VOCATIONAL ECONOMIC RATIONALE

In many cases of permanent disability or death, a lifetime loss of expected earnings results. A Vocational Economic Assessment defines the loss in terms of present value. This Vocational Economic Rationale presents both the philosophy and the methodology employed in these assessments. The method is used in cases of either partial or total disability. It is the standard employed by Vocational Economics, Inc., in conducting a Vocational Economic Assessment.

Introduction

The U.S. Supreme Court's decisions in *Daubert* (1993) and *Kumho* (1999) require that expert testimony meet the general tests of "reliability" and "relevancy." The Court provides flexible guidelines for determining the admissibility of expert evidence, noting that scientific evidence must be "grounded in the methods and procedures of science." The expert must employ the same level of intellectual rigor as he or she would outside the courtroom when working in the relevant discipline.

The U.S. Supreme Court, however, has recognized the inexact nature of assessments for lost earnings. In *Jones and Laughlin Steel v. Pfeifer* (1983) the Court stated that:

> By its very nature the calculation of an award for lost earnings must be a rough approximation. Because the lost stream can never be predicted with complete confidence, any lump sum represents only a "rough and ready" effort to put the plaintiff in the position he would have been in had he not been injured.

A Vocational Economic Assessment is a forecast of future expected earnings. In conducting the assessment, vocational and economic experts consider the unique characteristics of the individual being assessed in combination with relevant career development and economic theory. Experts apply population statistics to individuals to predict their lifetime earning streams. Statistical averages have long been accepted as a means for prediction – life expectancy, earnings, and others – and have long been accepted for use in the courts. No statistic, no matter how fine-tuned, can provide an exact predictor of an individual's future.

Earnings proxies and worklife expectancies are derived from *average* rates from various populations. Experts use available statistics about populations and apply them to meet the specifics of the case by considering how earnings or worklife expectancy statistics match the plaintiff's circumstances and characteristics. Data are used by persons who understand the principles on which they are based and the population to which they are applied.

The purpose of this Vocational Economic Rationale is to define the principles underlying assessments of lost earnings as well as the methodology employed in conducting a Vocational Economic Assessment.

Disability Issues

The presence of a disability is widely known to affect both earnings and worklife expectancy. This finding is documented in results from various surveys, including the Current Population

Survey (CPS), the Survey of Income and Program Participation (SIPP), and the American Community Survey (ACS)[1] from the Census Bureau, the National Health Interview Survey (NHIS) from the National Center for Health Statistics,[2] and the *N.O.D./Harris Survey of Americans With Disabilities*.[3] The disability effect is the cause of such events as the passage of the well-known Americans with Disabilities Act (ADA),[4] the existence of the Department of Labor's Office of Disability Employment Policy,[5] and the practice of rehabilitation counseling, just to name a few.

Defining Disability

Before measuring the effect of disability on earnings and employment, it is necessary to define what is meant by disability. Depending on the desired focus, different groups and surveys will define disability differently. The ADA, for instance, defines disability as existing in persons with a physical or mental impairment that substantially limits one or more of the major life activities. The Veterans Administration (VA) and the Social Security Administration each have their own definitions, which vary considerably. Males considered disabled by the VA but who do not meet any other criteria for work disability enjoy levels of employment comparable to males without a work disability, whereas individuals found to be disabled under Social Security law are unable to perform any type of substantial, gainful work activity.

A general definition of disability is provided by Haber (1967):

> Literally interpreted, disability refers to "loss or reduction of ability." Definitions in use in clinical studies, survey research, and administrative evaluations commonly accept the loss or reduction of capacity to engage in normative role activities as the central point of reference of disability, with an origin in impairments or functional limitations resulting from disease or injury.

Haber goes on to note that:

> *Disability* is distinguished from functional limitations by its relationship to the *required capacities* for the performance of normal roles and activities. Disability represents a loss or decrease in ability to respond to behavioral expectations as a result of impairments and functional limitations.

Given this basic definition, there are various surveys that provide disability data that can be useful for a calculation of lifetime earnings. Some of these are described in the sections that follow.

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[1] Data from all three surveys can be found on the Census Bureau website at http://www.census.gov/hhes/www/disability/disability.html

[2] One example is a study by Stapleton, et al. (1997) that accesses data from the NHIS. http://aspe.hhs.gov/daltcp/reports/eshcclit.htm

[3] http://www.nod.org

[4] http://www.usdoj.gov/crt/ada/adahom1.htm

[5] http://www.dol.gov/odep

Work Disability. One long-running study on disability, the Current Population Survey, uses a definition that is specific to persons with a work disability. The survey does not consider specific types of disability, but instead focuses on whether the individual has work-related limitations because of a physical or mental impairment that limits the individual in terms of performing work.

The CPS is the primary source of labor force characteristics for persons in the United States,[6] the source of the government's monthly unemployment rates that are widely quoted by the media. The CPS is used for a wide variety of purposes within the Federal government.

In March of each year since 1981, the CPS has been expanded to collect more information on income and employment. The *Annual Social and Economic Supplement* (the March Supplement) to the CPS provides earnings and employment data through expanded questions that specifically address work disability. The Census Bureau began publishing data on persons with a work disability in the 1980s (U.S. Census Bureau, 1983, 1989).

The Census Bureau defines work disability as existing when a person meets one or more of the following conditions:[7]

CPS Work Disability Criteria
Not Severe
Identified by the March Supplement question "Does anyone in this household have a health problem or disability which prevents them from working or which limits the kind or amount of work they can do?"
Identified by the March Supplement question "Is there anyone in this household who ever retired or left a job for health reasons?"
Received VA disability income in previous year.
Severe
Identified by the core questionnaire as currently not in the labor force because of a disability that is expected to last for at least the next six months.
Identified by the March Supplement as a person who did not work at all in the previous year because of illness or disability.
Under 65 years old and covered by Medicare in previous year.
Under 65 years old and received Supplemental Security Income (SSI) in previous year.

People who say yes to any of the Not Severe questions, but no to all of the Severe questions are classified as being not severely work disabled. Those who say yes to any of the Severe questions are classified as being severely work disabled.

Other Sources of Disability Data. A second definition of disability emanates from the long form of the 2000 Decennial Census, in which the US Census Bureau asked a series of disability-related questions. The Census Bureau uses the same questions in its American Community Survey (ACS), which has been taken since 2000. Through 2004, it had an annual sample size of

[6] http://www.bls.census.gov/cps/overmain.htm
[7] http://www.census.gov/hhes/www/disability/disabcps.html

more than one million persons per year, which made it the largest survey of disability data in the world. With full implementation in 2005, it began regular surveys of every county in the United States with an annual sample size of five million persons. The Bureau expects that the ACS will replace the long form of the Decennial Census in 2010.

In the two surveys, persons are defined as having a disability based on the following:

ACS and 2000 Decennial Census Disability Criteria
Physical Disability – Identified as having a long-lasting condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying
Cognitive Disability – Identified as having difficulty learning, remembering, or concentrating because of a physical, mental, or emotional condition lasting 6 months or more
Sensory Disability - Identified as having long-lasting blindness, deafness, or a severe vision or hearing impairment

The ACS also surveys two other forms of disability – self-care (difficulty dressing, bathing, or getting around inside the home) and going outside the home (difficulty going outside the home alone to shop or visit a doctor). These two can be used in combination with the physical, cognitive, or sensory disabilities described above to identify persons with severe disability. These definitions do not consider work disability, but instead focus on specific types of disability.

In addition to those already mentioned, the Bureau gathers data on persons with a disability in its Survey of Income and Program Participation (SIPP). Disability data can also be found in some worthy non-Census surveys, most notably the National Health Interview Survey (NHIS)[8] and the Panel Study of Income Dynamics.[9] These surveys gather data on a variety of potentially-disabling conditions and activity limitations.

The Effect of Disability

Two facts exist for persons with a disability. The first is that on average, when such persons work year-round, full-time, they earn less than counterparts without a disability. Second, they experience lower levels of labor market participation and employment, which when considered in aggregate, produce lower levels of worklife expectancy than those without a disability. These two facts combine to produce a probable reduction of lifetime expected earnings for persons with a disability.

These facts are supported by data from the CPS and the SIPP that are available on the Census website[10] and in research conducted by numerous nonforensic researchers. McNeil (2000), for instance, used data from the March 2000 CPS to explore employment rates of persons with a work disability. Also using CPS data, Yelin (1996) and Gibson (2000) have shown that employed persons with a work disability, both not severe and severe, are more likely to become unemployed than persons without a work disability. If unemployed, they are less likely to find

[8] http://www.cdc.gov/nchs/nhis.htm
[9] http://www.isr.umich.edu/src/psid/index.html
[10] http://www.census.gov/hhes/www/disability/disability.html

employment. These differences become more profound with age, making it more difficult to compete with their counterparts without disability and further reducing worklife expectancy.

In work funded by the US Department of Education, National Institute on Disability and Rehabilitation Research, researchers at Cornell University, including Burkhauser (2000) and Houtenville (2000), have published multiple papers using CPS and other survey data that explore the reduction in earnings and employment for persons with a disability. Other research includes a study by McCollister and Pflaum (n.d.) that uses the NHIS to study the effects of back pain on worklife expectancy and earnings, and another by Thomas DeLeire (2000) that uses the SIPP to address the continuing negative effects of disability following the passage of the Americans with Disabilities Act. In fact, all known research on the subject shows that disability negatively impacts earnings and employment rates.

If the individual being assessed has a permanent, medically determinable cognitive or physical impairment, the expert considers the functional limitations associated with that impairment. If it is further determined that the person meets the definition of disability, other factors specific to the individual are then considered. These may include age, education, work history, earning history, general learning ability, transferable skills, present employment status, and labor market access. If the expert determines that the disability will negatively impact the individual's ability to work and earn money, the degree of the loss is assessed.

Earning Capacity

The first decision point in a Vocational Economic Assessment is defining the present value base dollar figures that reasonably represent pre- and post-injury annual earning capacities.

Defining Earning Capacity

Earning capacity represents an individual's ability or power to earn money. It is the sum total of what one brings to the marketplace intellectually and physically. Education, skills, general learning ability, and the like comprise intellectual capacity. Ability to perform the physical activities associated with various jobs constitutes physical aptitude. These physical and intellectual attributes comprise human capital, and it is this human capital that enables a person to produce cash flows over a worklife.

Thus, if a person sustains a closed head injury that limits the ability to focus on a task, remember details, or relate to others, that person may sustain an impairment of mental ability. If, on the other hand, the person sustains a permanent injury limiting the ability to lift, climb, balance, stand, sit, etc., then physical ability is reduced. What remains to be determined in a case of permanent impairment is whether or not the injury in question has reduced or destroyed earning capacity. If so, that individual's earning capacity absent disability requires assessment and comparison with the earning capacity with disability.

Assessing Earning Capacity

In litigation, the issue is whether or not a permanent injury will affect an individual's ability to work and earn money over a lifetime. Earning capacity is the usual standard for defining lost earnings. Earning capacity is sometimes defined as the "high end" of what a person can earn, in

terms of both the annual salary and the number of years worked over a lifetime. The courts, however, usually do not accept damage arguments that would push the concept of earning capacity beyond the bounds of common sense. Our approach in assessing earning capacity is to look at the individual's reasonably expected earnings.

The process of analyzing a case involves answering a series of questions, with each question having several options. Through the process of answering these questions, an individual's earning capacity will emerge. In assessing an individual's annual earning capacity, the choices are to use either actual earnings or a proxy. In most instances, a mature worker has actual earnings that are congruent with average lifetime earning capacity. The converse is true for a younger worker. Younger workers rarely have earnings that reasonably represent an average lifetime earning capacity.

Proxy earnings may be education or labor market specific, as well as gender, disability, and/or age specific. The U.S. Census Bureau provides national average earnings of individuals by gender, level of educational attainment, and by disability status (U.S. Census Bureau, 1995 forward, 1998 forward). These data can be combined with data available from the U.S. Bureau of Labor Statistics[11] to adjust the national figures to state-specific dollars. In addition, Census provides national and local information pertaining to the average earnings of workers by gender, occupational grouping, and disability status (U.S. Census Bureau, 1990, 2000). These sources of information provide a basis for defining earning capacity for persons with and without disability.

Earning capacity is more commonly reduced, rather than destroyed, as a function of a disability. The post-injury earning capacity of a person with a disability is frequently represented by a proxy. The earning capacity associated with the proxy is often greater than the actual earnings of the individual with a disability. Many persons who are recently disabled have not yet begun employment or, if working, are earning at levels less than the amount that would reasonably represent their average lifetime earning capacity, stated in terms of present value.

Older workers with limited education who have performed heavy physical labor and who are disabled are more likely than younger workers to experience a complete destruction of earning capacity as a result of disability. A younger worker with a similar occupational history and a comparable disability would be relatively more likely to experience a reduction of lifetime earning capacity. Total destruction of earning capacity typically occurs among older workers who are no longer capable of performing their usual and customary work or those who are severely or catastrophically impaired, regardless of age.

Once the expert establishes annual earning capacity, an appropriate fringe benefit figure and worklife expectancy are applied to project lifetime earnings. Either actual fringe benefits or a statistical average is used. Fringe benefits for many workers significantly exceed the statistical average and for the mature worker, actual fringe benefits are sometimes used to project a lifetime stream of earnings.

[11] http://www.bls.gov/cew

Worklife Expectancy

The second decision point in a Vocational Economic Assessment is definition of pre- and post-injury worklife expectancies.

Defining Worklife Expectancy

Worklife expectancy is a statistical average, derived by summing a series of joint probabilities of life, participation, and employment (LPE) from a given age through age 89.[12] The worklife methodology used in Vocational Economic Assessments was introduced as the LPE method by Brookshire and Cobb (1983) and refined by Brookshire, Cobb, and Gamboa in 1987 to include persons with a work disability. With this methodology, a person's earning capacity is reduced by the probability of being alive and employed.

This methodology can be applied to data from various surveys in order to calculate disability-related worklife expectancy. Using CPS data, worklife expectancy tables for persons with a work disability were first published in 1987 (Gamboa) and updated periodically. The latest edition includes worklife expectancy statistics for persons with a work disability as well as for those with a physical or cognitive disability (Gamboa and Gibson, 2006; US Census Bureau, CPS: 1992 to 2001, 1998 forward; ACS: 2001 to 2004).

The notion of discounting an individual's future earning capacity by the probability of being alive and employed first appeared in a 1982 decision (*O'Shea v. Riverway Towing*) in an opinion written by Richard A. Posner. In commenting on the plaintiff's before injury expected earnings, he notes:

> If the probability of her being employed as a boat's cook full time in 1990 was only 75 percent, for example, then her estimated wages in that year should have been multiplied by .75 to determine the value of the expectation that she lost as a result of the accident; and so with each of the other future years.

In terms of assessing after injury expected earnings, he describes the following:

> Here is a middle-aged woman, very overweight, badly scarred on one arm and one leg, unsteady on her feet, in constant and serious pain from the accident, with no education beyond high school and no work skills other than cooking, a job that happens to require standing for long periods which she is incapable of doing. It seems unlikely that someone in this condition could find gainful work at the minimum wage. True, the probability is not zero; and a better procedure, therefore, might have been to subtract from Mrs. O'Shea's lost future wages as a boat's cook the wages in some other job, discounted (i.e., multiplied) by the probability-very low-that she would in fact be able to get another job. But the district judge cannot be criticized for having failed to use a procedure not suggested by either party. The question put to him was the dichotomous one, would she or would she not get another job if she made reasonable efforts to do so?

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[12] An explanation for the LPE methodology is provided on the Vocational Economics website (http://www.vocecon.com/technical/ftp/data/lpecalc.pdf).

> This required him to decide whether there was a more than 50 percent probability that she would. We cannot say that the negative answer he gave to that question was clearly erroneous.

The opinion reflects a "better procedure" for estimating future expected earnings, that of utilizing probability statistics to better define future expected earnings in assisting the trier of fact. The O'Shea case involves a woman with a severe work disability. The probability of employment for a 57-year-old female high school graduate with a severe work or physical disability is .049 or .120, respectively, compared to a probability of employment of .607 or .636 for a female of the same age and education with no disability (Gamboa and Gibson, 2006).

Assessing Worklife Expectancy

Because worklife expectancy is a statistical average, exercising professional judgment is essential when defining probable worklife expectancy in years. Worklife expectancy is gender or career pattern specific, as well as education, age, and disability specific.

It is important when using a worklife expectancy to consider the individual's work history. Typically, males have worklife expectancies that are greater than females. However, a specific female may demonstrate a work pattern that is more like that of an average male of the same age and level of education than that of a female. Similarly, some males may exhibit a pattern of work that is unlike that of an average male with a similar age, education level, and disability status. The specifics of each individual must be considered when assigning a worklife expectancy.

The disabled population varies significantly in terms of severity of disability, which in turn influences access to various occupations in the labor market. This variance is taken into account with worklife expectancy averages for persons with disabilities. When using data specific to people with work disabilities, for instance, these averages are of three types: the average for all persons with work disabilities, the average for persons with severe work disabilities, and the average for persons whose work disabilities are not severe. Individuals who meet the definition of work disability and who are employed or who have access to a significant portion of jobs in the labor market may be considered not severely disabled. Individuals who are highly unlikely to find or maintain employment are likely to be totally disabled or to meet the definition of severe work disability. With data from the 2000 Decennial Census and the American Community Survey, averages can be looked at by type of disability, such as physical or cognitive, which would be appropriate for those persons meeting the definitions noted previously. Through isolation or combination of these varying disability types, an analysis can be customized to meet the specifics of a particular case.

Present Value of Future Lost Earnings

The last decision point in a Vocational Economic Assessment is calculation of future earnings in terms of present value. Present value in a litigation context refers to the amount of money needed today which, when prudently invested, will replace a future stream of lost earnings. The present value sum plus accumulated interest should provide periodic cash payments to replace the expected lost earnings over the plaintiff's worklife expectancy, with no shortfall or overage.

Determination of the present value of a wage stream is dependent upon two key rates: the rate of expected annual increases in the plaintiff's compensation and the rate of return at which to invest the lump-sum award. Relying only upon average growth rates for wages when projecting future earnings will underestimate compensation growth because an employee's total annual compensation consists of two components: wages and fringe benefits. Over the past 50 years, fringe benefits have grown considerably faster than wages, resulting in an average annual increase in total compensation roughly one percent larger than the growth rate in wages alone. Therefore, average growth rates in total compensation are usually more relevant for computing present value than the average growth rate for wages alone.

In addition to growing the economic loss to reflect future increases in compensation, an expert needs to discount the future value losses to reflect the interest to be earned by conservative investment of the lump-sum award. If plaintiffs invest to replace future losses in labor market compensation, then a safe, short-term government treasury, such as a 91-day Treasury Bill, is a logical investment vehicle because it provides maximum return on investment with minimal inflation risk and no default risk. In addition, it permits withdrawal every 91 days to offset lost compensation without penalty or transaction cost.

The United States Court of Appeals for the Ninth Circuit addresses this issue in *Trevino v. United States* (804 F.2d 1512, 1986). When discussing the need for a discount rate based on 'the best and safest investments,' the court states in a footnote that:

> The reason that risk-free investments are preferred to more remunerative but riskier investments is that the plaintiff should not be faced with the burden of becoming a full-time broker merely to safeguard his award.

Once an expert identifies the appropriate data regarding growth and interest rates, the main issue is the relationship between the two, or the net discount rate. When computing present value, a range of net discount rates is possible: a positive net rate, a pure offset, or a negative net rate. With a pure offset, growth and interest rates are set equal to one another. With a positive net rate, interest rates are higher than growth rates and will result in a present value figure that is lower than that derived by using a total offset. With a negative net rate, growth rates are higher than interest rates and will result in a present value figure that is higher than that derived by using a total offset.

Examining data over a long period, forty or fifty years, is generally preferred as it considers a wide array of past economic conditions that could affect growth and/or interest rates in the uncertain future. *Trevino* supports use of a long-term period in estimating future rates. When discussing the use of what it considered an unrepresentative, 30-year timespan, the court notes:

> We cannot deny history, nor can history provide an always reliable basis for predicting the future. However, we can base our estimates on long time periods that will diminish the effect of shorter aberrational periods. Fluctuations that are great for a short time span are less dramatic, and skew results less, when they are seen as part of a longer period. We have no confidence in the ability of experts, the district court, or this court, to predict inflation or interest rates over the period of Sophia's life other than by extrapolating from the past.

Long-term interrelationships between compensation growth and interest rates show no consistent trend over the last 50 years. Depending on the period examined, the relationship would call for a net growth rate in some years and a net discount in others. Overall, the average long-term return on a 91-day Treasury Bill has been roughly equal to average compensation growth rates. The use of a pure offset method reflects this overall relationship and acknowledges the uncertainty in the future relationship between growth and interest rates.

Summary

The attached Vocational Economic Assessment conforms to the principles identified in this Vocational Economic Rationale. The lifetime loss of earning capacity is derived through a five-step model involving a definition of pre-injury earning capacity, pre-injury worklife expectancy, post-injury earning capacity, post-injury worklife expectancy, and a present value calculation. Each step in the assessment pertaining to lifetime earning potential is geared to the unique traits and characteristics of the individual. The present value of the lost earnings is an estimate of the measurable economic damages sustained by the individual.

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