:

$$U^o - U^f \qquad (3.9)$$

when the individual does not have the attributes to be successful in it.

The extent and frequency of the dis-benefits from the imperfect careers guidance will be a reflection of the quality of the careers guidance offered. The highest quality

careers guidance will be that corresponding to the case of **perfect careers guidance** whose expected net benefit is computed above. Here by definition **the risk of Type I and Type II errors is zero** for those individuals who seek the careers guidance. An important index of the quality of the careers guidance offered will be the expected net benefit it achieves, and **how close the imperfect careers guidance gets to the expected net benefits which would be achieved by perfect careers guidance**. The **index of quality, Q, of the careers guidance given to the individual advisee** may then be expressed as the ratio between the net benefits, VIG, which the imperfect careers guidance achieves for the individual advisee and the net benefits, VPG, which perfect careers guidance would have achieved (see Mayston, 2002a).

We can see the effects of lower quality careers guidance on the magnitude of the expected net benefits from the careers guidance also in terms of our earlier numerical example. As noted above, imperfect careers guidance involves a less than one hundred per cent reliability rate in the careers guidance giving the individual a positive assessment when the individual advisee does have the attributes to succeed in the career move. If this reliability rate is only 80 per cent, this implies:

$$p\,(P;S) = 0.8 \qquad (3.10)$$

Similarly, imperfect careers guidance involves a less than one hundred per cent reliability rate in the careers guidance giving the individual a negative assessment when the individual advisee does not have the attributes to succeed in the career move. If this reliability rate is only 75 per cent, this implies:

$$p\,(N;F) = 0.75 \qquad (3.11)$$

From the application of Bayes= theorem in statistics (see Bunn, 1984), and in our earlier example where the overall probability of success in the career move was 0.4, we have as an implication of these less than 100 per cent reliability rates for the imperfect careers guidance that:

$$p\,(S;P) = 0.681,\ p(F;P) = 0.319,\ p(S;N) = 0.151,\ p\,(F;N) = 0.849 \qquad (3.12)$$

i.e. the chances of the individual being successful in the career move if given a positive careers guidance assessment are now only 68.1 per cent, whereas they were previously 100 per cent under the perfect careers guidance. 15.1 per cent of the career advisees would still have succeeded despite being given a negative assessment under the imperfect careers guidance. In addition we have:

$$p(P) = 0.47,\ p(N) = 0.53 \qquad (3.13)$$

so that the overall probability of an individual being given a positive assessment has risen from the value of 0.4 which it would have been under perfect careers guidance to 0.47 under this example of imperfect careers guidance. The probability of a negative assessment has fallen from 0.6 under perfect careers guidance to 0.53. Whilst the individual has a higher chance of being given a positive assessment and recommendation of making the career move under the imperfect careers guidance, the accuracy rate of a positive assessment correctly implying that the individual has the attributes for success in the career move is, however, now only 68.1 per cent.

In order to compute the expected net benefit from the imperfect careers guidance, we must work backwards through the tree in Figure 3.3 to assess which career decisions the individual would have made when faced with these new probabilities of success following a positive or negative assessment by the careers guidance. If the individual is risk neutral and the individual careers advisee receives a positive assessment from the careers guidance, the individual has an expected payoff from making the career move of:

$$E^m(U;P) = p(S;P).U^s + p(F;P).U^f = (0.681).£25{,}000 + (0.319).£16{,}000 = £22{,}130 \qquad (3.14)$$

where the payoff is U^s = [£6,000 + £19,000] as previously if the career move is successful, and the payoff is U^f = [£6,000 + £10,000] as previously if the career move is unsuccessful . Since the resultant expected value of £22,130 exceeds the payoff of U^o = £20,000 from not making the career move, the individual will chose to make the career move when given a positive assessment. However, under imperfect careers

guidance, there is now a much higher probability, of 0.319 rather than zero, of the careers move actually working out to be unsuccessful for the individual even though they received a positive assessment and recommendation to make the career move.

The individual has an expected payoff from making the career move if they receive a negative assessment from the careers guidance of:

$$E^m(U;N) = p(S;N).U^s + p(F;N).U^f = (0.151).£25{,}000 + (0.849).£16{,}000 = £17{,}359 \quad (3.15)$$

which is lower than the payoff of U^o = £20,000 from not making the career move. The individual will therefore choose here not to make the career move if given a negative assessment, thereby giving up some chance of making a successful career move under the imperfect careers guidance.

Given the overall probabilities of 0.47 and 0.53 of receiving a positive, or negative, assessment from the imperfect careers guidance in this example, **the overall expected benefit from the imperfect careers guidance** is:

$$E^g_I(U) = (0.47) \,.\, £22{,}130 + (0.53) \,.\, £20{,}000 = £21{,}000 \quad (3.16)$$

The value, VIG, of the imperfect careers guidance to an individual who seeks the careers guidance is equal to the difference between their expected benefit, $E^g_I(U)$, with the imperfect careers guidance, and their expected benefit, $E^a(U)$, in the absence of the careers guidance, i.e.

$$VIG = E^g_I(U) - E^a(U) = £21{,}000 - £20{,}000 = £1{,}000 \quad (3.17)$$

where $E^a(U)$ = £20,000 as previously. The value of the imperfect careers guidance is still positive, and better than no careers guidance. Without careers guidance, the individual would have rated their chances of success in the career move at only p^s = 0.40, i.e. 40 per cent. With a positive assessment from the careers guidance, their chances of success are 0.681, i.e. 68.1 per cent. However, this is still substantially short of their 100 per cent chances of success in the career move if they had received

a positive assessment under perfect careers guidance.

Indeed, compared to the perfect careers guidance, which had a value of £2,000 to the individual in (3.6), the effect of the **lower quality** of the imperfect careers guidance is to **halve its value** to only £1,000. This halving in value, moreover, results from the fall in the reliability of the careers guidance, from 100 per cent to 80 per cent for a positive assessment, and from 100 per cent to 75 per cent for a negative assessment, which some might consider to be still fairly high reliability rates. **Lower reliability of the careers guidance may result in individuals making costly investments in unsuccessful career moves which they would not have incurred in the absence of a positive careers guidance assessment**. Reliability rates less than 80 per cent and 75 per cent for the careers guidance would result in even lower expected net benefits.

The index of quality of the careers guidance offered to individual i is given in this example by:

$$I(Q) = VIG / VPG = £1,000 / £2,000 = 50 \text{ per cent} \qquad (3.18)$$

The above discussion highlights the following key points:

i. the value of careers guidance must be determined **relative to** the expected payoff the individual would achieve in the absence of the careers guidance. Thus the fact that some individuals make beneficial career moves **following** careers guidance is not sufficient to establish the value of the careers guidance. Instead, the value needs to be determined relative to the career choices they would have made in the absence of the careers guidance.

ii. a large part of the benefit from the careers guidance is likely to come from the encouragement it gives to individuals who could benefit from the career move to make a career move they would not otherwise have made, if they had not received a positive assessment from the careers guidance. This can give them the confidence to undertake the investment cost without much fear of it not paying off for them. This

involves **reducing the frequency of Type I errors** of individuals rejecting career moves for which they have the attributes to succeed and which would have been beneficial to them.

iii. a further part of the value of the careers guidance in the above analysis comes from enabling the individual advisee to avoid costly investments in career moves which do not payoff for the individual. This results from the careers guidance making an assessment of their suitability for the career move. If this assessment is reliable, the individual advisee can make a career choice without much risk of undertaking a costly investment in a career move which fails to payoff. Part of the net benefit of the careers guidance then comes from **reducing the frequency of Type II errors** by helping individual advisees to avoid costly investments in career moves which they would have made in the absence of the careers advice, but which are unlikely to pay off for them.

iv. the expected net benefit from the careers guidance may well be **significantly reduced by a lower level of reliability** in its ability to identify the attributes in the individual advisee which will contribute towards success in the career move.

3d. The Cost of Inaccurate Careers Guidance Information

Imperfect careers guidance may involve not only imperfect assessments of the suitability of any given individual advisee for making a success of the investment required for a particular career move. It may also involve inaccuracies in the information given to the advisee as to the magnitude of the changes in net income which they will receive if they are successful in the career move. Thus the careers guidance might that predict the net income which the individual will receive if they are successful in the career move is $Y^{sg}{}_t$ rather than its true value of $Y^s{}_t$, and $Y^{fg}{}_t$ if they are unsuccessful, rather than the true value of $Y^f{}_t$. In addition the imperfect careers guidance may predict the investment cost which the individual must incur to make the career move to be I^g rather than its true value of I.

Such inaccurate information is likely to change the decisions of some individuals in Figure 3.3 as to whether or not to undertake the career move following a careers assessment. Both an inaccurately high estimate of the net income which will result from making the career move if the initial investment in it is successful, and an inaccurately low estimate of the cost of the investment required, are likely to induce more individuals to undertake the career move than if the information had been accurate. Similarly, both an inaccurately low estimate of the net income which will result from making the career move if the initial investment in it is unsuccessful, and an inaccurately high estimate of the cost of the investment required, is likely to dissuade more individuals from undertaking the career move than if the information had been accurate.

There is then **a greater risk of Type I and Type II errors** than if the information had been accurate. **The cost of such inaccurate information** is equal to the **increased frequency** such inaccuracy produces **in the occurrence of the Type I and Type II errors** times the respective costs of these Type I and Type II errors, as given by equations (3.8) and (3.9) above. The accurate assessment of these costs in equations (3.8) and (3.9) itself requires accurate information on the magnitude of the investment costs in undertaking the career move, the level of the net income the individual would receive if they did not make the career move and its associated investment, the future net income which the individual would receive if they were successful in the career move, and the future net income which the individual would receive if they were unsuccessful in the career move.

3e. The Effect of Multiple Possible Career Moves

In the above analysis we have considered the case where the subject for discussion and assessment by the careers guidance interview is one possible career move. In the case of perfect careers guidance, the career move being considered would be the one which is optimal for the individual advisee. We may define such an **optimal career move** as the one which would maximise the individual's welfare level, U^s, from the resultant flow of net income that the optimal career move generates, chosen from

amongst all possible career moves for which the individual would be given a positive assessment as to their suitability to succeed. Thus even though there may be multiple possible career moves for the individual, our above analysis for the case of perfect careers guidance still holds when we interpret U^s in this way. The welfare level, U^o, which the individual would attain without the career move is the one the individual would choose from all possible careers open to the individual, if the individual did not make use of the advice on offer from the careers guidance.

In the case of imperfect careers guidance, there is a risk that the careers guidance may imperfectly assess the suitability of any given individual advisee for a particular career move. In addition, there is a risk that the information given by imperfect careers guidance on the changes in net income that result from a given career move will be inaccurate. As a result, when there are multiple possible career moves which might be the subject of consideration in the careers guidance interview, there is a risk that the individual will chose a career move which is not the optimal career move for them.

We may again, however, formulate the analysis in terms of the risks of Type I and Type II errors occurring. Our earlier definition of **a Type I error** being one where the individual rejects the career move even though it would have been beneficial for them can now be modified in the case of multiple possible career moves to the following definition. A Type I error is now one where **the individual does not undertake the career move which would be optimal for them** (as defined above) but instead selects a less beneficial career option. This less beneficial career option may be making no career move at all compared to the individual's existing career. Alternatively, under imperfect careers guidance it may involve the choice of a career move which is less suitable for the individual than their optimal career move, and hence results in a lower welfare level for the individual than their optimal career move would.

We may now modify the calculation of the cost of a Type I error from that in equation (3.8) for the case of a single possible career move to that for multiple possible career moves:

$$U^s - U^j \qquad (3.19)$$

where U^j is the welfare level of the individual when they succeed in the less beneficial career option j. This is chosen by them in place of the optimal career move, when they are given less than fully accurate information by the imperfect careers guidance. U^s is the welfare level they would have had if they had made their optimal career choice and succeeded in it. The case j = 0 corresponds to the career option of making no career move at all compared to remaining with the individual's existing career. However, the cases j = 1, .. , J can correspond to other possible career moves the individual may make as a result of the imperfect careers guidance. Partly as a result of such Type I errors, the imperfect careers guidance achieves a lower level of expected net benefit than would perfect careers guidance, where the risk of Type I and Type II errors occurring for the individuals who receive the perfect careers guidance is zero.

In order to compute the **overall expected net benefit lost through Type I errors** from having imperfect careers guidance, rather than perfect careers guidance, the relative **frequency** of individuals choosing each of the different possible career options other than their optimal career moves, and succeeding in them, needs to be assessed. We will denote by $h(O_j, c, g)$ the relative frequency of an individual with the characteristics c , in terms of initial skills, aptitudes and talents, making the choice of the career option O_j and succeeding in it, after receiving the careers guidance g . We will denote by $m(c, g)$ the number of individuals with the particular set of characteristics c who receive the imperfect careers guidance g . The **total expected net benefit lost through Type I errors from providing imperfect careers guidance, g , rather than perfect careers guidance, for such individuals** is then given by weighting each individual welfare loss from a Type I error in (3.8) by the relative frequency $h(O_j, c, g)$ times $m(c, g)$. The **overall expected net benefit lost through such Type I errors across all individuals who make use of the imperfect careers guidance of quality level Q** is given by summing the resultant total across all the types of individual who make use of this careers guidance g = g (Q) at quality level Q.

When there is only one career move being considered, the **cost, or dis-benefit, of making a Type II error** is given by the loss of the benefit from not making the career move compared to unsuccessfully investing in the career move:

$$U^o - U^f \qquad (3.20)$$

as in equation (3.9). When there are several possible career moves, the extent of the cost of a Type I error depends upon which of these possible career moves the individual chooses as a result of the imperfect careers guidance. If the individual chooses career option O_j for j = 1, ..., J, a Type II error occurs when they unsuccessfully invest in this career move and it does not payoff for them , compared to not making a career move and remaining with their existing career where the payoff is U^o . Instead they receive only the payoff $U^{f\,j}$ if they fail to be successful in their investment in career option j. The **extent of the cost, or dis-benefit, of the Type II error** is therefore:

$$U^o - U^{f\,j} \qquad (3.21)$$

when the individual does not succeed in their chosen career option j .

In order to compute the **overall expected net benefit lost through Type II errors** from having imperfect careers guidance, rather than perfect careers guidance, the relative **frequency** of individuals choosing each of the different possible career options other than their optimal career moves, and failing to succeeding in them, needs to be assessed. We will denote by f (O_j ,c, g) the relative frequency of an individual with the same characteristics, c, in terms of initial skills, aptitudes and talents, making the career move to the career option O_j but failing to make a success of it, after receiving the careers guidance g . The **total expected net benefit lost through Type II errors from having imperfect careers guidance, rather than perfect careers guidance, for individuals with these characteristics** c is then given by weighting each individual welfare loss from a Type II error in (3.9) by the relative frequency f (O_j , c , g) times m (c, g). The **overall expected net benefit lost through**

such Type II errors across all individuals who make use of the imperfect careers guidance of quality level Q is given by summing the resultant total across all the types of individual who make use of this careers guidance g = g (Q) at quality level Q.

A final difference between the benefits achieved under imperfect careers guidance and those which would have been achieved under perfect careers guidance occurs for the following reason. **Under perfect careers guidance**, **more individuals are likely to make use of the careers service** than under imperfect careers guidance, because the expected net benefit to them of making use of the careers guidance is likely to be greater. Because of this, **less individuals will make their own Type I errors**, of not undertaking a career move which would have been beneficial to them, **through failing to make use of careers guidance** under perfect careers guidance than they would under imperfect careers guidance. Similarly, **less individuals will make their own Type II errors**, of unsuccessfully investing in career moves which are unsuited to them, through failing to make use of careers guidance, if perfect careers guidance had been provided in place of imperfect careers guidance. Adjustment then needs to be made in computing the above overall benefits for this difference.

3f. The Effect of Under-Informed Potential Careers Guidance Advisees

We also need to assess the significance of individuals in the population at large, who are potential careers guidance advisees, themselves being **under-informed** as to the potential benefits and chances of success of careers moves which they might make. Such lack of information will in part be reflected in **inaccurate assessments which they themselves make in the absence of careers guidance of their own chances of success** if they were to make any given career move **and of the net income they would receive** if they did make such career moves. Thus, in terms of **their own decision tree** in Figure 3.4 below, the subjective estimates, p^s, which they make of their own chance of success of a given career move, may be out of line with estimates based upon more objective information. Similarly, their subjective

assessments, $U^{s'}$, of the payoffs to them if they were to succeed and of the payoff, $U^{sf'}$, to them if they were to be unsuccessful in their investment in the career move, may be out of line with the actual payoffs, U^{s} and U^{sf}, they would receive if they made the career move.

As a result of such inaccurate assessments, there is likely to be an **increased risk that the individuals themselves will, in the absence of careers guidance, make a Type I error.** This will result from them not undertaking a career move they could have made a success of and which would have been beneficial to them. Similarly, there may be **an increased risk that they will, in the absence of careers guidance, make a Type II error.** This will result from their undertaking a career move which does not prove successful for them, and which makes them worse off than if they had remained with their existing career.

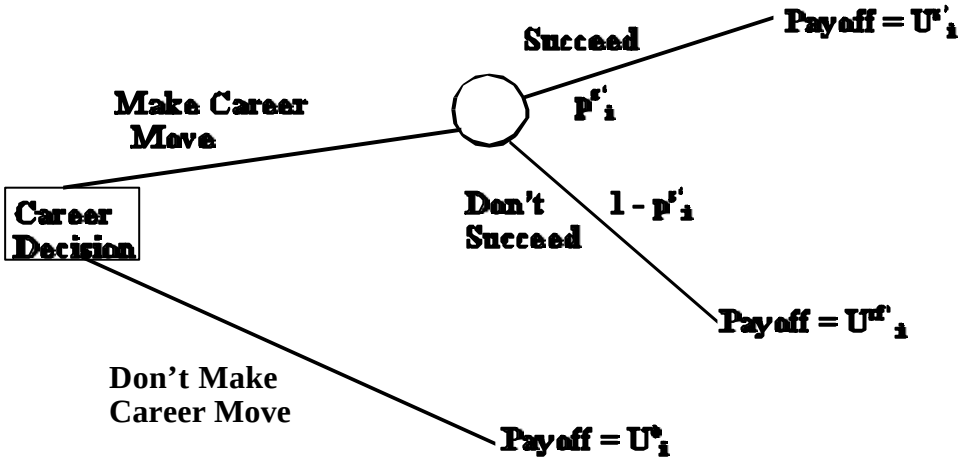

FIGURE 3.4

The effects of these increased risks of under-informed individuals making their own Type I and Type II errors in the absence of careers guidance are the following. The first is to **increase the total expected net benefit from good quality careers guidance compared to the individuals receiving no careers guidance**. The number of individuals, $h (O_j , c , a)$, who, in the absence of good quality careers guidance,

make career choices, such as O_j, which are not optimal for them (even though they succeed in them, and for which there is therefore still a Type I error), will be greater when these individuals are more under-informed. Similarly, the number of individuals, $f(O_j, c, a)$, who, in the absence of good quality careers guidance, make career choices, such as O_j, which are not optimal for them (and in which they do not succeed with a resultant Type II error), will be greater when these individuals are more under-informed.

However, a second effect of more under-informed individuals in the population at large may be to **make them less aware of the potential benefits of them making use of good quality careers** guidance. This will tend to reduce the size of m(c, g). The overall effect of a more under-informed population on the net benefits from the careers guidance will depend upon the relative strength of these two effects.

3g. The Total Benefit from Perfect and Imperfect Careers Guidance

Perfect careers guidance by definition results in all the individuals who make use of the careers guidance being perfectly assessed as to their suitability to succeed in different possible career moves and receiving advice as to their optimal career move, which the individual advisee can then invest in knowing that they will succeed in it. The total benefit from giving perfect careers guidance to individual i is then **equal to the payoff, U^s, which each individual with characteristics c receives when they succeed in their optimal career choice less the cost $C(Q^p)$ of providing the careers guidance to the individual advisee at this perfect level of quality.** For the sake of simplicity, we will ignore here any external subsidy element which is involved in any additional training or education. The total benefit from giving perfect careers guidance to all individuals who receive it is equal to the total net benefit to individual i times the number of individuals $m(c, g^p)$ with the characteristics c who make use of the perfect careers guidance, summed over all the types of individual who use the careers guidance. To compute **the total net benefit from providing perfect careers guidance, rather than providing no careers guidance**, we must subtract from this amount the total benefit, TBA, which individuals would have received in the absence of any careers guidance.

The total benefit, TB(Q), from imperfect careers guidance of quality Q is equal to that from perfect careers guidance less the cost, or dis-benefit, associated with the increased Type I and Type II errors discussed above, i.e.

$$TB(Q) = TB(Q^p) - NBL_1(Q) - NBL_2(Q) - NBL_3(Q) - NBL_4(Q) \qquad (3.22)$$

where $NBL_1(Q)$ and $NBL_2(Q)$ are the increased losses which arise from those individuals who use the imperfect careers guidance making Type I and Type II errors which they would not have made had they received perfect careers guidance. $NBL_3(Q)$ and $NBL_4(Q)$ are the increased losses from increased Type I and Type II errors due to the fall in numbers of individuals who make use of the careers guidance when it is imperfect. **The higher the quality of careers guidance given, the smaller will be the sum of these four terms.**

An **overall index, I(Q) of the quality of the careers guidance** is provided by the ratio:

$$I(Q) = TB(Q) / TB(Q^p) \qquad (3.23)$$

with I(Q) = 1.0 = 100 per cent for perfect careers guidance, but declining below 100 per cent the greater are the Type I and Type II errors involved in (3.22).

The **total net benefit, TNB(Q), from providing imperfect careers guidance of quality Q,** rather than providing no careers guidance, is given by:

$$TNB(Q) = TB'(Q) - C(Q) \quad \text{where } TB'(Q) = TB(Q) - TBA \qquad (3.24)$$

and where TBA is the total benefit TBA which individuals would receive, inclusive of Type I and Type II errors, in the absence of any careers guidance. The last term in (3.24) equals the cost of running an imperfect careers guidance service at quality level Q. In a parallel way to Section 2 above, we may define **an optimal quality, Q*, of careers guidance** as the quality level which maximises (3.24), and which will therefore involve:

$$MTB(Q^*) = MC(Q^*) \qquad (3.25)$$

i.e. equating the marginal total benefit, MTB(Q), of additional quality in the provision of careers guidance to the marginal cost, MC(Q), of providing the higher quality careers guidance at the optimal quality level Q*.

Where the cost of providing higher quality careers guidance falls partly upon the individual career advisee, through an additional fee that is paid to the provider, this will reduce the net cost to the career guidance provider and their funding source. If this additional fee is included within the computation of the marginal total benefit to the individual advisee, the result will be a reduction in the left-hand side of equation (3.25) by the amount of the additional fee, so long as they are indeed willing to pay this fee for the careers guidance. The right-hand side of equation (3.25) corresponds to the cost to the career guidance provider net of fee income, and will therefore also be reduced by the amount of the income. This will leave the optimal quality of careers guidance unchanged, so long as the demand of potential careers advisees is not **price sensitive** to the level of fees.

3h. The Information Required to Evaluate the Monetary Benefits of Improved Quality of Careers Guidance

We have seen in our above analysis that the concept of perfect careers guidance provides a useful **benchmark** against which lower quality careers guidance can be evaluated. As noted above, perfect careers guidance results in all the individuals who make use of the careers guidance being perfectly assessed as to their suitability to succeed in different possible career moves and receiving advice as to their optimal career move. The individual advisee can then invest in the career move knowing that they will succeed in it. We have also made use of the concept of a list of the **characteristics**, c , of the **skills, aptitudes and talents of the individual advisee** which are relevant to their careers guidance and their suitability for different possible career moves.

This suggests that **an information base is needed of the different relevant characteristics of careers advisees who make use of each careers guidance service, and of the type of career options which would be most suited to them, given these individual characteristics, if they had the benefit of perfect careers guidance**. The evaluation of the monetary benefits of each optimal career option requires information on the magnitude of the **investment costs** in undertaking the career move and the future net income which the individual would receive as a result of successfully making their optimal career move. This needs to be compared with the **future net income** which the individual would expect to receive in the absence of any careers guidance. Given that individuals may be risk averse, and experience diminishing marginal utility of income when facing the consequences of career investment decisions involving uncertainty, an adjustment to these monetary values may be made by taking the logarithms of the monetary outcomes to convert them to utility-adjusted values.

We have also made use of the concept of Type I and Type II errors in the evaluation of the monetary benefits of careers guidance that is less than perfect. A Type I error is one where the individual does not undertake the career move which would be optimal for them but instead selects a less beneficial career option, where this less beneficial career option may be making no career move at all compared to the individual's existing career. A Type II error occurs when an individual unsuccessfully invest in a career move and it does not payoff for them, compared to their not making a career move and remaining with their existing career. The **evaluation of the cost of Type I errors** requires information on the lower level of net income they will receive if they make a less beneficial career move, and the numbers of individuals who receive the imperfect careers guidance who choose such less beneficial career options. The **evaluation of the cost of Type II errors** requires information on the even lower level of net income they will receive if they make a less beneficial career move and do not succeed in them, and the numbers of individuals who receive the imperfect careers guidance who are unsuccessful in such less beneficial career moves.

In addition, an assessment is required of the difference in the numbers of individual career advisees that a poor quality careers guidance service attracts compared to the number of individuals who they would have attracted if they had offered perfect careers guidance. An assessment is also required of the associated monetary value of the reductions in Type I and Type II errors which could have been achieved by such individuals not make their own career decisions without sound careers guidance.

Whilst, for the sake of simplicity, we have focused on a two-period analysis in this section, our earlier insights from Section 2 above on the **value of human capital** derived from a multi-period analysis still hold. The information on future net income required in the multi-period analysis is **the discounted value of future net income**, adjusted where desirable by taking the logarithm of net income to allow for risk aversion and diminishing marginal utility of income.

4. IMPROVING THE QUALITY OF LIFE

In this section we relax our earlier assumption that changes in net income are the only benefits accruing to the individual careers advisee as a result of a career move. Instead we allow for the possibility that other quality of life variables may affect the welfareof the individual careers advisee, both during the periods of time in which the individual is working in a specifies job or during periods of time in which they are engaged in training or further education.

One important existing approach to incorporating quality of life assessments into the measurement of overall net benefits is that provided by the concept of the **Quality Adjusted Life Year (QALY)** in health economics. The basic approach to the use of this concept involves the use of a **valuation matrix** that seeks to value the relative importance of different combinations of the underlying quality of life variables on a scale from zero to one. A value of zero corresponds here to being dead, whereas a value of one corresponds to perfect health.

Two main quality of life variables which have been used to evaluate states of health between full health and death are **physical mobility** and **freedom from pain**. As in Kind, Rosser and Williams (1982), the variable representing states of physical disability has been given eight possible values, namely I corresponding to no disability; II to slight social disability; III to severe social disability or slight impairment of performance at work, or both, with ability to perform all housework except heavy tasks;. IV to cases where the choice of work or performance at work is severely limited, and housewives and old people are only able to carry out light housework and shopping; V to cases where the individuals concerned are unable to undertake any paid employment, unable to continue education, old people confined to home except for escorted outings or short walks, and housewives only able to perform a few single tasks; VI to cases where the individual is confined to a chair or wheelchair; VII to cases where the individual is confined to bed; and VIII to cases where the individual is unconscious.

Four levels of pain and distress for each of these levels of disability were defined,

with A = none, B = mild, C = moderate, and D = severe. The median valuations for each of these combinations (such as VI C) were derived from the responses of 70 individuals, including doctors, compared to the zero-one scale from perfect health to being dead. Some combinations involving severe disability and/or high levels of distress were given a negative score, with the implication that they were considered as worse than being dead. The resultant valuations defined the associated **Rosser Index** for the health states corresponding to these combinations of the underlying quality of life variables.

Under conditions of certainty, a given medical intervention, such as a surgical operation, on a patient would be expected to result in some increase in life expectancy of the patient and/or improvement in the quality of their life compared to their existing life expectancy and existing quality of life without the intervention. Thus in Figure 4.1, the patient in the absence of the surgical intervention might be expected to live 5 more years, with a quality of life profile, according to the Rosser Index measurement, that deteriorates slightly in the first four years and then declines rapidly in the fifth year. After the surgical intervention, the patient has an enhanced life expectancy of 10 years, with a quality of life in the first five years above that which they would have received without the surgical intervention, but which declines substantially as they approach the tenth year. The shaded area indicates the QALY measure of the benefit of the operation, taking into account not only the length of extended life gained but also the increase in the quality of life of each year of life.

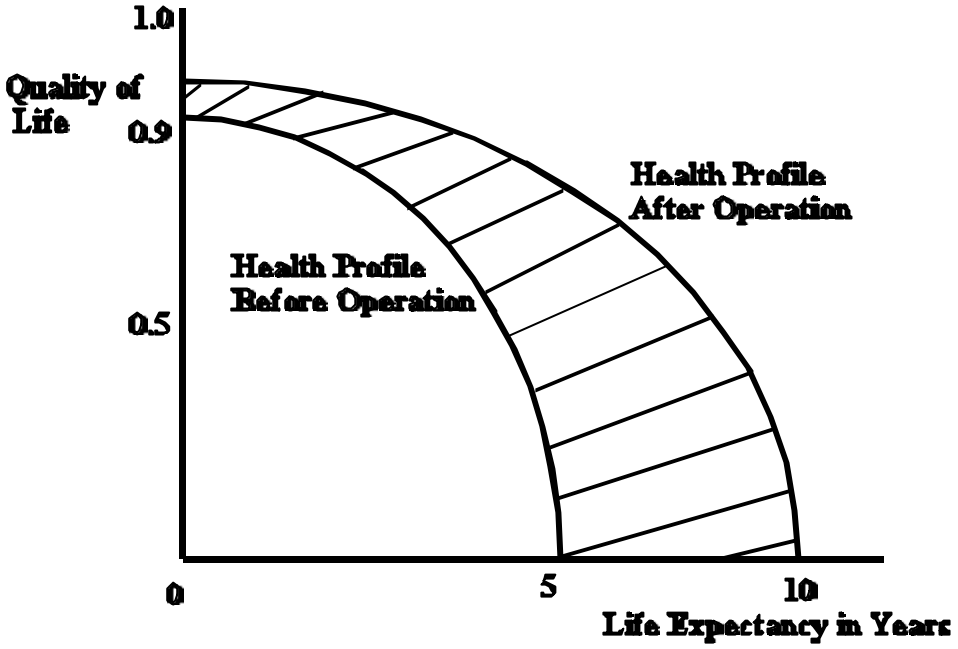

FIGURE 4.1

The analysis may be extended to take into account risk and uncertainty. Thus if there is an 80 per cent chance of the satisfactory outcome of the surgical operation in Figure 4.1, but a 20 per cent chance of death during the operation, the latter is given a value of zero weighted by the probability of 0.2, which is then added to the above increase in QALYs if the operation is successful multiplied by the probability of 0.8 of the operation being successful (see Williams, 1985).

There are five main methods which have been used to elicit individual valuations on the quality of life associated with different health states (see Torrance, 1986; Dolan, 2000). The first of these is the **Visual Analogue Scale** (VAS) which, in a similar way to the Rosser Index, asks respondents to rate the different health scales on a numerical scale between the best outcome of one (or one hundred per cent) and the worst outcome of zero. The psychometric **bisection method** (see Stevens, 1971) then asks individuals to rate the health state which they consider to be approximately

midway on this scale, followed by the health states which they consider approximately midway between this health state and the best and worst health states respectively, and so forth until finer and finer divisions are made in the interval scale to classify health states and their corresponding qualities of life.

The second method for deriving individual valuations on the quality of life uses the **Standard Gamble (SG)** approach. Here individuals are asked to consider an operation or other form of medical treatment with two possible quality of life outcomes, a good outcome, L_g, if the operation is successful, and a bad outcome, L_b, if it is unsuccessful. The probability of the treatment being a success is given by q and the probability of it not being a success is given by (1 - q). Under the expected utility approach, this gamble will have an expected utility of:

$$E(U) = q\, U(L_g) + (1 - q).\, U(L_b) \qquad (4.1)$$

The individual is then asked to consider an intermediate health state (better than death) with a quality of life of L_m, as an alternative to facing the risk of the medical treatment. They are then asked to assess the value of the probability of success of the medical treatment which would make them indifferent between (i) facing the uncertain medical treatment, with its possible good outcome, L_g, for the quality of life, but also its possible bad outcome, L_b, and (ii) having instead the intermediate quality of life, L_m, with certainty. For this probability, q', we have:

$$U(L_m) = E(U) = q'.\, U(L_g) + (1 - q').\, U(L_b) \qquad (4.2)$$

If the good outcome, L_g, corresponds to perfect health, with a standardised utility rating of 1.0, and the bad outcome, L_b, corresponds to death, with a standardised utility rating of 0, (4.2) yields:

$$U(L_m) = q' \qquad (4.3)$$

so that the utility which the individual attaches to the intermediate quality of life, L_m, can be derived directly from the probability of the good outcome at which the

individual respondent would be indifferent between these two prospects, and will lie between zero and one.

To evaluate qualities of life, L_w , worse than death, the intermediate state chosen is death. The medical treatment offers the prospect of full health (with a standardised utility rating of 1.0) with probability q and the outcome, L_w , with probability 1- q. For the probability, q", at which the individual is indifferent between this gamble and death with certainty (with its associated standardised utility rating of zero), we have:

$$0 = q" + (1 - q").U(L_w) \quad \text{i.e. } U(L_w) = - q" / (1 - q") \tag{4.4}$$

so that a quality of life that is considered to be worse than death has a negative utility rating, given by q" over (1 - q").

The third main approach to deriving quality of life valuations in health economics is **the Time Trade-Off (TT-O) method**. This method asks individuals to consider two alternative prospects under certainty. The first prospect involves living for x years of perfect health (with a standardised utility rating of 1.0 for each year) and then dying straightaway. The second prospect involves living for a greater number, y, years, but with a lower quality of life, L_m . If x' is the number of years of perfect health for which the individual would be indifferent between these two prospects, we have under the QALY approach that values years times quality of life ratings:

$$x' = y.U(L_m) \text{ so that } U(L_m) = x'/ y \tag{4.5}$$

For a quality of life, L_w , that is worse than death, the choice presented to the individual is firstly immediate death, and secondly y years with quality of life L_w followed by x years of perfect health. If x" is the number of years of perfect health at which the individual is indifferent between these two prospects, we have:

$$0 = y.U(L_w) + x" \quad \text{i.e. } U(L_w) = - x"/ y \tag{4.6}$$

The fourth main method for valuing quality of life in health economics is **the Person**

Trade-Off (PT-O) method, which considers choices between two treatments that will benefit different numbers of individuals, so that a trade-off is derived between the total number of years of healthy life enjoyed by x individuals and the total number of years with a lower quality of life enjoyed by y individuals (see Dolan, 2000; Williams and Cookson, 2000).

The fifth main method for valuing quality of life is **the Willingness To Pay (WTP) approach**, which considers how much money each individual would be prepared to pay for improvements in their quality and length of life. This incorporates their valuation of the length and quality of life into their own preference assessment for all variables which affect their overall welfare. However, willingness to pay will depend not just upon an individual's relative preference between quality and length of life and other variables, such as immediate satisfaction from the consumption of commodities which may cause later health problems. It will also depend upon the individual's ability to pay and level of income. Simply adding individual willingnesses to pay across individuals will give more implicit weight to richer individuals, who are more able to pay than poorer individuals. To counteract this effect and instead incorporate considerations of **distributional equity** into the analysis, different logarithmic weights may be attached to each individual's willingness to pay for increases in the quality and length of life of individual i. The logarithmic weights can reflect the degree of social **aversion to inequality** in the distribution of the monetary value of the benefits from increased quality and length of life (see Atkinson, 1970; Mayston, 2002a).

In order to **incorporate quality of life variables, other than net income, into our analysis of the benefits of careers guidance**, we must first identify these other variables. These will be ones which, alongside net income, affect the overall payoff to the individual of choosing any particular career option. These other quality of life variables may include:

i. the level of mental interest which the individual has in the tasks involved

ii. the level of mental stress which the individual experiences

iii. the level and nature of the physical activity involved in the tasks

iv. the level of self-esteem which the individual derives from the activities and status involved

v. the extent of the control which the individual has over their activities

vi. the sense of achievement which the individual derives from the activities

vii. the extent of social interaction the individual has with their colleagues and customers

viii. the extent of social esteem which the individual derives from their career

ix. the travel time taken between the individual's home and place of work or study

x. the level of stress/enjoyment experienced during travel between the individual's home and place of work or study

xi. the amount and quality of the time which the individual spends with their partner when the individual has the specified job, education or training

xii. the amount and quality of the time which the individual spends with their children when the individual has the specified job, education or training

xiii. the extent and quality of the social interaction which the individual has with others outside the workplace when they have the specified job, education or training

xiv. the quality of schooling which the individual's children receive when the individual is living in the accommodation the individual lives in when they have the specified job, education or training

xv. the extent of the physical activity the individual engages in outside their job, training or education

xvi. the extent of substance abuse which the individual engages in when they pursue a given career path

xvii. the quality of the physical environment which the individual experiences in their place of work, training or education

xviii. the quality of the physical environment which the individual and their family experience outside the place of work, training or education when the individual has the specified job, or is undertaking the education or training.

Several of these variables may in turn feed into the level of **job satisfaction** which the individual derives from the job, training or education, and the level of **physical and mental health** which they experience as a result of undertaking it. If we are able to measure the above variables in a meaningful way, we may represent these (non-income) quality of life variables for the individual advisee at time t as a list or 'vector' $L_t = (L_{t1}, ..., L_{tm})$, where L_{tk} denotes the level of the kth quality of life variable for the individual at time t. The future time path of quality of life variables over the time horizon t = 1,.. , n which the individual experiences may be represented by the vector $L = (L_1, ... ,L_n)$.

We may now extend the concept of the individual's human capital to include these quality of life variables as determinants of their overall welfare payoff from a career move. One role for high quality careers guidance is to make the individual advisee more aware of the extent of the enhanced net income and quality of life which they may experience in future years as a result of a career move, and hence to pay more attention to these future benefits.

In the case of career moves which improve the individual's physical and mental health status, direct use may be made of the evaluation techniques discussed above for measuring the resultant increases in Quality Adjusted Life Years which the

individual thereby experiences. These increases may result, from improved quality of life or from extensions in the length of life, or both. However, in the case of quality of life variables which do not predominantly affect the individual's physical and mental health, we need to incorporate these non-income quality of life variables into the analysis alongside income variables.

The **increase in the value of human capital** which the individual experiences as a result of a career move can now be evaluated in terms of the present value of the increases in the net income and quality of life variables the individual experiences over time due to the career move. This formulation allows for the possibility that the individual's net income and the different (non-income) quality of life variables may each change in different ways over the future years as a result of the career move, some potentially initially falling but later increasing, but not all necessarily going in the same direction. Thus a career move may result in higher net income in future years. However, it may also result in more time spent commuting to work, in a way which reduces the relevant non-income quality of life variable in these future years.

The **relative importance** of each of the income and quality of life variables depends upon the individual's preferences and associated welfare or utility function $U_{i\,t}$ at each point in time. Micro-economic analysis suggests that each individual will have an 'indifference map' between these variables, as in Figure 4.2 below, embodying these individual preferences and associated utility function (see e.g. Varian, 1992). Our earlier **decision analysis** framework using a utility of income function based upon the single variable of income can be extended to decisions with **multiple-attributes** (see Keene and Raiffa, 1976; French, 1989), involving not just income but also other quality of life variables. This is illustrated in Figure 4.2 below for the case of two variables. Y_t represents the individual's net income at time t and L_{tj} the value of their (non-income) quality of life variable k at time t.

Points, such as b and f, in Figure 4.2 represent different combinations of income and non-income variables that affect the quality of life. The curves in Figure 4.2 join points, such as a, b and h, between which the individual is indifferent. Thus the combination of net income and quality of life variable at point a is here considered by the

individual as equivalent to the combination at point b, which has a higher level of net income but a lower quality of life variable than at point a. The slope of the indifference curve through a and b represents the **trade-off** or marginal rate of substitution between net income and the quality of life variable for the individual. If the individual suffers a further fall in the quality of life in going from point b to point h in Figure 4.2, they require an even greater increase in net income in going from b to h to compensate them for a given fall in quality of life than they do in going from a to b. The trade-off between these variables is in general then not a constant one.

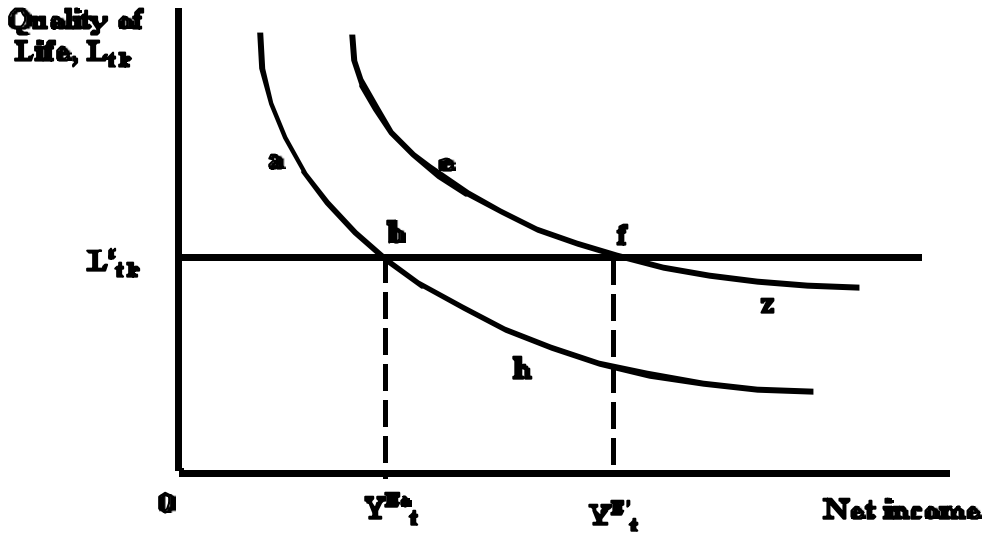

FIGURE 4.2

We may nevertheless derive a **monetary value to the overall benefit** which the individual receives from any given combination of net income and quality of life variables. We may do so through the concept of **equivalent net income**. This involves the level of net income which, if received when the individual has quality of life variables at a specified **standard level,** would make the individual indifferent between this given combination and the actual combination of net income and quality of life they will experience. Thus in Figure 4.2 the individual is indifferent between point k, involving the actual combination of net income and quality of life

they will experience if they stay with their present career, and point b. Point b involves a quality of life at the specified standard level, $L^{s}_{t\,k}$, together with a level of net income level of Y^{Eo}_{t}. Y^{Eo}_{t} is therefore the equivalent net income which, when received together with a quality of life at the specified standard level, would make the individual indifferent between this combination and the actual combination of net income and quality of life which they experience in their present career at point h.

We can similarly derive **a monetary measure of the net gain** in benefit which the individual careers advisee receives as a result of a career move. A career move will in general result in a move to a different indifference curve at time t than their existing one. The move from point h in Figure 4.2 to point z, for instance, involves an increase both in the individual's net income and in their quality of life variable, placing them on a higher indifference curve than at point h. We may derive a monetary value to the overall benefit they receive from the move through the corresponding concept of the **equivalent gain in net income** which would bring about the same utility gain for the individual at the specified standard level of the quality of life variables as the career move does.

The derivation of this equivalent gain requires each individual career advisee to assess the importance to themselves of each of the non-income quality of life variables, such as those listed above. If the quality of life variable is below the standard specified level (as in Figure 4.2 for points h and z), they need to specify **how much income they would be prepared to give up to increase this quality of life variable to the standard level**. If the quality of life variable is above the standard specified level (as in Figure 4.2 for points a and e), they need to specify **how much additional income they would require in order for them to be willing to reduce this quality of life variable to the standard level**. The calculation thus involves similar considerations to those involved in the **Willingness to Pay** approach discussed above.

If we again set the standard level of the quality of life variable in Figure 4.2 at the level $L^{s}_{t\,k}$, the move from points b to f achieves the same increase in utility levels at this standard quality of life as does the career move from k to h. As above, the

equivalent net income of point b in Figure 4.2 is $Y^{Eo}{}_t$, whereas the equivalent net income of point f is $Y^{E'}{}_t$ in Figure 4.2. The **gain in equivalent net income** levels between points b and f at this standard quality of life in Figure 4.2 is therefore given by $Y^{E'}{}_t - Y^{Eo}{}_t$.

We can insert this monetary value at time t of the career move into our present value calculations to obtain a value for the resultant increase in human capital. The level of equivalent net income which results from a career move will depend upon the quality level, Q , of the careers guidance offered to the individual, so that $Y^{E'}{}_t$ is a function of Q. Higher quality careers guidance should result in changes in net income and quality of life that in general raise the individual to a higher welfare level,. This makes $Y^{E'}{}_t$ in general **an increasing function of the quality of careers guidance given**, after any initial period of training or education has been completed.

Since quality of life considerations are directly involved in the determination of $Y^{E'}{}_t$, we may extend our earlier calculation of the net benefit that results from careers guidance at the quality level Q **to include quality of life considerations**. An optimal level of careers guidance, Q*, for the individual advisee may again be defined by the value of Q which maximises the net benefit, denoted by NB (Q), of the careers guidance. This optimal level can be used as a **benchmark or standard** against which all guidance providers can be judged in assessing the **value for money** and **relative effectiveness** of their provision for any given individual advisee.

We may again include considerations of equity into the analysis by incorporating some degree of social **aversion to inequality in the distribution of career benefits**, including those adjusted for quality of life considerations. We may also incorporate considerations of individual risk aversion and diminishing marginal utility of income, as discussed in Section 3 above. This can be achieved by taking the logarithms of the corresponding levels of income, and weighting by a relative policy weight, w_1, the cost to the public sector of providing the careers guidance to each individual, and of any subsidy element of the additional training or further education that is involved.

A higher relative policy weight, w_1, on the costs to the public purse may itself be

associated with a higher degree of tightness in the available budget for these activities. Where part or all of the cost of the career guidance falls on the individual advisee as a fee, this will reduce the level of net income of the individual advisee by the amount of the fee, so long as their demand for the careers guidance is not **price sensitive**. Only that part accruing to the public purse, or other sources of external finance, is then included within the computation of its cost net of fee income receipts.

We can then sum the resultant total value of net benefit to each individual across all the individual career advisees, to yield the total net benefit generated by careers guidance at the specified quality level.

5. WIDER BENEFITS

There are a number of important wider social benefits which are likely to be generated by high quality careers guidance, and which could be included in a cost-benefit analysis of such careers guidance. These wider social benefits are likely to include firstly:

5a. Increased Tax Yields to the Exchequer

When the existence of taxation is taken into account, the question arises as to how we should define the **net income** which we have considered in previous sections as accruing to the individual under different career options. From the viewpoint of the cost-benefit analysis, **if we ignore distributional considerations**, we may include within the income variable the **gross income before tax** earned by the individual during each period of time under the career option. We can then deduct job-related expenditures to arrive at the individual's net income. Whilst the income tax paid by the individual out of their gross income accrues to the Exchequer, distributional indifference requires that we pay attention to the **sum** of the income tax paid and the net income received by the individual after tax, i.e. the gross income of the individual.

However, it is likely that in making their own career decisions, individuals will pay attention to their own resultant **net income after tax**, rather than to their resultant income before tax. This itself will mean that **the social benefit** from individuals improving their life-time career earnings as a result of high quality careers guidance **exceeds the private benefit** to the individual career advisee, whenever they pay increased income tax (and National Insurance contributions) as a result of a career move. The Exchequer here is essentially a **shareholder in the human capital** of the individual career advisee, benefitting from its enhanced value. Such an enhanced value to human capital in the economy **extends the tax base** on which the Exchequer can draw to boost public finances.

If individual career advisees have to **bear the full cost** of the careers guidance given, the level of investment which they undertake in improving their own human capital

will tend to be **sub-optimal** from a social viewpoint. The cost-benefit analysis of careers guidance can then be linked to a case for an **optimal level of subsidy** to the careers guidance service and to the providers of additional training and further education. Such a subsidy can help to facilitate higher quality careers guidance and encourage a more socially optimal level of investment in human capital.

When distributional indifference does not prevail, the relevant net income variables should be computed net of both job-related expenditures and net of income tax. However, an additional term is required to be added to the right-hand side of the computation of net social benefits from the careers guidance in equation (3.24) above . This additional term is the total additional tax revenue generated as a result of the career moves made by careers advisees, weighted by the relative social weight upon income in the hands of the Exchequer rather than in the hands of individual taxpayers.

The wider social benefits resulting from beneficial career moves by individual career advisees will also include:

5b. Reductions in Unemployment and Other Social Security Costs to the Exchequer

Unemployment and other social security benefit payments will act like **negative tax payments**, boosting the net income after tax and benefit payments received by individuals who are unemployed or in low paid jobs. Securing a job, rather than being unemployed, or securing a better paid job, rather than a low paid job, through high quality careers guidance will reduce these costs to the Exchequer. Again, under distributional indifference, we may consider in the cost-benefit analysis simply **the sum of these cost savings plus the changes in the net income after tax and benefit payments of the individuals concerned**. This sum will again equal the change in the individual's **gross income** that results from the career move. However, **in the absence of distributional indifference**, we must evaluate **the net income of each individual under each career option, net of job-related expenditures and of tax**

and benefit payments in the calculation of the net income variables Y_i in our above analysis. We must then add to the right-hand side of equation (3.24) **the increased tax yield plus saving in unemployment and other social security payments**, weighted by any relative social weight on income in the hands of the Exchequer, in order to derive the measure of net social benefit from the careers guidance.

The calculation of the benefits of increased tax yield plus saving in unemployment and other social security payments must take into account the potential **long-term nature** of the unemployment which the individual may otherwise experience in the absence of high quality careers guidance. In the presence of high rates of **technological change**, **cyclical down-turns**, and **demand and supply shocks** to the economy, such as from oil price increases, individuals may suffer a high risk of unemployment in their original occupation or location. In the absence of high quality careers guidance, there is a danger that **initial unemployment** will develop into **more permanent long-term unemployment**. The **value of their human capital** will then be substantially **damaged** by the loss of the **present value of the future earnings** they would otherwise have obtained if they had not become unemployed.

The result will be a form of **hysteresis**, in which a temporary shock to the economy results in permanent **long-term damage to human capital**. High quality careers guidance, combined with other measures, such as well-designed re-training programmes, can seek to avoid such long-term damage by increasing the **flexibility** with which individuals, and the labour market as a whole, can respond to technological change, cyclical down-turns and to supply and demand shocks. The calculation of the benefits of high quality careers guidance therefore needs to include the long-term present value of the increase in **future net income** which the individuals receive if the careers guidance enables them to avoid the risk of long-term unemployment, in a similar way to the calculations indicated in Section 2 above. In addition, if we calculate the individual earnings net of tax and benefit payments, the assessment of the benefits of high quality careers guidance must include the **long-term** present value of the increased tax yield plus saving in unemployment and other social security payments which results from avoiding long-term unemployment. High quality careers guidance can then be an important complement to government

programmes, such as Welfare to Work and the New Deal for young unemployed people in the 18-24 age group (DfEE, 1999a).

A further interesting direction in which there may be a wider social benefit from beneficial career moves from high quality careers guidance arises from:

5c. Reductions in Health Care Costs on the National Health Service

That there is a **socio-economic gradient of individual health status** across different geographical areas and occupations is well-documented (see e.g. Marmot and Mustard, 1994; Mayston 2000b). Encouraging individual career advisees to make career moves which boost their net income and quality of life may well result in an **improved health status** for the individual. This in turn may reduce their need for health care during their working life and early years of retirement. Moreover, quantitative estimates are available (e.g. Carr-Hill et al, 1994) of the extent to which particular variables, including job-related one such as unemployment, impact upon the need for additional health care expenditure. Reductions in local unemployment levels through the provision of high quality careers guidance would then have a quantifiable impact on the need for additional expenditure by the NHS. If the associated health care costs would have fallen on the National Health Service (NHS), they would have been a source of additional pressure upon public expenditure that is financed out of general taxation. The saving of this additional health care cost needs to be added to the additional tax revenue and benefits savings generated by the career moves which the careers guidance encourages.

We have discussed above the incorporation of the benefits to the individual themselves from improvements in the quality and length of life which result from a career move. If the career move **extends the length of life** of the individual, this may also in the long run increase the health care costs which fall upon the National Health Service. How far this is true depends upon the extent to which the individual is more likely to experience long periods of health deterioration that are expensive to treat close to the end of their life, as a result of the career move. A move from an

occupation in which individuals tend to die early from incurable diseases to an occupation in which they live for many years, but then suffer several years of dementia, will yield changes in the quality and length of life for the individual themselves which may be evaluated using the concepts of Quality Adjusted Life Years discussed above. However, such a move may actually increase the health care costs that are in the long run imposed upon the NHS, although this increase may be more than offset by the additional tax payments which the individual makes over their extended life-time as a result of the career move.

Reductions in private health care costs from improved career choice may be a further private benefit from career guidance. However, they do not represent a change in public expenditure that must be offset against enhanced tax yields in the cost-benefit analysis.

5d. Reductions in the Frequency and Costs of Crime

One important role for high quality careers guidance is to enable individuals who would otherwise be unemployed to find new career opportunities. The statistical association between **unemployment and crime**, and the possible causal links between variables such as unemployment, substance abuse, and crime rates, suggests that a reduction in unemployment may assist in reducing crime rates. In a survey of empirical studies on unemployment and crime, Freeman (1999) found that there was much stronger support for the hypothesis that crime is linked closely to unemployment amongst data on individuals than from time-series analysis of trends over time, or from cross-section studies across different localities. The studies based upon data on individuals found that individuals who are prone to unemployment "are more likely to commit crimes and that people who commit crimes are more likely to do so during spells of unemployment".

A longitudinal study of 411 young men by Farrington et al (1986) found that the link between unemployment and crime was much greater amongst those with a history of **low status jobs**. Freeman (1999) also concludes that "the magnitude of the

worsened job market opportunities for less skilled young men and rise in inequality" from 1973 onwards "were sufficiently large to suggest that they could have played a major role in the increase in criminal activity" (emphasis added). This is consistent with an economic model of participation in crime in which the expected payoff to crime, after taking account of the risks of detection and conviction and the likely penalties, is compared by potential participants with the other economic activities which they could engage in. If the latter employment opportunities are of low value, the tendency to crime will be greater for those individuals who are at the margin of such participation in crime. Careers guidance may therefore have a benefit in reducing the costs of crime if it reaches those individuals who might otherwise commit crime in the future, and for who are a stage in their life when greater prospects of employment and increased job-related skills may discourage them from embarking on criminal activity, or continuing with it as much as otherwise.

Coopers and Lybrand (1994) estimated the marginal cost of an additional youth crime to be at least £2,300, of which **nearly half would be recoverable from the public purse** by less expenditure needed on the Criminal Justice System, and by local government and fire brigades responding to vandalism, criminal damage, fire damage and arson. Their cost estimate did not include any psychological benefits from reduced crime avoiding distress to victims or lessening the fear of crime amongst the elderly or others. Liddle (1998) carried out a more extensive analysis of the social costs imposed by a sample of offenders in the 15 - 17 population over their history of crime to date, in a study for the National Association for the Care and Rehabilitation of Offenders (NACRO), and found that the total cost per respondent of their crime history to date to average **£75,365 per respondent**. When extrapolated to the national population of approximately 2,500 offending individuals in this age group, the total cost of their crime to date totalled **over £188 million**. **Risk factors** identified in these respondent case studies (Liddle, 1998) as contributing to the likelihood of a **history of crime** included **lack of skills and training**, drug and/or alcohol abuse, and unstable family living conditions. High quality careers guidance to individuals who might otherwise be unemployed or lack skills and training may then potentially reduce these risk factors, both for young initial offenders and for older adults, and their children.

The high rate of **re-offending** of many of those who become caught up in the Criminal Justice System suggests that there are likely to be **long-term future costs of crime**, unless other more positive opportunities are available to the individual. High quality careers guidance may therefore yield large potential long-term cost savings, equal to the **present value of the savings in the costs of crime** which a **reduction in the risk factors** that are associated with participation in crime is likely to produce. However, this requires high quality careers guidance to be available to those at risk at points in their lives when they can make progress in escaping from the cumulative forces which may otherwise lead to a persistent history of crime. The extent to which careers guidance does succeed in these directions therefore needs to be carefully monitored, and combined with costings of the reduction in crime rates which this may generate.

5e. Macro-economic Benefits

High quality careers guidance, particularly to those who might otherwise be unemployed, is also likely to have substantial **macro-economic** benefits. These relate firstly to the concept of **mismatch** between **the demand for labour in different occupations and geographical areas and the available supply**. The level of mismatch within the British economy is considered by Layard, Nickell and Jackman (1991, p. 331) to explain at least a third of all unemployment in Britain. Mismatch is reflected in substantial variations in the ratio between local unemployment rates and local vacancy rates across different locations within the UK and across different occupational and industrial job classifications. High quality careers guidance, in conjunction with training and further education opportunities, can help to reduce this mismatch by making individuals who are unemployed in one particular geographic location, industry and/or occupation more aware of the increased employment opportunities which are available to them through geographical relocation and/or retraining.

High levels of mismatch will imply that unemployment is high in some local labour markets, whereas in others it is low. The **Phillips curve relationship** between

unemployment and inflation means that low rates of unemployment will result in higher rates of inflation than do high rates of unemployment. This relationship is likely to **be non-linear**, with an increasing slope, so that the additional inflation associated by subsequent equal reductions in the unemployment rate increases as the unemployment rate approaches zero. In such a case, a high unemployment rate in one local labour market when combined with a low unemployment rate in another local labour market will result in a **higher overall level of inflation** than if the unemployment rate been equalised between the two labour markets.

If an individual who is unemployed in one location or occupation relocates or retrains so that they can now compete in another labour market where the unemployment rate is low, they will exert **competitive downward pressure** upon the rate of wage inflation in the second labour market even if they do not obtain a job in it for some time. If they do obtain a job, the level of vacancies in the second labour market will decline and the level of **excess demand**, due to demand exceeding supply, in this second labour market will be reduced, again easing inflationary wage pressures.

The effect of such a reduction in the level of mismatch between the demand for labour in different locations and jobs and the available supply is to **reduce the level of wage inflation** which is associated with any given average level of unemployment across the economy as a whole. If the Chancellor of the Exchequer, or the Monetary Policy Committee of the Bank of England, has a **target rate of inflation** for the economy as a whole, the economy can now be run at a **higher level of aggregate demand**, and a lower average rate of employment, than otherwise without raising interest rates or taxation to curb aggregate demand. The benefit of the reduction in mismatch which improved careers guidance and retraining opportunities achieve is **the increase in aggregate demand**, as measured by the GDP increase, which such a reduction makes possible.

The increase in GDP will include the additional net income which the previously unemployed individuals receive as a result of their new employment, as well as that accruing to other individuals who find themselves with new job opportunities as the level of aggregate demand is expanded to a new higher level. The initial mismatch

may, for instance, relate to a shortage of skilled labour. This shortage may be partially relieved by a previously unskilled worker undertaking training following careers guidance to become a skilled worker. The availability of another skilled worker may in turn, however, set up a need for another unskilled worker to service the skilled worker in the production process, so that there is some degree of **complementarity** in the demand for the two types of labour. The expansion of demand to relieve mismatch and increase production can then extend to the employment of both workers without inflationary consequences (see Johnson and Layard, 1986).

As we have noted above, high quality careers guidance may help individuals who are initially unemployed from becoming long-term unemployed. If the number of months and years in which the individual is unemployed increase, both skills and motivation may decline, so that permanent damage to their human capital results. The **hysteresis** which is associated with the **long-term damage resulting from initial increases in unemployment** will not only **impair the value of the individual's human capital**. It will also result in an **increased pool of long-term unemployed** who offer little effective **competition in the labour market** to constrain inflationary pressure at any given level of aggregate demand, and who have effectively withdraw from the mainstream labour market as a source of labour supply. The benefit from high quality careers guidance which reduces the number of individuals who become long-term unemployed will then itself be a long-term one, requiring calculation of the **present value of the future stream of increases in aggregate demand** and GDP which are feasible at any given target rate of inflation if the long-term unemployment rate is thereby reduced.

High quality careers guidance can assist not only in informing individuals of job and training opportunities outside their present location and industry. It can also help individuals to **form more realistic expectations** of their likely income if they pursue different courses of action. The use of **search theory** in labour economics (see Pissarides, 1985; Mortensen, 1986) has stressed the importance of an individual's **reservation wage.** This is defined as the wage at which they are just willing to take a job in any given period of job search. If the individual has an excessively high

expectation of the wage they can ultimately command if the keep searching for a longer period of time, their reservation wage in any given shorter period of time will tend to be excessively high. As a result, they will refuse jobs offering a lower wage than this excessively high reservation wage, and therefore be unemployed for longer than if they had formed more realistic wage expectations. The level of **transitional unemployment** will therefore be increased, if individuals, because of inadequate careers guidance, take longer in their search for new employment. However, there may not only be a loss of net income, and higher social security cost, in the period for which they have the initial high reservation wage. As the duration of their unemployment increases, their skills and motivation may decline, thereby reducing also their longer term prospects and earnings. The level of more **permanent long-term unemployment** may also increase, if the wage expectations which individuals form in the absence of high quality careers guidance do not adapt sufficiently to the prevailing labour market conditions.

5f. Net Social Benefits

We can draw the above strands together into an overall computation of the net social benefits that result from different levels of quality of careers guidance. We will denote by $TB^{o}(Q)$ the value of the net benefit to recipients of the careers guidance at quality level Q. This is computed in a similar way to TB'(Q) in equation (3.24) above, but adjusted for quality of life considerations through the concept of equivalent net income discussed in Section 4above. Individual income is also computed **net of tax** payments and the receipt of any social security payments by the individual.

In order to compute the overall Net Social Benefit, NB(Q), within a **social cost-benefit analysis**, we need to add to $TB^{o}(Q)$ the **tax yield** to the Exchequer, T(Q), that results from the additional income that the careers guidance generates. In addition we need to add the savings in social security benefits, S(Q), and any reductions, H(Q), in health care expenditures on the NHS that result from the career improvements that are associated with this level of quality of careers guidance. Since the tax yield and

savings in social security and health care costs accrue here to the public purse, we will weight them by the relative policy weight, w_1, on financial costs and benefits to the public purse compared to money income in the hands of private individuals. Because much of the cost of crime also falls on the public purse, we will similarly include within such relative weighting any reduction, M(Q), in the cost of crime which results from the improved career prospects which the careers guidance achieves.

We have discussed above the possibility that high quality careers guidance may help to reduce the degree of **mismatch** in the labour market between the demands for particular skills in particular parts of the country and the available labour supply. This in turn may enable the economy to be run at a higher level of aggregate demand, that is still consistent with any given level of the inflation target for the economy at large. The additional demand for labour, and available supply, that is generated by this higher level of aggregate demand may include not only the labour that is newly-trained or newly re-located as a result of the careers guidance. It may also include labour in other occupations and locations whose demand is complementary to the newly-trained or newly-relocated labour. Easing a bottleneck of skilled workers through encouraging re-training may then result in more unskilled workers also being employed to work alongside the additional skilled workers on the production line. As a result, the net income of the unskilled workers may also rise, as may their quality of life from non-income variables.

If there are macro-economic external effects on the net income and/or quality of life of other workers, these should also be included in the calculation within the social cost-benefit analysis. This will involve an additional term, which we will denote by $TB^{oo}(Q)$. This is computed in a similar way to earlier but summed over all individuals who are not directly in receipt of careers guidance, but whose net income and/or quality of life changes because of the reduction in mismatch that the careers guidance achieves.

The improved employment opportunities of these secondary workers will also in general result in increases in the tax yield from the higher pre-tax incomes which these improved employment opportunities generate. The value of T(Q) used in the

social cost-benefit analysis should therefore include the additional tax yield generated by the improved employment opportunities to these secondary workers. Similar remarks apply to the savings in social security costs, S(Q), in health care costs, H(Q), and in the costs of crime, M(Q).

The overall total for the net social benefit from the careers guidance in the social cost-benefit analysis therefore equals:

$$NSB(Q) = TB^{o}(Q) + TB^{oo}(Q) + w_1 . [T(Q) + S(Q) + H(Q) + M(Q) - C(Q)] \qquad (5.1)$$

where C(Q) is again the cost of the careers guidance, and associated subsidy element to the additional training and/or further education involved, that falls on the public purse, net of any fees charged.

A level of **optimal social quality of careers guidance** can be defined as that level which maximises the value of NSB(Q). This will be achieved when the **marginal increase in the value of human capital** which higher quality of careers guidance achieves is equated to the **net marginal social cost**, weighted by the policy weight w_1 placed upon net public expenditure.

The net marginal social cost equals the additional cost to the public purse of providing the higher quality careers guidance, and any associated subsidy element to the additional training and/or further education involved, less the monetary value of the additional tax yield and savings in social security benefits and health care expenditures and costs of crime which result from the higher quality careers guidance. These financial offsets may reduce the net social cost of providing the higher quality careers guidance to a low level. The net social cost may indeed become negative as a result of these financial offsets if the higher quality careers guidance results in large savings in social security payments because individuals who would otherwise have been unemployed now become employed.

The computation of the increase in human capital is carried out here using net income projections for the individual, net of income tax and social security payments.

Improvements in the quality of the careers guidance which result in large social security payment savings may then still be justified even though they may not substantially increase the individual advisee's income, net of tax and social security benefits. This highlights the potentially large diverge which may exist in some cases between the social benefits of careers guidance and the private benefits to the individual careers advisee, and underlines the scope for assessing the detailed case for external financial support for careers guidance services of different levels of quality in order to achieve these wider social benefits.

6. INFORMATIONAL REQUIREMENTS AND MANAGEMENT STRATEGY

If the economic benefits of careers guidance and associated educational and training expenditure are to be maximised, there is a strong case for making the most efficient use of available information to ensure that this objective is achieved. Information is itself costly to collect and analyse, with a value that depends upon its timely and effective use. As we have stressed above, there is a need to recognise that the future is to a significant extent inherently uncertain, with differences likely to prevail between what can currently be expected ***ex ante*** about the future, on the basis of the best use of the information currently available, and what may actually prevail ***ex post*** in the future regarding future earnings levels and other payoffs from different current career choices. Adding value to current career decisions therefore means making better use now of the information that could currently be made available. As with the regulatory requirements upon Independent Financial Advisers for financial products, it is reasonable to expect high standards of ***ex ante*** information provision on the relative merits of different career options, and their different characteristics, and exploration of the risk and other preferences of the individual advisee, even when information on future ***ex post*** **outturns** is not yet available. The value of human capital at stake in many individual career decisions is likely to be at least as great as that for many other decisions with financial consequences that the individual may face.

Information also has many characteristics of a **public good** (Mayston, 1992), with the **user information needs** of many different potential users often **overlapping** (Mayston and Jesson, 1999). If it to be used efficiently and effectively, there is a need to ensure good design and coordination in the overall system for producing and utilising the type of information that can help to maximise the benefits of careers guidance and associated education and training expenditure. There are a number of **interacting levels** at which this can occur:

a. the first is the **strategic level**, at which a national assessment of skills shortages, needs and current mismatches can be made, supported by detailed sectoral and geographical analyses (see Skills Task Force, 1999; Learning and Skills Council, 2001),

together with an assessment of the extent of micro- and macro-economic benefits that can be achieved from reducing these skill shortages and labour market mismatches. This assessment may be linked to the development of national and local targets for learning, skills acquisition and employment outcomes.

b. the second is at the level of different individual **potential client groups** for careers guidance, whose characteristics, attitudes, behavioural patterns, likely preferences and scope for income and quality of life improvements from enhanced skill acquisition and greater employment opportunities can be assessed on the basis of national and local analyses of these target groups (see White and McRae, 1989). Such analyses may help to clarify which potential client groups are likely to gain most from careers guidance provision from a reduction in their associated Type I and Type II errors, and the most appropriate form of guidance provision for each group. This is turn may help to inform the development of **strategy frameworks** (c.f. DfEE, 1999b, 1999c) and **local profiling** for identifying individuals most in need of different forms of help, based upon considerations of expected benefits as well as cognitive psychology (see Sampson, Palmer and Watts, 1999).

c. the third is at the level of the provision of a detailed and comprehensive (on-line) information base for individuals and their advisers on **career opportunities and future employment prospects** in different occupations and geographical areas, earnings potential, costs of living, job characteristics, associated education and training needs, and success rates of those entering different courses and career routes. The strong need for a comprehensive, and well-organised, information base containing many of these data items has again been stressed by the Skills Task Force (1999; 2001). It has noted that "in the absence of such information currently, it is hardly surprising that skills shortages and gaps in the UK have often reached levels that generate significant concern". The development of the newly extended Local Labour Force Survey (Bell and Hussain, 2000) will assist in the development of such a strengthened database. A detailed survey and analysis of the rates of return on a wide range of basic literacy and numeracy skills, and vocational and academic qualifications is also now available in Dearden *et al* (2001).

d. the fourth is at the level of individual careers service providers, where **target standards** may be set and monitored. These standards may include those for the quality of provision of information on the above data items and their interpretation for individual advisees, and for the assessment of individual needs, and for the training and qualifications for the local advisors involved in this process. This process may be reinforced by the completion of *pro formas* for each individual on their relevant characteristics, preferences and expected outcomes from the different career choices they currently face.

e. the fifth is through **keeping track of the progress** of individual advisees from careers service providers to the next stage of their employment career path or of the education and training process. Productive links may then be developed with Individual Learning Records, the Local Labour Force Survey and monitoring the extent to which each individual careers service provider contributes to the overall strategic targets which the local Learning and Skills Council has set, on the basis of a detailed assessment and analysis of sectoral and geographical skills needs and labour market mismatches. The sharing of data between different agencies would be an example of 'joined up' government in operation, though requires the development of adequate protocols to be consistent with individual data protection.

f. the sixth is through linking the immediate outcomes of the careers service providers to a wider analysis of their **relative performance**, using analytical techniques such as Data Envelopment Analysis (Mayston and Jesson, 1998) and Stochastic Frontier Analysis (see Mayston, 2000b). These techniques can help to identify current **best practice** providers of careers guidance, after taking into account the nature of the client groups which they serve and the local economic environment. In addition, they can be used to assess the **relative effectiveness** and **value for money** of other existing providers and the **quantitative scope** that exists for securing benefits from improving the quality of their provision. The identification of best practice can itself be used to define **standards of delivery** and **targets** for service delivery and the quantitative benefits associated with these targets.

g. the seventh is through longer-term **longitudinal studies** of the education, training

and employment progress of individuals receiving careers guidance, and their associated ***ex post*** payoffs in terms of enhanced income and non-pecuniary quality of life improvements, such as job satisfaction. These require careful design to adjust for the level of careers guidance received, such as through the use of comparison control groups (see e.g. Killeen, White and Watts, 1992, pp. 52 - 57) or multi-variate statistical models, and for any selection or endogeneity bias (Mayston, 2002b) which introduces an inter-relationship between the level of guidance received and the individual characteristics of each advisee. Detailed longitudinal studies of the differential impact of careers guidance include those by Witherspoon (1995) and Killeen and White (2000).

7. CONCLUSIONS

We have developed a framework for the analysis of the monetary benefits from different levels of quality of careers guidance, and associated careers guidance interview, based upon **the value added** which it achieves in the value of human capital of individual careers advisees. We have also extended this framework to include the analysis of the extent to which careers guidance improves the career choices of individual advisees under conditions of **uncertainty**. The benefits from such careers guidance, and increases in its **quality**, flow from the reduction in both Type I errors, of individuals failing to chose career moves which would be optimal for them, and the Type II errors which result if individuals make career moves that makes them worse off than if they had not made the career move. Perfect careers guidance for the individual will result in a zero frequency of such errors. The frequency and magnitude of these errors is an indication of the extent to which the quality of the careers guidance offered by a given provider diverges from the **benchmark** of perfect careers guidance.

We have also extended our analysis to take into account the **quality of life improvements** resulting from the careers guidance, and examined how to place a monetary value on these improvements that takes account of the preferences of the individual careers advisee. In addition, we have analysed several sources of wider **social benefits** which should be included within the **social cost-benefit analysis** of higher quality careers guidance. In doing so, we can build upon the earlier contribution of Killeen, White and Watts (1992) on the economic value of careers guidance.

The analytical framework can be used as the basis for the specification of the associated **informational requirements** to formulate detailed quantitative estimates of the associated costs and benefits. This in turn can support the development of a **well-designed database** on client characteristics, local economic and other environmental variables, and the improvements in the net income and quality of life which result from the careers guidance provided by different individual providers. The above focus on the frequency and magnitude of Type I and Type II errors as

indicators of the scope for **beneficially improving the quality** of existing careers guidance provision can itself, for instance, be related to **quality of service indicators**. These may include the degree of **access** to the careers guidance which is available to potential client groups who could benefit from high quality careers guidance by reducing the extent of Type I and Type II errors in their existing career choices, and the **quality of information** which is available to them.

The development of a well-designed database based upon these analytical foundations can assist careers guidance providers in identifying beneficial career moves for individual advisees. In addition, it can generate well-designed **performance indicators** which demonstrate the **scope for further progress** in improving the quality of careers guidance provision. The conceptual framework we have discussed can be linked to analytical techniques which can identify current **best practice** providers of careers guidance, taking into account the nature of the client groups which they serve. In addition, they can be used to assess the **relative effectiveness** and **value for money** of other existing providers and the **quantitative scope** that exists for securing benefits from improving the quality of their provision. The identification of best practice can itself be used to define **standards of delivery** and **targets** for service delivery and the quantitative benefits associated with these targets.

The above framework theory can also be used to support the detailed appraisal of the case for different levels of **financial support** for individual careers guidance providers, and for the system as a whole, to achieve different possible standards of careers guidance quality. In addition, it can assist in the appraisal of the **optimal level of fees** to careers guidance advisees.

Reaping the potential benefits of high quality careers guidance, through reducing the frequency and magnitude of Type I and Type II errors by individuals in their career choices, can itself contribute directly to the Government's own **central policy aim** and associated objectives in the field of education and skills, namely "to help build a competitive economy and inclusive society by .. enabling all young people to develop and to equip themselves with the skills, knowledge and personal qualities

needed for life and work; and …. encourage and enable adults to learn, improve their skills and enrich their lives" (DfES, 2002). Further steps towards the achievement of this goal can be made by building upon the analytical foundations we have discussed in this Report, in the directions indicated above.

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