LITIGATION ECONOMICS DIGEST

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A LETTER FROM THE EDITORS

The National Association of Forensic Economics (NAFE) was formed by a group of interested forensic economists in 1986. The following year the organization published the initial issue of the *Journal of Forensic Economics*. NAFE has continued to publish that journal since 1987, and its subscriber base has grown considerably during those years. John Ward and Jerry Olson deserve considerable credit for developing the quality of that journal.

At the 1994 NAFE Board of Directors Meeting, the Board voted in favor of expanding the type of services the organization should make available to its members. As a result of that decision NAFE now operates a computer bulletin board, an e–mail service, and a web site on the Internet. In addition, the board authorized the publication of a new journal, which has been christened the *Legal Economics Digest*, with the obvious acronym of "LED."

The purpose of the *LED* is to both expand the types of information provided to the NAFE membership, and to enlarge the breadth of topics available to authors. The *LED* will contain regular articles on new data available for economic research, the current status of work done by the Ethics Committee, and evaluations of computer software available for forensic economists.

The enlarged breadth of topics will include some case studies, and some "how–to" articles, as well as typical articles that appear in the *JFE*, but with more emphasis on practical topics and less on theory. We hope to provide articles on a wide range of issues in the field of forensic economics, including commercial litigation, employment litigation, securities fraud, environmental litigation, and valuing financial assets and businesses, as well as the traditional issues covered in the *JFE*.

We have described above our initial expectations for the journal. However, our foremost desire is to provide information of interest to the NAFE membership. To that extent we will appreciate suggestions from the readers of the *LED* as to the future content of the publication.

Carroll B. Foster

Robert R. Trout

A LETTER FROM THE PRESIDENT

We are pleased to present this premier issue of the ***Litigation Economics Digest***, a new professional journal offered by the National Association of Forensic Economics (NAFE), devoted to practical litigation issues of interest to forensic economics practitioners.

In 1986, NAFE's charter membership included 105 American and Canadian Universities, and members with a diversity of professional interests in 44 states. The ***Journal of Forensic Economics*** was initiated in 1987 to serve as a forum for NAFE members, and others, to exchange ideas about forensic applications of academic economics research and techniques.

Our membership has grown over the years, with a roster that now includes members from all 50 states, Puerto Rico, and the Virgin Islands, and foreign locations ranging from Hong Kong to Europe to South Africa. While the majority of our NAFE members are economists working inside and/or outside of academia, our membership list also includes attorneys, accountants, business valuation specialists, financial experts, pension valuation experts, psychologists, psychiatrists, vocational rehabilitation specialists, and expert forensic practitioners from other professional disciplines.

Given this growth in NAFE's membership, it has become increasingly evident that a second professional journal, focusing on practical issues encountered in forensic economics work, as a complement to the academic focus of the ***Journal of Forensic Economics***, would offer a useful service to the forensic economics community.

We believe that the ***Litigation Economics Digest*** will provide that service.

John Phillips Adams, Jr.
President
NAFE

NOTES

The ***Litigation Economics Digest (LED)*** specializes in presenting applied articles in the discipline of forensic economics, and presents useful consulting information to the forensic practitioner.

The *LED* is published bi-annually at a subscription price of $50 a year for NAFE members, and $60 for non-members. Subscriptions should be sent to the National Association of Forensic Economics, P. O. Box 30067, Kansas City, MO 64112.

We are now soliciting articles in forensic economics for publication in future issues. The next issue will be Spring 1996. The *Digest* will usually contain articles in the following areas: Applied Forensic Economics, Law and Economics, Data Sources, Computer Programs and Ethics in Economics.Those interested should forward two copies of their article, along with any other pertinent information, to the Editorial Office at the address shown below.

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While the *LED* does not accept advertisements of consulting services, we will accept advertisements concerning computer software, books and consulting support services. Advertising rates are available upon request.

The National Association of Forensic Economics expresses its thanks to the College of Arts and Sciences and the Department of Economics, University of Missouri-Kansas City, for technical support in producing the *Litigation Economics Digest.*

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Loss Of Earning Capacity In The Case Of A Farmer

Ralph J. Brown*

Introduction

In wrongful death and personal injury cases the economist is often requested to provide expert analysis and testimony on the loss of earnings and earning capacity.[1] In performing this analysis, the economist frequently relies on the past earnings record as one means of determining pre-injury earning capacity of the injured or deceased. In the case of the wage earner, the record of past wages and hours worked is often used as evidence of pre-injury earning capacity. Wages at the time of the appraisal may be adjusted to reflect wage increases that would have reasonably occurred from the time of the accident to the date of the appraisal or trial. This base earnings figure is then projected into the future taking into a account probable earnings increases and reduced to present value to determine the present value of lost earning capacity.

While this method is usually straight-forward in the case of a wage earner it is considerably more difficult in the case of a self-employed person such as farmer. The net farm profit or (loss) figure shown as the Farm Income and Expense (Schedule F) of the Federal Income Tax return is often presented as evidence of past earnings. However, economists immediately recognize that there are problems with using this data as a measure of lost earnings or lost earning capacity. First, the net farm profit (loss) numbers shown on the tax return require considerable adjustment before we have an accurate measure of net farm income. Second, these income figures reflect the returns to capital assets as well as the returns to labor and management. This requires an adjustment of the net income statement of the farm enterprise to provide an estimate of the return to capital and labor. This imputation method for calculating the returns to labor and management requires assumptions about the normal return on farm assets and opportunity cost of unpaid family labor.

An alternative method of determining the loss of earning capacity of a farmer is the opportunity cost approach. This method requires estimating the market value of the farmer's labor and management services. This requires knowledge of the farmer's labor and management inputs, usually in terms of hours worked, and placing a market value on these contributions.

It is the purpose of this article to examine the issue of estimating the loss of earnings and loss of earning capacity in the case of a self-employed farmer. The discussion is also applicable to nonfarm personally managed businesses. This article is organized as follows. In section II the issue of us-

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[1]Throughout this paper a distinction is made between loss of earnings and loss of earning capacity. Earnings is defined as the actual earnings, while earning capacity reflects the earnings capable of being earned based on the age, education, occupation, experience, and physical and mental condition of the person

ing Farm Income and Expense (Schedule F) information to measure the loss of earnings and earning capacity will be examined. In section III alternative methods of estimating the loss of earning capacity in the case of a farmer will be examined. These methods will rely on data relating to labor inputs in the farming enterprise and their market values. Section IV will discuss the issues in cases of personal injury, Section V will discuss other applications of the model and possible deviations, and Section VI will provide a summary and conclusions.

Use Farm Tax Returns as a Measure of Damages

The economic variable of importance in a personal injury or wrongful death case is a measure of the pre-injury earning capacity of the claimant. In the case of a farmer, this is normally represented by the returns to the labor and management inputs in the farming enterprise. In most cases, the first financial information concerning the injured or deceased farmer that the attorney provides is the farm tax return. This financial schedule provides information concerning the farm income from sale of livestock, crops, agricultural program payments, and custom hire income and subtracts farm expenses to determine net farm profit. While this statement provides important information about the farming enterprise it is not sufficient or in the appropriate form to provide information about the profitability of the farm enterprise or the returns to labor and management. Consequently, the farm tax return must be adjusted to obtain an accurate economic measure of the farm enterprise.

In order to calculate the pre-injury earnings of the claimant as a farmer involves a series of calculations. The calculations are as follows: (Edwards, 1987)

1. calculation of cash net farm income,
2. calculation of accrual net farm income,
3. adjustment of accrual net income for the opportunity cost of assets employed in the business.

A. Calculation of Cash Net Farm Income and Accrual Net Farm Income

Cash net farm income shows the amount of cash available for capital purchases, debt reduction, income taxes, and family living expenses. The steps in calculating cash net farm income are presented in Table 1. Total cash farm income (Item 1) represents income derived from the sale of livestock, livestock products, crops, government payments, refunds, crop insurance proceeds, and other miscellaneous income sources. Adjustments to income (Item 2) represent changes in inventory values of feed, grain, market and breeding livestock. This adjustment takes into account production that is not sold in the same year. Home used production (Item 3) represents the value of farm products produced but consumed by the family rather than sold or added to inventories. Total feed and livestock purchases (Item 4) is an adjustment for the addition to inventories that arise due to purchases. Gross product or value of farm production (Item 5) is calculated as the sum of Items 1-3 less Item 4.

Table 1. Calculation of Cash Net Farm Income and Accrual Net Farm Income

1. Total Cash Farm Income (Sales of livestock and crops, patronage dividends, government payments, machine work)
2. Adjustments to Farm Income (Changes in inventories, accounts rereceivable, and unpaid patronage dividends)
3. Home used production
4. Total Feed and Livestock Purchases
5. Gross Value of Farm Production (1+2+3-4)
6. Total Cash Expenses (Chemicals, fertilizer, seeds, farm taxes, veterinary fees, etc.)
7. Adjustments to Expenses (Changes in feed and supply inventories, prepaid expenses, and investment in growing crops)
8. Depreciation (based on estimate of actual service life of depreciable asset)
9. Total Expenses (6+7+8)
10. Cash Net Farm Income (1-4-6)
11. **Accrual Net Farm Income (5-9)**

Total cash expenses (Item 6) represents all cash expense involved in the operation of the farm enterprise. Adjustments to expenses (Item 7) represent changes in the inventory of growing crops, commercial feed and supplies, changes in prepaid expenses, accounts receivable, farm taxes due, and accrued interest and depreciation. Depreciation (8) is an adjustment for decline in asset values due to obsolescence or use. These will have to be estimated based on the expected service life of the asset. Cash net farm income (Item 10) is estimated as total cash farm income (Item 1) minus total feed and livestock purchases (Item 4) minus total cash expenses (Item 6).

The second variable that must be computed is the net farm income as calculated by the accrual or inventory method. This figure provides information about the economic returns to the farm business that includes returns to labor, management, and the net worth in land and other farm assets. Accrual net farm income (Item 11) is estimated as gross value of farm production (Item 5) minus total expenses (Item 9).

B. Calculation of Return to Labor and Management

The return to the labor and management contribution of the claimant may be computed by adjusting the accrual net farm income measure for the accrued interest expense, opportunity cost of assets, and the opportunity cost of unpaid labor contributed by other family members. This procedure is presented in Table 2. The return to labor and management (Item 6) is computed by adding back the interest expense (opportunity cost of borrowed capital) (Item 2), deducting the opportunity cost of long-term (item 3) and other farm assets (Item 4), and opportunity cost of labor supplied by other unpaid workers (usually family members). Adding back interest expense places the farm enterprise on a debt-free basis. The opportunity cost of long-term assets is based on the return that could be received from the invest-

ment of the market value of these assets in an alternative investment with similar risk and liquidity characteristics. Studies on the returns to long-term farm assets indicate an average return of approximately 3.5 percent. The opportunity cost of unpaid labor supplied by other family members is measured at a wage rate and hours that reflects the cost of hiring similar labor in the farm labor market.

The pre-injury return to farm labor and management skills of the injured or deceased can be computed on a year by year business. Because of the volatility of farm income and expenses the annual figures are often averaged over a three or five year period to smooth the series.

C. Comments of the Return to Labor and Management

There are several problems with this method of establishing a measure of pre-injury earning capacity. First, the return to labor and management computed in this manner is a measure of *earnings* but not a measure of *earning capacity*. In most states the measure of damages in personal injury and wrongful death cases is loss of earning capacity not loss of earnings. The loss of earnings figure calculated by this method is a doubtful measure of earning capacity. The returns to labor in a farming enterprise can vary on an annual basis due to a large number of factors. *Changes in farm output and input prices, changes in the weather, changes in the government farm program, changes in farm taxes (property taxes), interest rates, changes in the rate of obsolescence due to technological change and a whole range of other variables will directly affect the returns to labor and management.*

At times, the returns to labor and management could be negative or extremely low or extremely high due to factors that have nothing to do with labor effort, productivity, or market value of the farmer's labor contributions. Therefore, even though the calculation of the returns to labor and management is an interesting and often enlightening exercise it contributes little to a greater understanding of the loss of earning capacity. It is not unusual to find very low or even negative returns to labor and management for extended periods of time in some farm enterprises. Consequently, using net returns to farm and labor and management inputs can provide unreasonable estimates of earning capacity. The next section will examine alternative methods of calculating earning capacity based on the concept of opportunity costs

Table 2. Calculation of Return to Labor and Management

1. Accrual Net Farm Income
2. Interest Expense for Year (Interest expense + ending accrued interest—beginning accrued interest)
3. Opportunity cost of long-term farm assets (3.5% x market value of long-term assets)
4. Opportunity cost of other farm assets (6% x market value of other farm assets)
5. Opportunity cost of labor by other unpaid family members.
6. **Return to labor and management. (1+2-3-4-5)**

Calculation of Loss of Earning Capacity Using the Opportunity Cost Approach

An alternative method of measuring earning capacity is based on the opportunity cost approach. That is, what would the type of labor provided by the injured person command in the labor market. This approach could be conceived as what the injured party could command by selling their services to others in the farm labor and farm management market or alternatively what it would cost to replace the lost services by hiring someone to perform these same services. This approach requires knowledge of the farming enterprise and the type of labor provided by the injured. It also requires knowledge of the value of those services in the labor market. The determination of hours worked by the injured can be determined in two different ways.

A. Value of Time Approach

The simplest approach is to determine the hours worked in the farming enterprise through an in-depth interview with the injured person or other knowledgeable person in the case of a wrongful death case. This interview would determine the type of farming operation, e.g., livestock (hogs, cattle, sheep, dairy), crops, etc. The normal hours worked by the injured person by day of week and month of the year would be determined. It is not uncommon for farmers to testify that they worked in excess of 3,000 hours per year. One problem with this approach is to determine the extent that these hours are in the nature of farm labor or in the nature of farm management. Obviously, the wage rates differ significantly between these two categories of labor.[2] This can be a real problem in that while the farmer is providing farm labor that could be hired at a lower wage rate he is also thinking about farm management problems. Because of this joint production or simultaneity problem it is inappropriate to value all of the farm hours worked at either the farm labor wage rate or the farm manager wage rate.

One approach to this problem is to attempt to segregate farm labor hours and farm management hours. The hours worked in obviously laboring activities, e.g., doing chores, operating farm equipment, etc. would be valued at the farm labor wage rate and the hours actually spent analyzing books, planning, meeting with bankers, attending management seminars, etc. could be valued at the farm manager wage rate. Unfortunately, this approach does not completely solve the simultaneity problem. Another approach recognizes that farm managers often charge a fee for their services based on some percentage of gross receipts or farm assets under management. The value of farm management services using this approach could then be added to the farm labor hours valued at the farm labor wage rate to determine the total value of injured farm labor and management services.

B. Labor Requirements Approach

An alternative approach to the estimate of the labor input requirements is the use of data on the typical labor requirements by type of farming en

[2]For example in South Dakota the prevailing farm laborer wage rate is $6.50 per hour while the prevailing wage for a farm manager is $12.15 per hour See South Dakota Department of Labor (1993).

terprise. In most states, land grant institutions of higher education through their cooperative extension services publish production cost estimates for livestock and crop enterprises. These cost estimates typically reflect average management and commonly used technology. Of interest to the forensic economist are the estimates of labor requirements by type of farm enterprise.

Examples of labor requirements by type of livestock and crop enterprises are presented in Tables 3 and 4 on the preceding page. Table 3 presents the average number of farm labor hours by type of livestock enterprise. Depending on the study, some of these studies include farm labor and management time while other include only farm labor time. Use of these figures requires knowledge of this distinction. Table 4 presents labor requirements by crop enterprise. The farm labor/farm management distinction must also be made for the crop enterprises.

Table 3. Labor Requirements by Livestock Enterprise

Type of Enterprise	Labor Requirements
Swine	
Farrow-finish, pasture	15 hours/litter
Farrow-finish, total confinement	12 hours/litter
Farrow-finish, partial confinement	15 hours/litter
Feeder pig production, partial confinement	0.75 hours/head
Beef	
Yearling steers, hay or silage	2 hours/head
Steers calves, hay and silage	3 hours/head
Yearling heifers, hay and silage	1.5 hours/head
Backgrounding steer calves, winter	1.25 hours/head
Backgrounding steer calves, summer	0.25 hours/head
Cow-calf, calves sold	8 hours/cow unit
Cow-calf, calves fed	9.5 hours/cow unit
Sheep	
Ewe flock, early lambs	6 hours/ewe unit
Ewe flock, late lambs	4 hours/ewe unit
Feeder lamb	1.5 hours/head
Dairy	
12,000 lbs milk/cow	60 hours/cow unit
15,000 lbs milk/cow	65 hours/cow unit
18,000 lbs milk/cow	70 hours/cow unit
21,000 lbs milk/cow	75 hours/cow unit

Source: John Lawrence, "Livestock Enterprise Budgets for Iowa-1993," Iowa State University, University Extension, March 1993.

Table 4. Labor Requirements by Crop Enterprise

Type of Enterprise	Labor Requirements
Corn following corn	3.4 hours/acre
Corn following soybeans	3.0 hours/acre
Corn silage following corn	5.0 hours/acre
Soybeans following corn	2.6 hours/acre
Hay production-seeding oat companion crop	4.0 hours/acre
Hay production-seeding preplant herbicide	3.3 hours/acre
Hay production-alfalfa or alfalfa-grass hay	1.33 hours/acre
Maintaining grass pastures growing practices	0.5 hours/acre
Maintaining grass pastures fence maintenance	1.0 hours/acre

Source: Mike Duffy, "Estimated Cost of Production in Iowa," Iowa State University, University Extension, November 1992.

C. A Hypothetical Example

A hypothetical example may illustrate the labor requirements approach. Assume we have a farmer who is totally disabled or deceased who had the following farm enterprise:

1. 30 sows in a farrow-finish, partial confinement operation, 2 litters per year
2. 100 unit cow-calf operation
3. 250 acres of pasture
4. 320 acres corn/soybean rotation.
5. Estimated hours working in the farm operation 3,320 per year. Estimated labor/management breakdown is 90%/10%.

The labor requirements for this particular operation are as shown in Table 5. As shown, total labor requirements in this type of farm enterprise is 3,121 hour per year. Based on consultation with farm management specialists these hours are approximately 90 percent farm labor and 10 percent farm management hours. The farm labor hours of 2,809 hours per year are valued at $6.50 per hour[3] or $18,258 per year.

The farm management contribution may be valued using three different methods. Method 1 values the farm management contribution based on the adjusted gross income of the enterprise. The adjusted gross income is defined as sales less purchases of feeder animals and feed. As indicated by Bennett (1990) professional farm managers typically charge 7 to 10 percent of adjusted gross income as a management fee. Method 2 values the farm management contribution based on the average capital managed. The average capital is the sum of the value of real estate, average machinery, and value of breeding stock. Using this method professional managers typically charge 1.5 to 2.5 percent of the average capital under management, (Bennett, 1990). A third method of computing the management contribution is to add 50 percent to the hours of labor based on the budget figures and value these at the laborer wage rate.[4]

[3]This is the prevailing farm labor wage rate in Iowa, Minnesota, and South Dakota at this time.
[4]This is the rule of thumb method of calculating labor and management contributions of a farmer as used by some farm management specialists. This suggestion was provided by Mike Duffy, extension economist at Iowa State University.

Table 5. Labor and Management Requirements for Hypothetical Farm Enterprise

Labor Requirements

1. 30 sows in a farrow-finish, partial confinement operation, 2 litters per year

   900 hours/year = 30 sows x 2 litters x 15 hours per litter

2. 100 cow-calf fed operation

   950 hours/year = 100 cow units x 9.5 hours per cow unit

3. 250 acres of pasture

   375 hours/year = 250 acres pasture x 1.5 hours per acre

4. 320 acres corn/soybean rotation.
   480 hours/year = 320 acres corn x 3 hours per acre x 0.5 per year
   416 hours/year = 320 acres corn x 2.6 hours per acre x 0.5 per year

Total Hours per Year = 3,121 hours per year.
Total Farm Labor Hours per Year = 2,809 hours per year.(90% farm labor)
Farm Labor Contribution at $6.50 per hour = $18,258 per year.

Farm Management Requirements

Method 1. Adjusted Gross Income (Sales - purchased feeder animals and feed) x 8.5%.
Farm Management Contribution = $100,000 x .085 = $8,500 per year.
Method 2. Average capital managed (real estate + machinery + breeding stock) x 2%.
Farm Management Contribution = $500,000 x .02 = $10,000 per year.
Method 3. 0.5 X total hours worked X farm labor wage rate,
Farm Management Contribution = 0.5 x 3,121 hrs x $6.50 = $10,143.

Total Farm Labor and Management Requirements

	Labor	Management	Total
Method 1:	**$18,258**	**$ 8,500**	**$26,758**
Method 2:	**18,258**	**10,000**	**28,258**
Method 3.	**18,258**	**10,143**	**28,401**
Average	**$18,258**	**$ 9,548**	**$27,806**

As shown in Table 5, the farm labor and farm management contributions are valued are valued using three different methods of valuing the farm management contribution. The gross receipts method values farm management at $8,500 per year. The net assets managed approach values farm management at $10,000 per year and the rule of thumb 50% of farm labor approach yields a farm management value of $10,143 per year. In this particular case, the three methods of measuring loss of farm labor and management services provided similar results.

Estimation of the loss of earning capacity in the case of a self-employed farmer is more difficult than the measure of the loss of earning capacity in the case of a wage earner. However, utilization of the opportunity cost approach appears to be the most accurate and defensible approach.

Special Problems in Personal Injury Cases

In personal injury cases the farmer is often partially disabled but continues to farm, albeit at a reduced rate. For instance, due to the injuries the farmer may work fewer hours per day and have to reduce the size of the farming operation. Once again, several methods may be used to measure the loss of earning capacity. The method that relies on the farm income statements involves the estimation of lost revenues less variable expenses to estimate lost income. For example, assume the injured farmer must reduce his hog operation from 30 sows to 15 sows. The lost revenues would represent the fewer pigs sold because of the reduction in the number of sows farrowing. Deducting the variable expenses associated with producing these pigs yields the lost earnings. As previously stated in Section II above, the problem with this approach is that it measures lost earnings from this particular farming enterprise but it does not necessarily measure the loss of earning capacity.

The alternative approach to measuring the loss of earning capacity is to measure the lost hours due to the reduced capacity for work. In the case of the hog farmer this would involve a loss of 450 hours per year using the direct requirements approach. Valued at $6.50 per hour the annual loss of earning capacity would be $2,925 per year.[5]

Other Applications and Possible Deviations

The discussion to this point has been concerned with the loss of earning capacity of a farmer. The methodology followed in this paper may be applicable in many cases involving self-employed business persons in the non-agricultural sector. That is, rather than using Profit or Loss From Business (Schedule C) or an adjusted Schedule C net income as a measure of the loss of earning capacity the more appropriate approach might be the opportunity cost methodology presented herein. In the case of a self-employed business person, the cost of hiring a person involved in the same line of business working in the same capacity would provide a measure of the pre-injury earning capacity.

As an example, take the case of a self-employed trucker who owns his own tractor-trailer. The Schedule C return will typically include deductions for depreciation, interest, maintenance, licenses, tolls, and fuel. The determination of the return to labor and management as opposed to the return to capital could be estimated by using the same approach as outlined in this paper. However, this would unduly complicate the analysis of the estimation of the loss of earning capacity and make this estimate sensitive to changes in depreciation, fuel prices, maintenance costs, etc. A better approach to the estimation of the loss of earning capacity in the case of a self-employed trucker would be to determine what it would cost to hire a replacement trucker. This would eliminate all the complications involved when the net income represents return in the form of a return to capital and a return to labor and management.

Having criticized the use of business tax returns as a measure of earning capacity there are circumstances where it may be more appropriate than the

[5]This is actually a conservative measure of the loss of earning capacity in that some of the hours of work required are management hours which should be valued at a higher wage rate.

opportunity cost approach. Generally, these would be cases where the nature of the business involves:

1. a personal service by the owner,
2. the sale of these services is major source of revenue (sales of other goods or other's labor should be netted out),
3. little or no capital is involved.

Examples of these occupations might be an insurance agent or consultant. In these occupations, average earnings for insurance agents or consultants, which can vary greatly between individuals, may not be a very accurate measure of the earning capacity of a particular individual.[6] My comments at this point are preliminary and full examination of these issues in the case of non-agricultural businesses is a subject worthy of further study.

Summary and Conclusions

This paper has examined the issue of estimating the loss of earning capacity in the case of a self-employed farmer. The use of farm income statements was examined. The net farm income statements were adjusted to the accrual net farm income measure and the opportunity cost of assets employed in the operation were deducted to determine the return to labor and management inputs. This measure represents a measure of lost earnings. It was concluded that if the measure of loss is the loss of earning capacity this approach does not yield realistic measures of the loss of earning capacity.

Alternative methods of measuring the loss of earning capacity of a self-employed farmer concentrated on the measure of hours of labor and management lost as a result of the injury. One method of measuring lost hours of productive work is to directly estimate the lost based on an interview of the farmer. A second method for measuring lost hours of productive work involves the direct requirements approach. This method involves the consultation of an expert service such as the cooperative extension service at a land grant university to determine the average hours required to produce a certain level of farm livestock or crop output. This method also provides a cross-check on the interview method.

While both of these methods provide measures of farm labor hours required they often to not provide much information about the management input required. Several method may be used to calculate the value of management services. Approaches often used by farm management services include the management fee as a percent of total receipts or average capital managed. Another method involve rule-of-thumb calculations based on labor hours required. This paper has presented alternative methods for calculating the loss of earning capacity in the case of a self-employed farmer. It is concluded that the opportunity cost approach is the appropriate measure of the loss of earning capacity of a farmer. The application of this method was also discussed in cases of self-employed businesses in the non-agricultural sector.

[6]Likewise, some individuals, due to superior talent, may earn economic rents that would not be reflected by use of an opportunity costs measure of earning capacity.

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Cash Flow Vs. Net Income In Commercial Litigation

Patrick A. Gaughan, Henry Fuentes, Laura Bonanomi*

Introduction

The traditional analysis of damages in commercial litigation focuses on the loss of net income with little or no attention paid to cash flow analysis. The literature of accounting and corporate finance, however, has highlighted the deficiencies and potential inaccuracies associated with net income. Net income is a measure that can be subject to manipulation while cash flow is a more accurate measure of financial performance. Moreover, cash flow is a more reliable measure of the viability of a business.

This article examines the role of net income in commercial litigation. In particular, the deficiencies of net income are pointed out. While net income and cash flow are usually closely correlated, in certain instances the two measures deviate. The authors opine that in such instances cash flow is preferable to net income. The corporate finance literature citing an apparent market preference for cash flow over net income, along with other evidence in the field of business valuation, are used to support the authors' opinion.

Cash Flow vs. Net Income: Definitional Discussion

The statement of income, or statement of earnings or operations, as it is frequently called, is the report that measures the success of an enterprise's operations for a given period of time. The business and investment community uses this report to assess profitability, investment value, and credit worthiness. However, whether existing confidence on the part of many financial analysts is appropriate is a debatable proposition. Since the derived income is at best a rough estimate, the reader of the statement should take care not to attribute to it more significance than it deserves.

Why is the income statement so important? The major reason is that it provides investors and creditors with information that helps them predict *the amount, timing, and variability of future cash flows.* Accurate predictions of future cash flows help investors assess the economic value of the enterprise and help creditors determine the probability of repayment of their claims against the enterprise.

The financial reporting environment has undergone a change from the income statement model to an increased emphasis on the cash flow model. The driving force behind this change in emphasis is discussed further in the section on the "Reliability or Lack of Reliability of Net Income".

The evolution of the statement of cash flows provides an interesting example of how the needs of financial statement users are eventually met. A 1961 study recommended that a funds statement be included in all annual

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reports to stockholders and that it be covered by the auditor's opinion.[1] In 1963, APB Opinion No. 3 was issued to standardize the preparation and presentation of the funds statement. The Financial Accounting Standards Board (FASB) recommended that the name be changed to "Statement of Source and Application of Funds" and that the statement be presented as supplementary information in financial reports. The inclusion of such information was not mandatory, and its coverage by the auditor's report was optional.[2] Even though the statement was optional, the number of companies presenting funds statements increased sharply. In 1971, APB Opinion No. 19 made it mandatory that a "statement of changes in financial position" be presented as an integral part of the financial statements and that it be covered in the auditor's opinion.[3] This statement emphasized a working capital approach under the assumption that working capital provided an adequate approximation of cash flow. The 1980's, however, showed that this assumption was no longer valid.

In 1984, the FASB strongly supported the inclusion in the primary financial statements of a statement of cash flows that reflects an entity's cash receipts classified by major sources and its cash payments classified by major uses. In November 1987, the FASB issued Standard No. 95, in which the requirement of a "Statement of Cash Flows" became effective for annual financial statements for fiscal years ending after July 15, 1988.[4]

The primary purpose of the statement of cash flows is to provide information about an entity's cash receipts and cash payments during a period. Cash flows are categorized into operating, investing and financing activities. Transactions and other events characteristic of each kind of activity are as follows:

> OPERATING ACTIVITIES—Reflect cash effects of transactions that enter into the determination of net income, such as cash receipts from sales of goods and services and cash payments to suppliers and employees for acquisition of inventory and expenses.
>
> INVESTING ACTIVITIES—Generally involve long-term assets and include (a) making and collecting loans, and (b) acquiring and disposing of investments and productive long-lived assets.
>
> FINANCING ACTIVITIES—Involve liability and owners' equity items and include (a) obtaining cash from creditors and repaying the amounts borrowed, and (b) obtaining capital from owners and providing them with a return on, and a return of, their investment.

Legal Standards

The traditional measure of damages in commercial litigation is a variant of gross and net income. The case law seems to focus on net versus gross

[1] Perry Mason, "Cash Flow Analysis and the Funds Statement", *Accounting Research Study No 2*, New York AICPA, 1961

[2] "The Statement of Source and Application of Funds," Opinions of the Accounting Principles Board No. 3, New York AICPA, 1963, par. 8

[3] "Reporting Changes in Financial Position," Opinions of the Accounting Principles Board No 19, New York AICPA. 1971

[4] "Statement of Cash Flows," Statement of Financial Accounting Standards No. 95, Stamford, Conn FASB, 1987

profits as the appropriate measure of damages.[5] Other articles from the economics profession have refined the measure of net income that is appropriate to damages to be lost revenues minus the incremental costs associated with the achievement of those lost revenues.[6] These standards are consistent with the case law in this area.[7] In *Sawyers v. FMA Leasing Co.* the court endorsed the deduction of the expenses associated with the achievement of the lost revenues. Other cases have endorsed the use of net profits which include a deduction of the relevant operational expenses.[8]

While there appears to be little attention paid to the distinction between net income and cash flows, the court appears to have kept an open mind for consideration of other relevant issues. "It is impossible to announce with exact certainty any rule measuring the profits the loss for which recovery may be had."[9] It is the intention of this article to point out the deficiencies of net income and open for consideration the instances where cash flow analysis may be the more appropriate measure of damages. It is the opinion of the authors that in certain instances net income may be unreliable thereby creating a need to substitute the more accurate cash flow measure.

Reliability or Lack of Reliability of Net Income

We have indicated above that there was a change in the financial reporting environment in the 1980s. Why the significant change? One major reason is that investors and analysts were concerned that accrual accounting had become too far removed from the underlying cash flows of the enterprise. The accounting profession uses too many arbitrary allocation devices (deferred taxes, depreciation, amortization of intangibles, accrual of revenues, etc.) and therefore computes a net income figure that may no longer provide an acceptable indicator of the enterprise's earning power. The rising importance of cash flow analysis, as opposed to income statement reliance, is further reinforced due to the following reasons:

1. The high and continuing debt levels of many companies;
2. The trend over the past 20 years toward capitalizing and deferring more expenses; and
3. A wave of corporate bankruptcies in the early 1980's.

The previous Statement of Changes in Financial Position which emphasized the working capital concept did not provide sufficient useful information about liquidity and financial flexibility, as does the cash basis. Frequently, receivable and inventory mismanagement leads to a lack of liquidity which a statement focusing on working capital would not uncover.The classic illustration of this type of a problem is W.T. Grant, which, prior to its ultimate declaration, had reported reasonable amounts of net income and working

[5]Robert L Dunn, *Recovery of Damages for Lost Profits* , 4th Edition, 1994, Law Press, Kentfield, CA

[6]Patrick A Gaughan, "Economic and Financial issues in Lost Profits Litigation," in *Litigation Economics*, Patrick A Gaughan and Robert Thornton (eds), 1993, JAI Press, Greenwich, CT and Carroll B Foster, Robert R Trout and Patrick A Gaughan, "Losses in Commercial Litigation", *Journal of Forensic Economics*, Fall, 1993, VI (3), 179-196

[7]*Sawyers v FMA Leasing Co* , 722 P 2d 773 (Utah 1986)

[8]*Lee v Durango Music*, 144 Colo, 270, 355, P 2d 1083 (1960) and *Ricky Smith Pontiac, Inc. v. Subaru of New England, Inc* , 440 N E 2d 29, 48, Mass App 396 (1982).

[9]*Southwest Battery Corp v Owen*, 131 Tex 423, 427, 155 S W. 2d 1097, 1099 (1938), as cited in Dunn

capital provided by operations.[10] However, too much of its working capital was tied up in receivables and inventories. As shown in Figure 1, a review of its net cash flow from operating activities would have shown the significant lack of liquidity and financial inflexibility that eventually caused the company's bankruptcy. Amounts representing net income and working capital from operations were shown as positive from 1966 until 1974, while during that same period cash flow from operations was substantially negative.

An illustration of the discrepancy between net income and cash flow is provided by a recently litigated matter in which the plaintiff, who went out of business in 1989, sued the defendant on the grounds that alleged major flaws in the operation of a piece of capital equipment in early 1989 caused the failure of the business. The plaintiff (who will be called XYZ Company) contended that they were a profitable, healthy company for 23 years and then, "all of a sudden," they were bankrupt. A close examination of the company's financials, however, reveals a company with a severely deteriorating liquidity position. As can be seen from Figure 2, XYZ Company, despite a long history of sales growth and profitable operations, also had a long history of negative cash flow from operations. This negative cash flow was funded through borrowing. By the end of 1988, the Company had reached the limit of its borrowing capacity and was, in fact, extended credit beyond contractual limits which, due to negative cash flow, it was unable to pay.

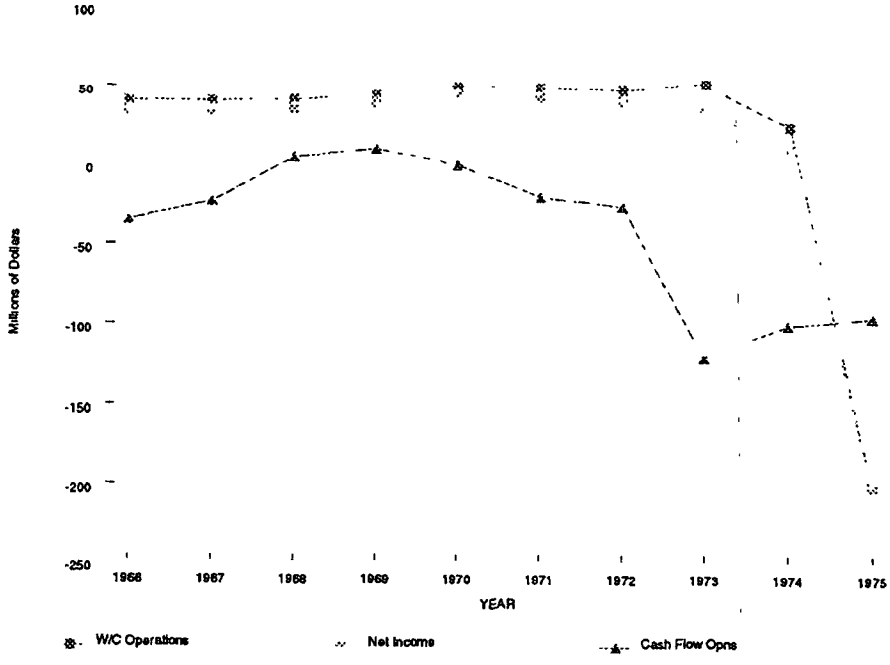


Figure 1. WT Grant: Working Capital, Net Income and Cash Flows

[10] "Cash Flows, Ratio Analysis and the W T Grant Company Bankruptcy, *Financial Analysts Journal*, July-August 1980

XYZ COMPANY
SUMMARY OF FINANCIAL STATEMENT INFORMATION
1974 - 1988
(IN THOUSANDS)

YEAR	SALES	FINANCIAL INCOME BEFORE TAX	CASH PROVIDE (USED) IN OPNS	INCREASE (DECREASE) IN DEBT
1974	21,200	300	290	(230)
1975	19,600	140	(140)	210
1976	20,700	90	(1,300)	1,370
1977	23,000	120	210	(260)
1978	27,000	170	(40)	190
1979	29,500	130	(1,000)	1,500
1980	34,500	180	300	(370)
1981	39,900	160	(780)	950
1982	36,400	80	(80)	90
1983	44,500	570	360	(180)
1984	49,000	550	(910)	950
1985	52,000	320	(500)	1,100
1986	58,600	250	(370)	990
1987	62,000	170	(570)	1,100
1988	59,500	114	(4,200)	4,400
TOTALS 1974 - 1988		3,344	(8,730)	11,810

Figure 2

Is it possible for a company to have many years of continuous positive income from operations but continued negative cash flows? The answer is no. Although in the short run a company can have positive income but negative operational cash flow, if the net income number is truly reflective of the results of operations, eventually that income should turn to positive cash flow.

In the case of the XYZ Company, the use of arbitrary accounting methods masked the true financial condition of the firm. This was done in three ways.

1. The continuous deferral of sample costs which had a positive effect on income but negative cash flow from operations;
2. The capitalization of inventory items which were slow-moving or obsolete;
3. The failure to make allowance for a deteriorating accounts receivable customer base (Figure 3).

XYZ COMPANY
HISTORICAL RELATIONSHIP SALES
AND ACCOUNTS RECEIVABLE
(IN THOUSANDS)

YEAR	SALES	ACCOUNTS NOTES RECEIVABLE	RESERVE DOUBTFUL ACCOUNTS
1974	21,200	3,900	220
1975	19,600	4,100	240
1976	20,700	4,500	209
1977	23,000	5,700	220
1978	27,000	6,700	220
1979	29,500	7,700	230
1980	34,500	7,900	240
1981	39,900	8,400	240
1982	36,400	7,900	250
1983	44,500	9,900	250
1984	49,000	10,200	250
1985	52,000	10,300	225
1986	58,600	11,700	220
1987	62,000	12,900	0
1988	59,500	15,000	0

Figure 3

It should be pointed out that during this time period the required financial statement was the Statement of Changes in Financial Position (with a working capital approach), not the current Statement of Cash Flow. During this entire period of time, neither creditors nor accountants assessed operational cash flow—an assessment which would have produced a much different view of XYZ Company, a company with striking parallels to W.T. Grant & Co.

Corporate Finance Literature on Cash Flows vs. Net Income

While the distinction between net income and cash flows does not appear to have been clearly made in the case law, it has been one which has drawn attention in the corporate finance literature going back to at least the 1960s. In those early articles, the impact on stock prices of variations in earnings that are derived from accounting changes which alter accounting in-

come but which do not have economic significance were examined.[11] Other studies have shown that changes in depreciation policies which have no cash flow significance, such as changes from accelerated depreciation to straight line depreciation, which result in an increase in reported profits, failed to cause stock prices to increase.[12] Kaplan and Roll, using the Fama, Fisher, Jensen and Roll's "Market Model" of the event study literature, also found that the market was efficient in the processing of new information when it determined that accounting changes which did not have cash effects failed to receive a positive stock market response. In fact, the typical stock price response was negative, leading the authors to conclude that since the firms that were engaging in the changes in depreciation policies were performing poorly, they were doing so to conceal this performance. In this case, the market was efficient in processing the new information on this apparent concealment by lowering stock prices.[13]

Other accounting policies changes, such as changes in inventory valuation from FIFO to LIFO, which cause net income to decline but increase cash flows due to tax effects, were shown to increase stock prices.[14] The opposite was the case in switches from LIFO to FIFO. It was clear from Sunder's study that the market was not fooled by the accounting motivated decreases in net income but perceived the improved cash position of the firm to warrant higher stock prices.

Later studies have also confirmed that the stock market is not naive in its interpretation of accounting earnings.[15] For example, Copeland, Koller and Murrin showed that there was a low 0.024 correlation between growth in earnings per share and the P/E ratio for the Standard & Poors 400. On the other hand, there was a high 0.94 correlation between the market value of companies and their discounted cash flows that were derived from Value Line forecasts.

There is some debate as to whether accounting earnings perform better in the long run than in the short run where they clearly perform poorly.[16] Some contend that accounting earnings are a "major determinant over longer intervals" (such as ten years) due to the impact of earnings which are not distributed as dividends which then cause the book value of equity to rise which, in turn, has a positive impact on stock prices.[17] The potential long run rehabilitation of accounting earnings will be an area of empirical research in the future.

The above referenced long run caveats, notwithstanding, the evidence covering decades of research is that the market values cash flows and, where it's possible to discriminate between events that have different ac-

[11]Philip Brown and Ray Ball, "An Empirical Evaluation of Accounting Income Numbers ", *Journal of Accounting Research*, 6, no. 2, (Autumn 1963), 159-178.

[12]T Ross Archibald, "Stock Market Reaction to the Depreciation Switch-Back," *Accounting Review*, 47, no 1, January, 1972, pp 22-30

[13]For a review of this literature see: Frank Rielly, *Investment Analysis and Portfolio Management*, 2nd edition, 1985, pp 178-181

[14]Shyam Sunder, "Stock Price and Risk Related to Accounting Changes in Inventory Valuation", *Accounting Review*, 50 no 2 April, 1975, pp. 305-315

[15]Tom Copeland, Tim Koller and Jack Murrin, *Valuation: Measuring and Managing the Value of Companies*, 1990, John Wiley & Sons, pp. 81-94

[16]Peter D. Easton, Trevor S Harris and James A Ohlson, "Aggregating Accounting Earnings Can Explain Most Security Returns The Case of Long Return Intervals," *Journal of Accounting and Economics*, 15 1992, 119-142

[17]Michael Brennan, "A Perspective on Accounting and Stock Prices", *Journal of Applied Corporate Finance*, 8 (1) Spring, 1995, 43-52

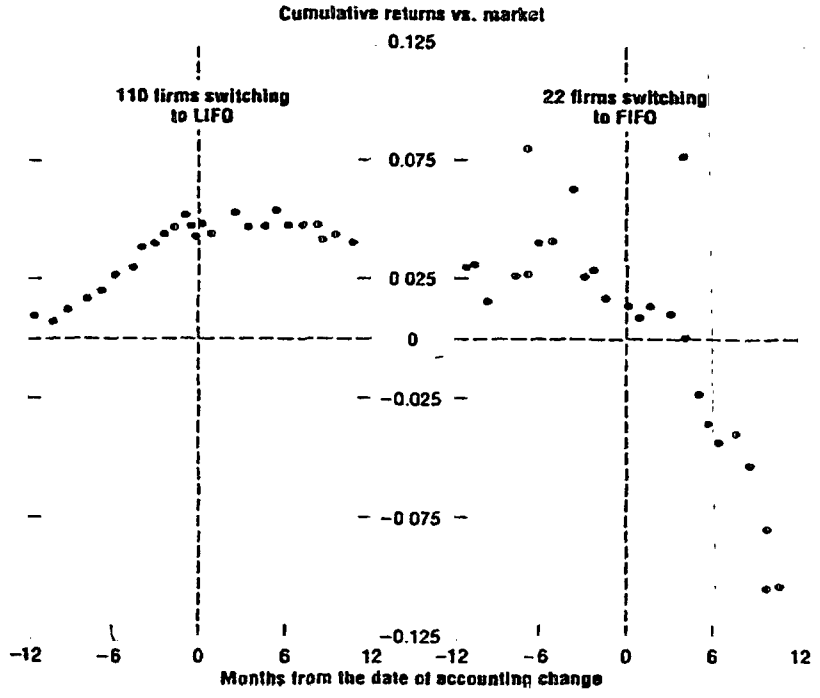


Figure 4

counting earnings and cash flow impacts, the market tends to focus on the cash flow effects. The relevance of this research to commercial litigation is that an objective entity, the market, unambiguously chooses cash flows over accounting earnings when the movements in the two deviate. This objective evidence may be a factor that the courts want to consider when selecting the proper measure to value losses.

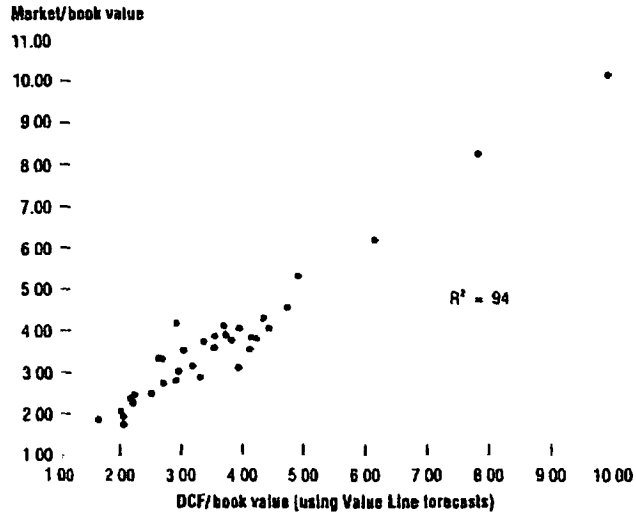
Evidence from the Field of Business Valuations

An asset derives value from cash flows not accounting earnings. This is a basic and well accepted proposition in leading corporate finance textbooks. "The value of any asset depends on the cash flow(s) it is expected to provide over the ownership period."[18] A buyer of a business is primarily interested in deriving a stream of cash as opposed to accounting earnings that do not translate into cash flows. This is clear from the fact that businesses are valued based upon projected Free Cash Flows as opposed to projected accounting income. While some definitions of free cash flow differ, a commonly accepted definition is:

$$(1) \qquad FCF = CF - I(1\text{-}T) + D_p - P_f - B - Y \ [19]$$

[18]Lawrence J. Gitman, *Principles of Managerial Finance,* Seventh Edition, 1994, p 260

[19]Charles R Moyer, James R McGuigan and William J Kretlow, *Contemporary Financial Management,* Fifth Edition, West Publishing Co 1992, p 66



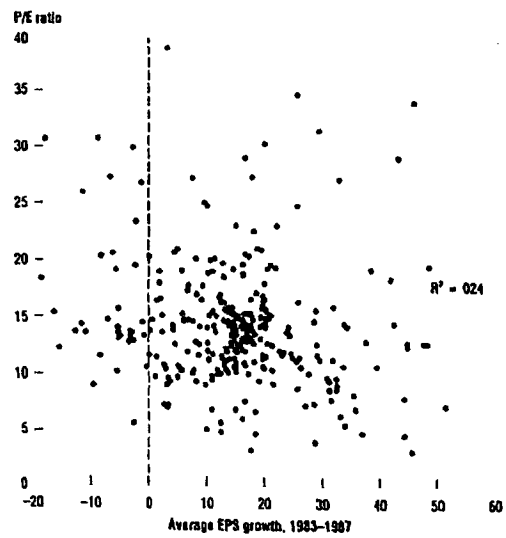


Figure 5

where:

FCF	=	Free cash flow
CF	=	After tax operating cash flow
I	=	Before tax interest payments
T	=	Firm's marginal tax rate
D_p	=	Preferred stock dividend payments
P_f	=	Required redemption of preferred stock
B	=	Required redemption of debt
Y	=	Investment in plant and equipment required to maintain cash flows

After tax operating cash flows are defined as:

(2) $CF = (R - O)(1-T) + Dep(T) - NWC$

where:
- R = Revenues
- O = Operating expenses
- Dep = Depreciation
- NWC = Net working capital

A firm is said to have free cash flows "when a firm is able to generate more cash flows from its ongoing operations than is needed to remain in business."[20]

The fact that businesses are valued using free cash flow is a well established proposition for valuations of larger corporations as well as for the valuation of small businesses.[21] This does not mean that accounting earnings are irrelevant. Indeed, the discounted cash flow model is one of several methods that are used to value businesses. Others include market comparables and asset valuation approaches.[22] However, when cash flow and accounting earnings approaches yield conflicting results, a choice has to be made between these approaches. The choice of free cash flow over accounting net income is underscored by the fact that buyers of businesses who may invest considerable capital on this selection made this decision based upon discounted cash flow models not discounted accounting earnings models. Clearly, practitioners in this field find the more reliable measure of value to be cash flows and are unwilling to invest based upon accounting net income. This decision verifies the superiority of free cash flow and raises concern about the law's exclusive reliance on accounting earnings.

Conclusion

While the economic and finance professions have made a distinction between accounting earnings and cash flow and have expressed a preference of cash flow over accounting earnings when the two measures yield conflicting results, the legal profession does not seem to be cognizant of the difference between the two measures. Through an exclusive reliance on accounting earnings, courts can, under certain circumstances, come to inaccurate conclusions. Damages may be awarded to an entity based upon a track record of positive accounting earnings that do not translate into positive cash flows. In such cases, a plaintiff would be overcompensated and a defendant would be unfairly punished. It is hoped that this issue will be clarified in the future.

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[20]Kenneth Hackel and Joshua Livnat, *Cash Flow and Security Analysis*, Business Irwin One, New York, 1992, p 167

[21]Patrick A Gaughan, *Mergers and Acquisitions*, 1991, Harper Collins, p 546

[22]Robert Trout, "Introduction to Business Valuation", in *Readings in Litigation Economics*, Patrick Gaughan and Robert Thornton eds (Greenwich JAI Press), pp 107-149

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Is The Value Of A Firm The Upper Limit Of Future Lost Profits In Business Litigation?

James L. Plummer*

Introduction

Sometimes a business litigation case will turn into a "battle of the experts," in which each side has very different "technical lost profit assumptions" on key issues such as what the rate of growth of revenue would have been in the absence of the wrongful act, the appropriate Incremental Lost Profit Margin (ILPM) for calculation of lost profits, the appropriate discount rate to be used for arriving at a present value of future lost profits, and how far out the damage period should extend.

Either the plaintiff or the defense side may choose to introduce an expert opinion on the value of the firm, each for quite separate reasons. The plaintiff side may calculate what the value of the firm would have been without the wrongful acts at a point in time after substantial lost profits have occurred, in order to try to capture the "longer term" effects of the wrongful acts on the plaintiffs. The defense side may introduce an expert opinion of the value of the firm as of dates just before and just after the wrongful acts. From a tactical point of view, the defense may believe that it is "simplifying the damages picture for the jury," and perhaps also avoiding battle over the specific technical assumptions inherent in the plaintiff lost profits analysis.

The law recognizes both "lost profits" and "diminution of business value" as ways of measuring damages, but without statutory or case law guidance as to whether one of these measures of damages ought to be considered an upper limit on the other.[1]

The issue of whether the value of the firm ought to be considered an upper limit on the present value of future lost profits in business litigation has generated verbal discussion among forensic experts, business appraisers, financial analysts , and economists for years, but little rigorous analysis. At the fall 1991 meeting of the Business Valuation Section of the American Society of Appraisers, one of the speakers was Robert L. Dunn, author of *Recovery of Damages for Lost Profits* (Lawpress, Fourth Edition, 1994), the most widely used legal reference in this subject area. He was asked about this same issue from the floor by Shannon Pratt, a leading U.S. business appraiser. Dunn replied that it was a fascinating issue that had also troubled him, but that the law usually allowed a wide variety of viewpoints to be expressed on the issue.

*The author is President of QED Research, Inc. in Palo Alto, California. He wishes to thank Patrick A. Gaughan for many useful comments on an earlier draft, without associating him with the opinions expressed herein.

[1] See Robert L. Dunn, *Recovery of Damages for Lost Profits* (Lawpress, Fourth Edition, 1994); and William A. Cerrillo, *Proving Business Damages* (James Publishing Company, 1989).

Actual or potential wedge separating a higher lost profits measure of damages from a lower diminution of value measure of damages	Effect of using a lost profits measure of damages	Effect of using a diminution of value measure of damages	Comment
Wedge #1 Measuring damages in before-tax dollars	Damages are usually overestimated because the expert does not "gross up the discount rate or cap rate to a before-tax basis consistent with the legal standard	Damages will be accurately estimated if after-tax earnings or cash flow is used along with a consistent after-tax discount rate or cap rate	If no other "wedges" existed, consistency between the two measures of damages could be achieved by scrupulous consistency in discount rates and cap rates
Wedge #2 Issues of owner-operator compensation	Allows the past and future return to the owner's time to be included in the past and future lost profits stream	Truncates the stream of loss of return to the owner's time as of the valuation date	Theoretically, experts could separate losses to the business from losses of return to the owner-operator's time Not often done in the case law
Wedge #3 Use of a marginal debt/equity cost of capital in lost profits analysis v use of an all-equity cost of capital in a business valuation	A lost profits measure of damages will be accurate if a weighted debt/equity cost of capital is used to discount future lost profits	Diminished value may not underestimate damages if the valuation takes account of the potential upward effect of debt leveraging on the profitability of the plaintiff firm	For many smaller and weaker plaintiff firms, marginal borrowing capacity does not exist, so this potential wedge is not relevant
Wedge #4 The effect of a premature valuation date in a litigation setting	If the Incremental Lost Profit Margin (ILPM) declines a lot during the damage period, then a valuation during that decline period will underestimate plaintiff damages	Using a valuation date as of the date of the wrongful acts almost always underestimates damages It also is inconsistent with the appraisal principle of "blinders" for post-appraisal events	The combination of using a constant ILPM and doing the valuation as of the date of trial involves counteracting estimation biases, which may result in "simplified rough justice"
Wedge #5 Lost profits analysis presumes continuation of ownership, whereas a "market comps business valuation incorporates the risks of transferring ownership	For smaller owner-operated businesses, a lost profits approach to damages avoids the danger of underestimation of damages due to inadvertent incorporation of incorporation ownership transfer risks	For smaller owner-operated businesses, a diminution in value approach based on market comps runs the risk of under-estimating damages via incorporation of ownership transfer risks	Since the "market comps" approach is probably the best way to value smaller owner-operated firms, it may be best to avoid a diminution in value approach to estimating damages for those firms
Wedge #6 In an environment of moderate to rapid growth, lost profits analysis does not take account of the difference between lost profit and lost cash flow, whereas a business valuation done on net cash flow does	In an environment of moderate to rapid growth, a lost profits measure of damages will overestimate damages, unless deductions are made to allow for the impact on working and fixed capital needs	When appraisers see a big difference between profits and cash flows, they will usually base valuation on cash flow, resulting in a more accurate estimation of damages	Case law is behind the evolution of thought in accounting, finance, and economics, in that lost profits still hold sway, whereas cash flow is professionally recognized as a superior measure of impact

Figure 1. Summary of Actual and Potential "Wedges" in between Lost Profit and Diminished Value Measures of Damage

The analytical exploration of this issue contained herein indicates that the law is very wise in not giving specific guidance, because there are several reasons why the fair market value of a firm may *not* be an upper limit on the present value of future lost profits. There are a number of factors that can create "wedges" in between a *higher* present discounted value of future annual lost profits and a *lower* appraised fair market value of the firm. As will be discussed herein, some of the wedges are the result of experts using inconsistent or otherwise flawed methodology, and those wedges may be reduced or eliminated by use of more consistent methodology. Other wedges result from the nature of the litigation process, and may not be so easily eliminated. Figure 1 summarizes the six actual or potential wedges and some of the issues about them that will be discussed herein.

Factors Causing the Wedges

A. Wedge #1 — Corporate Income Taxes

A plaintiff that recovers damages in a business litigation ordinarily owes income taxes on such recovery. Consistent with that fact, lost profit damages are measured in terms of before-tax dollars of profit. Another practical reason for measuring lost profits in terms of before-tax dollars is that, otherwise, the damages would have to reflect the overall tax situation of a particular plaintiff, who might have other activities that influenced actual tax rates paid.

Especially for larger corporations, the "income approaches" to business valuation operate mainly off of after-tax definitions of profit and cash flow. A typical assumption of the combined state and federal corporation income tax rate for large corporations is 40%. If there is one dollar per year of lost profit that would have been earned each and every future year after date of trial, then such dollars would have only 60% as much impact on a valuation of the firm as of date of trial than they would have on a calculation of the present discounted value of future before-tax lost profits. That is a big *potential* wedge, *if* the same discount rate is used for both the lost profits analysis and the business valuation analysis.

It is possible to avoid this wedge by being precise in the quantification of discount rates and capitalization rates. The cost of equity capital in the marketplace is measured in after-tax rates, whether the appraiser chooses a capital asset pricing model approach, or a buildup approach, or a risk premium approach. Regardless of one s approach to getting an after-tax cost of equity capital rate, it is important to recognize that this rate has to be grossed up to a before-tax basis before it can be used for a lost profits analysis. Figure 2 shows the process of obtaining an after-tax cost of equity capital, and then grossing it up to a before-tax basis. In the Figure 2 example, a 20% after-tax cost of equity capital translates into a 33.3% discount rate suitable for lost profits analysis, to take account of a 40% combined state and federal income tax rate.

Discount rates as high as 33.3% are almost never used on the plaintiff side of business litigations, and even the defense side tends not to use rates this high. Litigators sometimes say that judges and juries get a nose bleed if they see rates higher than 15% or 20%. The defense side may seem mean spirited or extreme if they use rates that high. This means that the defense has all the more reason to avoid use of any before-tax discount rate by doing a valuation as of date of trial, or even before.

Global assumptions:

40%	=	Effective combined state and federal income tax rates
8%	=	Annual rate of growth of revenue, earnings, and net cash flow
130%	=	Ratio of net earnings to net cash flow

Suppose the after-tax earnings-based discount rate is determined by the Schilt "risk premium" method, and the plaintiff firm's risk category corresponds to Schilt Category 2-"Established firms in a more competitive industry that are well financed, have depth in management, have stable past earnings and whose future is fairly predictable." Combining Schilt's 11-15% risk premium with a long-term Treasury bond rate of about 7% yields an after-tax/earnings-based discount rate of about 20% for cell (Al) of the following matrix:

	Net earnings (profits) (A)	Net cash flow (B)
(1) After-tax basis	(Al) 20.0% For an after-tax earnings approach to appraisal (diminution in value)	(B1) 14.0% For an after-tax appraisal (diminution of value) approach off of net cash flow
(2) Before tax ("grossed up") basis	(A2) 33.3% For a before-tax lost profits analysis (lost earnings analysis)	(B2) 23.3% For a before-tax lost cash flow analysis

Row (2) is derived from row (1) by multiplying by a factor equal to 11(1-combined marginal tax rate)

Column (B) is derived from column (A) by using the "Mercer formula," explained in Christopher Z. Mercer, *Valuing Financial Institution*, Professional Publishing, Burr Ridge, Illinois, 1989, pp. 262-266.

Source for Schilt "risk premium" approach is James H. Schilt, "A Rational Approach to Capitalization Rates for Discounting the Future Income Stream of a Closely Held Corporation," *The Financial Planner*, January 1982, p. 58.

Figure 2. An Example of Mutually Consistent Discount Rates for Different Damage Analyses

So, while it is easy to say that this wedge can be avoided by precise consistency in discount rates, the actual practice is for the discount rates used in lost profits analysis to be far too low to be consistent with the after-tax

equity cost of capital discount rates used in business appraisal. In the real world, the before-tax v. after-tax gap can be a very big wedge indeed.

The effective marginal income tax rates of smaller companies are much lower, because owner-operators simply take the available end-of-year profit in extra salary and bonuses. In these situations, the difference between an after-tax discount rate and a before-tax discount rate will be much smaller.

As one step in a business valuation analysis, business appraisers are used to substituting for the subject firm s tax rates and tax levels those levels that would likely be experienced by the typical buyer.[2] If the appraisal is being used as a measure of damages in a business litigation, this is one correction that the appraiser should leave out. It is the actual tax rates and tax levels of the plaintiff firm that should be used in an appraisal that is intended to measure damage to the plaintiff.

B. Wedge #2 — Compensation of the Owner-Operator

What is called "profit" for an owner-operated firm is both a return to capital invested and time invested, and the two streams are often treated the same under the law.[3] Most people who buy owner-operated firms are buying both a business and a job.

When an owner-operated business is sold, usually it is also sold as both a business and a job for the potential buyer. However, if a firm is being valued at date of trial or before, the plaintiff owner is *not* implicitly being compensated for the loss of the *opportunity* to expend his or her future time for future compensation.

If a plaintiff that has seen his business fail as a result of wrongful acts chooses to claim both lost return on capital investment and lost salary into the future, it is only consistent to subtract from the claimed lost salary the salary that the plaintiff earns in alternative employment over the same period. If the owner-operator is older and has experienced a specialization of skills just to that business, then there may be a considerable gap between the level of earnings in the lost business and the level of earnings in alternative employment.

Particularly for smaller businesses, this "owner-operator compensation wedge" can be quite important. The plaintiff will usually be better off by doing a year-by-year analysis of the present value of future losses of both investment return and return to time, rather than truncating that stream via a valuation of the firm.

It is possible to avoid this wedge by doing both the lost profits analysis and the valuation analysis on the same basis with regard to owner-operator compensation. The lost profits analyst may choose to separate the year-by-year lost profits analysis from the year-by-year potential lost personal earnings analysis.[4]

[2] See Fishman et. al. (1955), p 5-32.

[3] See *Dempsey v. Sternik*, 498 N E. 2d., 310,315, Illinois App. 3 Dist., 1986 However, there is case law in both directions. See Dunn (1994), pp. 396-400. Also, if the owner-operator is not a *personal* listed plaintiff along with the plaintiff firm, then it may be more difficult legally to include lost personal earnings in damages (particularly damages beyond date of trial)

[4] There may be incentive for a plaintiff damages expert to do this, since the tradition in most states is to use riskless Treasury bonds in discounting future personal lost earnings However, the potential personal earnings stream associated with an owner-operated business is considerably more risky than the earnings stream of the average worker.

C. Wedge #3 A — Weighted Discount Rate v. an All-equity Discount Rate

In a conventional future lost profits analysis, the analyst looks at the historical mix of debt and equity capital that the firm has employed, and calculates what financial analysts call a "weighted average cost of capital," or WACC. There might be some debate between the plaintiff side and the defense side as to whether the firm had any future capacity to borrow the same level of debt or more debt. The plaintiff side may try to use an all-debt cost of capital and the defense side may try to use an all-equity cost of capital. Neither extreme is usually appropriate.[5]

However, in doing a business valuation, one is valuing the equity in the firm and it is appropriate to use an all-equity cost of capital.[6] The cost of equity capital will ordinarily be much higher than the cost of debt capital, so the plaintiff will again prefer to do a year-by-year analysis of the present value of lost profits using a *lower* weighted average discount rate rather than doing a valuation of the equity in the firm using a *higher* all-equity cost of capital.

There may not turn out to be a downward bias in estimating damages via a business valuation if the appraiser takes full account of the potential upward impact on firm profitability from debt leveraging.

There are many litigation situations where the plaintiff firm was financially stretched prior to the alleged wrongful acts, and had no marginal borrowing capacity. In those situations, this wedge would not be relevant.

D. Wedge #4 — Effect of a Premature Valuation Date

Particularly in those business litigations involving the failure of a business at some time before the date of trial, the defense side will often see an advantage in introducing into evidence a valuation of the business just before the alleged wrongful acts occurred. Very often this valuation will conclude that, because of dismal anticipated market conditions, or poor management, or whatever, the firm had zero or little value even prior to the wrongful acts. This is often viewed by the defense as a way to avoid having to present their own viewpoints on the messy technical issues of lost profits analysis, such as the path that revenue would have taken in the absence of the alleged wrongful acts, or the appropriate level of the Incremental Lost Profit Margin (ILPM), or the appropriate discount rate, or how long the damage period would extend beyond date of trial. Putting up a zero or low number for the value of the firm prior to the alleged wrongful acts is a way to "have our own low number," yet not have to work very hard in presenting and defending it. There may be the hope that the jury will be grateful to the defense for keeping things simple, as opposed to a very elaborate plaintiff future lost profits analysis that has "a lot of moving parts" and is subject to attack on all of them. The idea that business valuation analysis is simpler than lost profits analysis is a popular myth among litigators, which derives partly from hiring less qualified business appraisers experts, who do indeed oversimplify the appraisal issues.

If it is too much of a stretch for the defense to allege that the firm had little or no value at the time of the alleged wrongful acts, then they may con-

[5] See Fisher and Romaine (1990); and Lanzillotti and Esquibel (1990)

[6] See Fishman, et. al. (1995), p 5-13.

fine damages to the period in between the alleged wrongful acts and the date of trial. This may or may not be accompanied by a low valuation of what the firm would have been worth as of the date of trial. If the defense utilizes a business valuation, the valuation date is seldom after the date of trial.

For its part, the plaintiff side usually regards valuation as of date of trial to be much too early. For all the reasons discussed herein, they will prefer do a year-by-year analysis of the present value of future lost profits, and then perhaps use a business valuation as of the end date of that analysis as a way to capture the remaining long-term effects of the alleged wrongful acts.

What is an appropriate business valuation date in a business litigation setting? This issue turns on the behavior of the Incremental Lost Profit Margin over time. The Incremental Lost Profit Margin is the accepted method for deriving the change in *net profits* that occurs as a result of a loss of revenue:

> The objective is to measure the change in *net* profits that resulted from the wrongful acts. However the Net Profit Margin is simply the amount of net profit at the end of an accounting period divided by revenue for the same period. It is an *average* ratio or margin. What is needed to measure a *change* in net profits is an "Incremental Profit Margin." The Incremental Profit Margin measures the *change* in net profits as a result of a *change* in revenue. This Incremental Profit Margin will fall in between the Gross Profit Margin and the Net Profit Margin. Realizing why the Net Profit Margin is not the right parameter for measuring the change in net profits is the most important single concept in lost profits analysis. (Plummer and McGowin, 1993, p. 232.)

The concept of the Incremental Lost Profit Margin (ILPM) is widely accepted among financial analysts, forensic economists, CPAs[7], and business appraisers, as is the concept that the ILPM will decline during the lost profits period as the plaintiff takes more and more mitigating actions to convert fixed costs into variable costs. Given enough time, virtually all categories of costs that were fixed in the short term can be made variable over the long term. So, whereas the ILPM may have started out closer to the Gross Profit Margin at the beginning of the damage period, over the course of time the ILPM will asymptotically approach the level of the Before-tax Net Profit Margin (BNPM).

The top graph in Figure 3 shows the asymptotic relationship between the Incremental Lost Profit Margin (ILPM) and the Before-tax Net Profit Margin (BNPM). From a purist technical point of view, if a business valuation is done at any time before convergence occurs, the plaintiff is unfairly denied the differential between the two profit margins. If there is a two-to-five-year time gap between the date of the alleged wrongful acts and date of trial, then perhaps enough time has gone by to achieve convergence, or close to it.

[7] See American Institute of Certified Public Accountants (AICPA), Management Consulting Services Division, 1993 Special Report 93-4, p 22; or Foster et. Al. (1993)

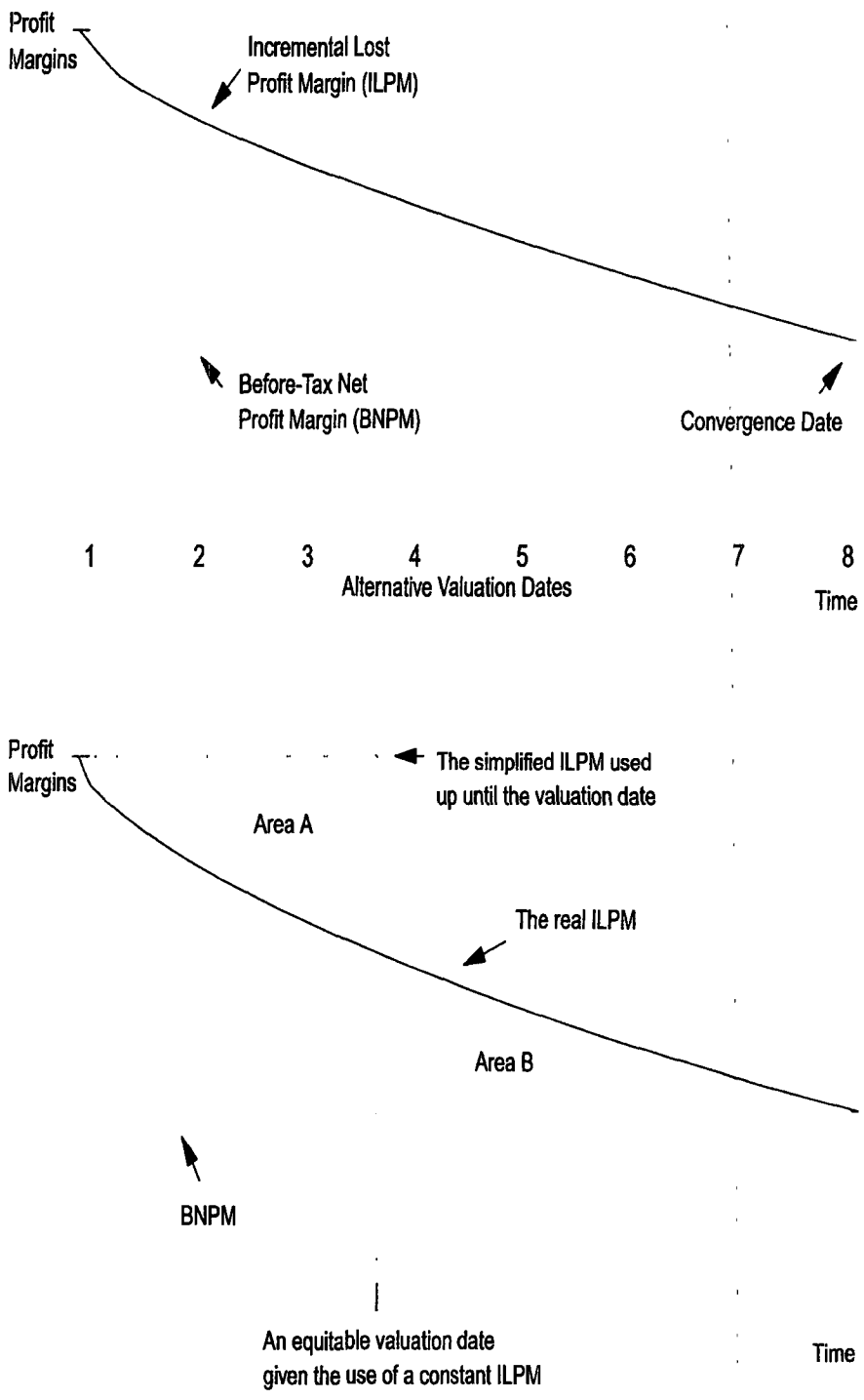

Figure 3. Derivation of an "Equitable Valuation Date"

Although it is widely accepted that the ILPM function will decline as the damage period proceeds, it is relatively rare for either side in a business litigation to make very detailed efforts to quantify that decline period-by-period. Instead, the initial ILPM is often assumed to be constant, at least between the date of the alleged wrongful acts and the date of trial. Then, the plaintiff side will often attempt to extend the use of that initial ILPM into a future lost profits analysis, and the defense will attempt to avoid use of any future ILPM by doing a valuation with a valuation date as of date of trial, or even earlier.

In the bottom part of Figure 3, Area A defines the dollar amount by which past lost profits are *overstated* by using an ILPM that remains constant up until date of trial, instead of empirically measuring how much the ILPM actually declines during this period. Area B measures the amount by which a business valuation done as of date of trial would *understate* the losses of the plaintiff because the plaintiff would be implicitly denied the differential between the ILPM and the BNPM in between the date of trial and the date of convergence between the ILPM and the ANPM. What if Area A and Area B were equal? That would mean that the *rough justice* method of using a constant ILPM up until date of trial, but measuring post-trial damages by a valuation as of the date of trial, would achieve equal and offsetting[8] distortions. This is comforting, since neither judges or juries are likely to want to sit through empirical measurements of the declining ILPM, nor lost profit analyses (or business valuations) that extend too many years into the future. This *rough justice* may be the only practical course other than much more complicated damage presentations.

Apart from the decline of the ILPM, there is another reason why the valuation date for an appraisal that is being used to measure damages in a business litigation should *not* be a date earlier than the date of trial. It is accepted appraisal methodology that an appraiser doing a retrospective appraisal as of some earlier date than the date of his report is supposed to put on blinders and ignore events and facts that occurred after the valuation date. The appraiser is trying to simulate the mind of a knowledgeable but typical buyer as of the valuation date. However, the case law of business damages *does* allow the court, the jury, and damages experts to take into account how the real world evolved in between the date of the alleged wrongful acts and the date of trial. A valuation of the firm as of the date of the alleged wrongful acts will have to treat more variables as uncertain, and incorporate those uncertainties into key valuation parameters such as discount rates, capitalization rates, and earnings multiples. This will ordinarily, but not always,[9] tend to operate toward obtaining a lower valuation as of the date of the alleged wrongful acts than a valuation done as of the date of trial.[10] Thus, a bias toward lower damages ordinarily arises from using a valuation date earlier than the date of trial.[11]

[8] Not quite offsetting. In the bottom graph of Figure 3, the right-hand portion of the ILPM does not show the effect of discounting to present value as of date of trial, an omission that could be corrected with more complex graphics.

[9] Not always because there are situations where the world turns out much *less favorably* for the plaintiff firm than an appraiser or buyer could have anticipated before the date of the alleged wrongful acts

[10] See AICPA Consulting Services Practice Aid 93-3, p. 10.

[11] This bias is aggravated by the tendency, in most jurisdictions, to not allow prejudgment interest between the date of the alleged wrongful acts and the date of trial (unless the loss was a

E. Wedge #5 — The Price Effect of Ownership Transfer Risks

Those involved in business brokerage or mergers/acquisition work are keenly aware of the many categories of risks involved in the transfer of the ownership of a business. A buyer may fear not being able to transfer the loyalty of customers or key employees or both. A buyer may also have self-doubts as to whether he or she is as aware as the seller of the subtleties of changing market conditions or competitor conditions, and may be "walking into the lion's den." Whether or not these fears come to be realized, they may be incorporated into the bids of potential buyers, and then into the sale prices of businesses.

Many business appraisers,[12] particularly those appraising small and medium sized businesses, try to rely heavily on the "market comparables data" that they get out of the business brokerage market and the mergers and acquisitions market. To the extent that business appraisers use data that incorporates the risk aversions associated with the transfer of ownership of a business, that business may be worth more to a continuing owner than it is on the open market.

Suppose a firm is valued at 4-6 times its net after-tax annual cash flow (after owner compensation), or at 2.5 times "seller discretionary cash flow" (including owner compensation and perks), parameters well within the usual range of appraiser experience. An owner-operator may feel quite justified in saying "That's what the firm would have been worth to potential buyers, not what it would have been worth in my hands for years to come." Thus, the owner who never contemplated selling may feel shortchanged by the use of typical business valuation formulas to measure damages in business litigation. This is yet another reason why plaintiffs will not wish to see a business valuation used to measure business damages, or only used to cap a lost profits analysis as of some future date.

The existence of this wedge may rule out use of a diminution of business value measure of damages for litigation involving smaller owner-operator businesses. This is because the most accurate approach for valuing this kind of firm is to use the comparables multiples that come out of business brokerage experience.[13] Yet, it is precisely these transaction prices that most incorporate the risks associated with the transfer of business ownership.

F. Wedge #6 — Full Recognition of the Difference Between Profit and Net Cash Flow in an Environment of Moderate to Rapid Revenue Growth

In most business litigations, it is not necessary to worry about whether some modest growth in revenue would have generated not only profit, but also a requirement for more working capital, and perhaps more fixed capital. However, in a environment of moderate to rapid growth, it is unfair to

sum certain as of the date of the alleged wrongful acts), or to only allow use of a prejudgment interest rate far below cost of capital rates (discount rates).

[12] The author is a "market comparables" business appraiser of mainly smaller businesses, and also a business broker.

[13] For example, the annual publication BIZ COMPS contains data on the ratio of sale prices to total owner discretionary cash flow (the sum of before-tax profit, owner compensation, owner perks, and depreciation) This data is used more than any other single valuation approach for the appraisal of small businesses.

the defendants to measure the profits that would have been earned on the foregone revenue, but not also measure the extra cash that would have to be found to cover the working capital requirements and the fixed capital requirements.

Obviously, the plaintiff side usually does not wish to raise this issue at all. The defense side often misses it if they don't have an experienced expert working with them. If they do raise the issue, they will worry about having sufficient legal precedents for making these "negative adjustments" to a lost profit analysis stick. In this area, the law is considerably behind the evolution of thinking in the academic and financial communities. In those communities, it is increasingly recognized that net cash flow is a better measure of the financial health of a firm than net earnings (profits).[14] Where there is a substantial divergence between estimated lost profit and estimated lost net cash flow, lost net cash flow usually is a better measure of damages.

An alternative approach for the defense, other than estimating lost before-tax net cash flow, is to argue that the "diminution in business value" approach to damages is a more accurate measure of damages. An experienced business appraiser who sees a big difference between profits and net cash flow during a period of moderate or rapid growth will ordinarily opt for heavy reliance on a present discounted value of future net cash flows[15] valuation method.

Using net cash flow, either as the direct measure of damages, or as the basis for a diminution of value analysis raises issues of discount rate consistency. In Figure 2, Column (B) shows how much lower the relevant discount rates will be for use with net cash flows.[16] Figure 2 is an example of net cash flow discount rates that would result from a situation of 8% annual growth and a 130% ratio between net earnings and net cash flow. The after-tax discount rate applicable to after-tax net cash flow is 14%, as compared to a 20% discount rate for after-tax earnings. The before-tax, or grossed up discount rates are 23.3% for before-tax net cash flow, as compared to 33.3% for before-tax net earnings.

Under What Circumstances Would the Two Measures of Damages Come Up with About the Same Answer?

It is possible to define a situation in which a lost profits approach and a diminution of business value approach would come up with about the same answer. Each and every one of the wedges summarized in Figure 1 would have to be eliminated. That is to say, *all* of the following conditions would have to be met simultaneously:

A. Either 1) the plaintiff firm would have to be one that had never paid significant amounts of corporate income taxes and would not be ex-

[14] See Gaughan et. al. (1995); and Hackel and Livnat (1992).

[15] "Net cash flow"(also often called free cash flow) herein means net profit after taxes, plus an addback for depreciation and amortization, less the change in working capital (current assets minus current liabilities), less an "annualized fixed investment requirement." This definition of net cash flow does not deal with the net cash proceeds from such financing activities as changing long-term debt levels or raising equity capital Estimating an accurate "annualized fixed investment requirement" can be difficult, which is why it is usually avoided in court.

[16] The derivation of net cash flow discount rates from net earnings discount rates was done using the Mercer formula, which is described in Mercer (1989).

pected to pay any even if it underwent a change in ownership, or 2) the damages expert would have to be precisely consistent (see Figure 2) in differentiating before-tax v. after-tax discount rates or capitalization rates.

B. The lost profits expert and the appraisal expert would have to be mutually consistent in measuring the incremental lost profit margin (ILPM) and the net earnings stream either *both before* owner compensation or *both after* owner compensation.
C. Either 1) the plaintiff firm would have to be one that did not rely at all on debt capital, so that the discount rate used for lost profits analysis would be exactly the same as the discount rate used for valuation analysis, or 2) the valuation analysis would incorporate the potential leveraging effect of debt on profitability.
D. The valuation date would have to be no earlier than date of trial, and after the decline in the ILPM was over. Alternatively, use of a constant ILPM and a valuation date (perhaps the trial date?) midway in the period of decline of the ILPM may approximate the same result.
E. The primary method for measuring damages from diminution of business value would have to be the present discounted value of future lost profits method, and not the market comparables method, especially if the plaintiff firm is a small owner-operated business subject to substantial risks upon ownership transfer.
F. Either 1) the market conditions facing the plaintiff firm would have to be such that no growth or only slow growth in revenue would have occurred in the absence of the alleged wrongful acts, or 2) the experts would have to be absolutely precise in differentiating discount rates and capitalization rates that apply to profits versus those that apply to net cash flow (see Figure 2).

These conditions are approximated in some business litigations, particularly those involving smaller non-growing firms that are all equity financed, and don t pay a lot of corporation income taxes. However, it is safe to say that there are also many business litigations wherein *all* of these conditions are not met, and thus one could expect a substantial divergence between the damages estimated via a lost profits approach and a diminution in business value approach.

The Circumstances That Would Produce a Big Divergence Between Damages Measured Via Lost Profits and Damages Measure Via Diminution in Business Value

If *any one* of the following conditions occur, then there can be a significant divergence between damages measured by a lost profits approach and damages measured by a diminution in business value approach:

A. Either 1) there is a significant rate of corporate income taxation for the plaintiff firm, either historically or prospectively upon a hypothetical sale of the business, or 2) an expert that erroneously uses an after-tax cost of capital discount rate for a before-tax lost profits analysis.
B. An inconsistency between the lost profits analysis and the diminution in business value analysis in the treatment of owner compensation.

C. Either 1) any significant use of debt financing by the plaintiff firm, either historically or hypothetically if the alleged wrongful acts had not occurred, or 2) a business valuation expert that does not take into account the potentially leveraging effect of debt on profitability.
D. Choice of a valuation date that is before date of trial and/or before the decline in the ILPM is over.
E. Use of a market comparables approach rather than a present discounted value approach as the primary method for measuring diminution in business value, especially for smaller businesses subject to substantial risks upon transfer of business ownership.
F. Either 1) a rate of growth sufficient to cause a substantial divergence between net profit levels (higher) and net cash flow levels (lower), or 2) an expert that is not precisely consistent in differentiating which discount rates and capitalization rates apply to profits (earnings) and which apply to net cash flow (see Figure 2).

A Message to Plaintiff Counsel

In many instances, the plaintiff side tries to extend a future lost profits analysis farther into the future than is credible, and then top that off with a business valuation at the end of the future lost profits period. The more extreme the stretch into the future, the easier it is for the defense to introduce an appraised value as of a much earlier date as an alternative measure of damages that does not contain as many complicated assumptions about the future.

If the defense does try to use a business valuation measure of damages as of a date that is so early that it effectively truncates much of the plaintiff damages, some of the above substantive points can be used, but it is best to put them on with a substantive business appraiser, rather than through an expert only familiar with lost profits analyses.

A Message to Defense Counsel

Defense counsel sometimes uses a valuation analysis with an early valuation date as a tool to short circuit or avoid the battle over technical lost profit assumptions. It usually doesn't work, unless the plaintiff side has been accommodating by hiring an expert that doesn't know enough about appraisal to make the above types of criticism.

It is better to attack an inflated lost profits analysis head on by bringing in experts on the particular industry and having them work closely with an experienced business appraiser.

If the defense takes this approach, then they can also take "valuation snapshots" as of several valuation dates, both past and future. The experienced appraiser can opine as to how the value of the firm would have changed with and without the wrongful acts, and with and without the occurrence of other causal factors that may have been more important than the alleged wrongful acts. That way, business valuation is used as a useful reference point, without getting locked into using a business valuation with an early valuation date as the sole and very vulnerable measure of business damages.

Conclusions

Whether the fair market value of a firm is an "upper limit" or "valuation cap" on the present value of future lost profits in a business litigation is a more complex question than has been recognized in the verbal debates among experts on this issue. The analytical explorations herein indicate that there are at least six actual or potential "wedges" that all operate in the direction of making a business valuation measure of damages lower than a present discounted value of future lost profits measure of damages. Some of these potential wedges can be avoided by more precise and consistent analysis by damage experts. Some of the wedges may not be eliminated even with the best analytical methodology. Plaintiffs will ordinarily shy away from business valuation measures of damages, whereas defendants will be more inclined to use them. Simple explanations of the complex interrelationships between lost profits analysis and business valuation discussed herein will never be easy, but they will seem easier and more credible if they come from an experienced business appraiser rather than an expert who is only familiar with lost profits analysis.

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Introduction To Cross Tabulation Statistics For Disparate Impact Cases

G. Michael Phillips*

Introduction

Along with the economy's restructuring are numerous layoffs. With the layoffs are lawsuits and opportunities for statistically oriented forensic economists to provide analysis and opinion. While on the surface these cases are identical to the discrimination cases which were popular a decade ago, such as discrimination in schooling or recruitment, the disparate impact cases focus on the possible differential effects of a company's policies on the existing workers in the part of the company where the policy is made or implemented. As a result, while traditional discrimination cases often dealt with thousands of observations, sometimes using census type data, increasingly these disparate impact cases may deal with only few dozen or a few hundred employees. This paper discusses contingency table analysis for small samples like forensic economists would address in layoff-discrimination or disparate impact cases.

In a typical disparate impact contingency table analysis, cross-tabulation tables are constructed. In these tables, "treatments" (columns) are analyzed to determine whether they had any impact on "results" (rows). For example, one might consider a 2x2 table in which columns referred to "under 40" and "40 and over" with rows referring to "continued employment" and "laid off". In a typical large sample discrimination analysis, the table would be analyzed by constructing a Chi-squared test with 1 degree of freedom to test the null hypothesis of independence between rows and columns (e.g. Mansfield, 1986). If the test showed no significant differences, for example, a p value greater than the critical value, usually 5%, then one would fail to reject (i.e., tentatively accept) the null hypothesis of no discrimination.

When sample sizes are smaller, the Chi-square statistic can sometimes lead to incorrect conclusions. This paper provides examples of some alternative methods which forensic economists may choose to implement when addressing disparate impact and similar smaller sample problems.

The paper begins with a description of the sample problem, a discrimination case of a size easily handled by a "lone entrepreneurial economist" such as described in Piette's seminal 1991 article. The paper then applies two easily computed approximations: Pearson's Chi-square and Yates' Corrected Chi-square. Next, the permutation solution (Fisher's Exact Test) is presented followed by a computer simulated approximation to the exact solution. Finally, the results are compared. In the sample case, the two Chi-square tests would lead to opposite conclusions, and neither is particularly accurate relative to the exact solution or the computer approximation.

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The Sample Problem and the Traditional Chi Squared Solutions

Suppose that a forensic economist or statistician has been retained to analyze whether statistics suggest that a firm discriminated against older workers in a recent layoff. A hypothetical briefing from the client attorney might go as follows: Before the layoff, the firm employed 75 workers of whom 8 were in the protected age group of 40 or more. In the layoff, 10 workers were released of whom 3 were in the protected group. Is there a statistically significant impact on older workers? Indeed, 11% of the workforce was in the protected class while 30% of those laid off was in the protected class. Isn't that strong evidence for discrimination?

At this point the forensic economist regrets that inadequate data are available to run a logistic regression in which each worker's characteristics were used as predictor variables with a dummy for being in the protected group against a dependent dummy variable for being laid off. Since only grouped data are available, contingency table (crosstabulation) methods apply.

The following contingency table is suggested by the data:

Post Layoff Results

	Age: under 40	40 & Over	Total
Full-time employed	**60**	**5**	**65**
Laid Off	**7**	**3**	**10**
Total	**67**	**8**	**75**

Testing whether or not the rows and columns in a contingency table are independent is much like a common "urn" problem which most economists studied in their first statistics course. In the sample problem, suppose that the urn contains the labor force; suppose that those under 40 are represented by green balls and those over 40 are represented by red balls. If 10 balls to represent those to be laid off were drawn randomly from the urn with 67 red balls and 8 green balls, how frequently would there be at least 3 green balls in the sample? Is this frequency more or less than 5% of the time? [1]

As an expedient alternative to actually counting how many possible draws could contain at least 3 balls, statisticians have long suggested re-

[1] Although the critical values in this paper are for 1-tailed tests, the analysis could as easily been constructed using 2-tailed tests. Whether a 1-tailed or 2-tailed test is most appropriate depends largely on the particular application being studied and the given legal jurisdiction. Even for discrimination cases, there remains little agreement. (e.g. Hawley,1992; and Piette, 1992) but the trend seems to be increasingly favoring the 2-tailed test.

casting the problem to one which could be more readily solved. In particular, one might note that if there really is independence between the rows and columns, then the ratios of the first row elements to the column totals should be equal. For example, (60/67) should statistically be equal to (5/8) if the null hypothesis is true. (A little algebra shows that the theoretical values if the null hypothesis of independence is true would have about 2 more than observed in the under 40, and 2 less in the over 40, laid off categories.)

Since such observed ratios are almost never numerically equal, a variety of Chi-squared type tests could be performed to tell whether these two observed responses are "close enough" to the theoretical null-hypothesis values. Economists appear to favor the Pearson Chi-squared statistic (Mansfield, 1986; Piette, 1991; and Gaughan and Hodson, 1993) which in the above 2x2 case is computed to be

$$X^2 = 75*(60*3-5*7)^2 / (67*8*65*10) = 4.526.$$

The 1-tailed p-value associated with this particular value is p = .0167. Using Pearson's statistic, one would reject the null hypothesis of independence at the 5% level since the observed p-value is less than 5%. In other words, one would conclude that being over 40 is statistically related to the probability of being laid off.

The Yates Corrected Chi-squared statistic is also used by numerous statisticians but seemingly little by economists[2]. The Yates statistic makes an adjustment to the Chi-square numerator by subtracting half of the total sample size from the term to be squared. The resulting statistic is believed to better follow the Chi-squared distribution (Hays,1973). In this example, the Yates Corrected Chi-squared statistic is calculated as:

$$Y^2 = 75*(|60*3-5*7|-.5*75)^2 / (67*8*65*10) = 2.488.$$

This particular value has a 1-tailed p-value of .0574. Here one would not reject the null hypothesis of independence; at the 5% level, these results would be viewed as providing no reasonable foundation for discrimination and even less of a foundation if a 2-tailed test was applied.

A Permutation Test Solution: Fisher's Exact Test

The above Chi-square tests are approximate solutions, using an assumed statistical distribution to make probability statements about the frequency with which one might observe the given table if it arose solely by chance. Referring to the urn representation of the problem, one uses these approximations to avoid counting all the various combinations of red and green balls drawn 10 at a time.

Alternatively, one could "brute force" compute every possible permutation of the table and tabulate the results. Such exact tabulation, under the null hypothesis, is the basis for permutation tests (Good, 1994).

In practice, one need not physically compute every possible table. Permutation tests take advantage of combinatorics to facilitate counting.

[2] This observation comes from an informal survey of a dozen business and economics statistics and econometrics books on the shelf, none of which mentioned the Yates correction although presenting the classical Pearson Chi-square.

The permutation test for 2x2 tables was actually introduced in 1934 when R.A. Fisher introduced his Exact Test (Good, 1994). Using the hypergeometric distribution, Fisher calculated the probability of seeing a specific table result. By computing the result for a given table and adding to it the probabilities of all tables with even more extreme distributions, he empirically computed the right hand tail area, the 1-tailed p-value, associated with the observed table[3].

To see how Fisher's exact test is computed, consider the probability of having just the sample table given the total number laid off and total number over 40. The probability so obtained is the base, to which the probability of having more extreme tables would be added. The sum would be the right-tail probability (p-value) to be compared to a 5% threshold value. This initial component of the exact test is given by

$$P_0 = (65!*10!*67!*8!)/(60!*5!*7!*3!*75!).$$

With larger populations, the factorials in a hypergeometric problem quickly exceed the numerical capability of most spreadsheet programs or hand calculators, and are nearly impossible to compute exactly by hand. Consequently, the Exact Test has been previously described as available when sample sizes are very small (e.g. Piette, 1991). Chi-squared tests have generally been used as approximate solutions instead of the exact permutation test to avoid computational intractability.

With fast inexpensive computers, Fisher's Exact Test can be computed directly even on massive tables letting the computer work recursively to identify the various tables and calculate the relevant tail values. The test is widely implemented in general statistics software (e.g. Stata, Systat, Statistica, BMDP) and specialty programs (e.g. StatXact). Computationally, it is no longer necessary to use Chi-square approximations instead of permutation tests.

Applying Fisher's Exact Test to the sample data, one finds that the probability of 3 or more being laid off from the over-40 group is 6.79%. Because the right hand tail value exceeds the 5% threshold (critical) value, we do not reject the null hypothesis of independence. The data would not favor the plaintiff in a disparate impact lawsuit.

Another way to view the exact problem is by conducting a computer simulation of the layoff, allowing a computer-generated random result to be compared to the real-world results. A computer resampling simulation of an urn problem may be easier to explain than combinations and factorials to a jury.

For example, consider the following computerized simulation of the example scenario:

Using a spreadsheet or computer language of choice:

1. Create a 75 element vector in which the first 67 elements are 0 and the remaining 8 elements are 1. The first 67 represent those originally working who are under 40 while the 8 represent those in the protected group.

[3] Upton (1978) discusses manual computation of the 2x2 Exact Test. Freeman and Halton (1951) derive the r x c generalization of the Exact Test.

2. Randomly "shuffle" the 75 element vector.
3. Of the first 10 elements, how many are 1s? Record the answer.
4. Repeat steps 1-3, lots of times.
5. Tabulate the results.

This computationally intensive simulation is a simple example of a resampling test. With enough iterations, it provides an empirical probability distribution for the laying off of older workers in the firm under the null hypothesis of independence between age and employment status. One can explain to a jury that the distribution of results is what would be statistically expected if random sampling was the only force at work and from this one can see how common or unusual the observed "real world" result was.

Using the *Resampling Stats* statistical simulation language, the above simulation was performed 120,000 times (about 3 minutes on the computer) and the results were tabulated into bins of 0,1,...,8 "1s" (e.g. older workers laid off in a given simulation). There were 8,110 entries in the 3 or higher bins. Thus, the empirical probability of 3 or more older workers being included in the layoff purely by chance was 6.76%, the simulated p-value. In this example simulation, the p-value exceeds the 5% critical value, so one would fail to reject (i.e., tentatively accept) the null hypothesis.

This doesn't give any different answer than the Exact Test, but the forensic economist may consider using simulations of layoffs as a heuristic alternative to help explain more complicated statistical results. Even so, there is some mathematical basis for the analyst chosing to rely on the simulation approach as the basis for an opinion rather than just using the simulation results as an illustration of classical tests. The above resampling test is one of the simplest applications of Bootstrapping procedures. Mammen (1991) presents mathematical support for statistical bootstrap simulations. Effron and Tibishirani (1993) provide a more readable explanation of bootstrapping. Simon (1990) is a practical introduction to resampling statistics using the *Resampling Stats* language.

A Comparison of the Results

The attorney wants to know: is there a statistical basis for discrimination charges?

The Exact Test applies, and indicates that there isn't a statistical basis for rejecting age being independent of lay off status, if one uses a 5% threshold level.

The estimated 1-tailed p-values were as follows:

Fisher's Exact Test:	.0679
Resampling Simulation:	.0676
Yates' Chi-Square:	.0574
Pearson's Chi-Square:	.0167

For practical purposes, there is no difference between the Exact value and the Resampling value. The Yates' adjusted Chi-square provided the correct conclusion but with approximately a 15% error relative to the Exact result. The traditional Chi-square provided the incorrect conclusion, rejecting

statistical independence when this was not supported at the 5% level, and with approximately a 75% numerical error.

Again it should be stressed that these are not Monte Carlo results over a wide range of randomly drawn tables; these specific results are based on one hypothetical scenario. However, they illustrate why forensic economists performing analysis in disparate impact cases may choose to use different statistics for analysis than would have been chosen in previous years' discrimination cases with vastly larger sample sizes.

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Principles Of Establishing The Lost Earnings Base

Michael L. Brookshire and Shelly E. Caruthers*

Introduction

The decision regarding the lost earnings base is fundamental in the establishment of lost earning capacity and in the defense of claims for lost earning capacity. Appropriate calculations applied to an inappropriate base yield an inappropriate answer. Yet, the paucity of research into how the base is or should be determined is striking, and the need for such research has been previously discussed in several publications.

This paper may serve to stimulate further research in this important area. The first objective of this survey research was the elucidation of principles which guide forensic economists in determining the lost earnings base. Second, a debate has arisen as to whether forensic economists are, or should be, estimating lost earning capacity that is expected versus "capacity" in the sense of what earnings have been at their greatest or might possibly be. Several of the questions in this survey were specifically designed to determine what forensic economists actually do in deciding between the concepts of expected lost earning capacity, and a notion of earning capacity that is removed from what is expected. It is therefore the second objective of this research to use a survey focused upon the earnings base to reveal how economists interpret the generalized guidance from the courts in earnings base decisions.

Survey Design

This research was a survey of members of the National Association of Forensic Economics (NAFE). One of the authors used the *1994 NAFE Membership Directory*, and its biographies, to choose a sample that included all NAFE members with a master's degree or higher in economics or a related business field—finance, actuarial or quantitative sciences, or accounting. Thus, an obvious and intended bias exists in the sample selected from the NAFE membership. Further research may be useful to explore whether principles determined from these responses might differ if those with other training were also surveyed. Of the 338 mailed surveys, 67 responses were received for a response rate of 19.8 percent. While this response rate to a mailed survey is respectable, it is lower than the response rate for previous surveys of forensic economists. The lower response rate is not surprising since the completion of this survey, compared to those in the past by Brookshire and others, required more time and effort. We have no reason to believe that those responding were (systematically) either

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more or less experienced practitioners in this field. While such a bias is possible, we feel that the response rate is sufficient to establish a strong starting point for how the lost earnings base is determined.

Also, survey respondents were strongly encouraged to include comments regarding each survey question, and these comments are referred to many times in the analyses which follow. Only the open-ended comments to question #14 are included in this article, however.[1]

Survey Results and Analysis

Question 1

John Doe, a journeyman electrician since 1990, died on December 26, 1993, at the age of 34. Following are Mr. Doe's regular and overtime earnings from 1990 to 1993 (in 1994 dollars). What full-year, dollar base would you choose for 1994?

Year	Age	Straight-Time Wages (In 1994 Dollars)	Wage Rate (In 1994 Dollars)	Overtime Wages (In 1994 Dollars)	Total Wages (In 1994 Dollars)
1990	(31)	$23,920	$11.50	$3,450	$27,370
1991	(32)	$24,752	$11.90	$1,785	$26,537
1992	(33)	$25,480	$12.25	$2,481	$27,961
1993	(34)	$26,520	$12.75	$2,200	$28,720

1994 Base = $

Results:

There were 62 usable responses to this question. Following are the mean and quartile values:

Mean = $ 28,571

QUARTILE VALUES		BASE IN DOLLARS
100%	(maximum)	30,443
75%		29,500
50%	(median)	28,720
25%		27,647
0%	(minimum)	25,168

[1] Our original paper, which included open-ended comments for each question, will be provided by the authors upon request. Michael L. Brookshire and Shelly E. Caruthers, "Principles of Establishing the Lost Earnings Base," paper presented at the Western Economic Association meetings, San Diego, California, July 6, 1995.

Analysis:

From the above results, it is obvious that respondents relied on John Doe's past earnings history for a base as opposed to any other alternative. This generalized result flows throughout the survey responses. The mean response of $28,571 appears to be based upon some average of past straight time wages and overtime wages; the median response is exactly the last-year total wages. The upper quartile and maximum are high because some respondents adjusted past wages by inflation; this was incorrect because all values were noted to be in 1994 dollars. The minimum value is an average of straight-time only, with overtime wages not considered.

Question 2

Two weeks before the John Doe trial, the attorney tells you that the Union business agent will testify that there was a greater than 50% chance that Mr. Doe would have been promoted to lead electrician for his crew on January 2, 1994. The rate of pay for this position would have been $17.00/hour (in 1994 dollars) with approximately the same number of overtime hours as Mr. Doe received as a journeyman electrician. How would this change the full-year, dollar base for 1994 in Question #1?

1994 Base = $

Results:

There were 53 usable responses to this question. Following are the mean and quartile values:

Mean = $ 34,054

QUARTILE VALUES		BASE IN DOLLARS
100%	(maximum)	39,549
75%		38,000
50%	(median)	34,362
25%		29,582
0%	(minimum)	26,520

Analysis:

This question was designed to see how respondents considered additional information from a fact witness in this example. With a mean of $34,054 as opposed to a mean in Question 1 of $28,571, it appears that this additional information would be considered. However, this mean is lower than the $37,839 which exclusively considers $17.00 per hour plus an average of overtime. This appears to be because respondents were skeptical about the fact that Mr. Doe had not actually earned $17.00 per hour at his date of death. Some respondents said they would not change their wage base due to this new information, and even more made the comment that they would show both conclusions.

Question 3

A 35-year-old housewife is rendered permanently and totally disabled on January 15, 1993. She is a high school graduate and has not worked since she married at age 21. Before the injury, she stated that she may go back to work in the fall of 1993 when her only child entered junior high (7th grade). What full-year, dollar base would you choose for 1994?

1994 Base = $

Results:

There were 31 usable responses to this question. Following are the mean and quartile values:

Mean = $ 16,031

QUARTILE VALUES		BASE IN DOLLARS
100%	(maximum)	32,644
75%		20,000
50%	(median)	15,870
25%		10,400
0%	(minimum)	-0-

Analysis:

This question deals with establishing a wage base in a situation where wage data specific to the individual are unavailable. Due to the low number of usable responses (31), it appeared that respondents had difficulty in answering, or were reluctant to answer, this question. The range on this question was large, with a minimum of zero to a maximum of $32,644, and the spread among quartile answers is notable. It is difficult to determine what the mean of $16,031 is based upon because, in the comments, we see that answers were based on several different sources. These included minimum wage and high school graduate earnings from the P-60 series. These failures to respond and variations likely result from the core issue so apparent in this case—is it earning capacity or expected earnings? Of course, every set of facts is different and judgment may differ on what, if anything, is "expected." Age of the individual comes to be an important variable in such judgments.

Question 4

Carol Carter was a 30-year-old housewife and full-time student at the time of her death on January 1, 1994. She had not worked since resigning a clerical position at age 24. Mrs. Carter was a junior at a local college working toward a Bachelor's degree in accounting; she had a 2.0 of 4.0 grade point average.

What education level(s) would you assume?
and/or
Regardless of when you would start a loss, what would be your base(s) in 1994 dollars?

Results:

This question asked for the education level that would be selected as the base (4a) and/or the base in 1994 dollars (4b). There were 62 usable responses to 4a, with the following distribution of answers:

1.) Bachelor's Degree	46.8%
2.) Some College, No Degree	11.3%
3.) Associate Degree	14.5%
4.) Some College, No Degree *and* Bachelor's Degree	16.1%
5.) Associate Degree *and* Bachelor's Degree	8.1%
6.) High School Graduate *and* Bachelor's Degree	3.2%

Analysis:

46.8 percent of respondents would have projected Bachelor degree earnings only. 27.4 percent of respondents report they would do two methods, one being a Bachelor's degree scenario and the other something less than Bachelor degree earnings. Many mention that they would look at earnings at younger age brackets (i.e.. 18-24, 25-29) due to the six year separation from the labor force.

Results:

There were only 28 usable responses to the second part of the question. Following are the mean and quartile values:

Mean = $ 21,996

QUARTILE VALUES		BASE IN DOLLARS
100%	(maximum)	33,094
75%		25,490
50%	(median)	22,800
25%		19,265
0%	(minimum)	8,000

Analysis:

The low response to this question probably reflects the difficulties and issues already discussed in regard to question #3. The mean and median are closest to the earnings of females with an Associate degree which is inconsistent with 4(a). The low number of responses to this part of question 4 makes one put more emphasis on the conclusions derived in 4(a). The on-going education in this example seems to significantly affect the expectation that an earning capacity has been lost, and alternative scenarios are sometimes used.

Question 5

Jane Jones was a single, 29-year-old high school graduate, who died in early 1994, with the following wage history.

Year	Age	Earned Income (In 1994 Dollars)
1985	(20)	$15,600
1986	(21)	$16,200
1987	(22)	$15,500
1988	(23)	$18,100
1989	(24)	$15,800
1990	(25)	$17,200
1991	(26)	$15,900
1992	(27)	$16,900
1993	(28)	$19,500

At the date of death, Ms. Jones was working as an Administrative Assistant and had held similar clerical and supervisory positions, with several different employers, since 1985. What full-year, dollar base would you choose for 1994?

1994 Base = $

Results:

There were 62 usable responses to this question with the following mean and quartile values:

Mean = $ 18,454

QUARTILE VALUES		BASE IN DOLLARS
100%	(maximum)	23,581
75%		19,500
50%	(median)	19,500
25%		17,375
0%	(minimum)	-0-

Analysis:

Although the mean is $18,454, 25 percent of respondents selected the last full year of earnings as the base and the median response is the last-year value. Many question the earnings in the last full year to be sure that there is not a one-time event. However, they selected the last full year of earnings assuming this was not the case. The $17,375 appears to come from an average of past years, and the zero minimum is due to a state law that prohibits loss to the estate where there are no dependents. Beginning with the next question, responses clarify the weight given to the $19,500 value in these responses. It is not that the last year value is so high; it is because it is last.

Question 6

John James owned a small construction company at the time of his death on January 1, 1994. Following are the (Schedule C) profits of the business...

Year	Age	Earned Income (In 1994 Dollars)
1987	(44)	$65,000
1988	(45)	$63,000
1989	(46)	$55,000
1990	(47)	$41,000
1991	(48)	$32,000
1992	(49)	$39,000
1993	(50)	$34,000

What full-year, dollar base would you choose for 1994?

1994 Base = $

Results:

There were 45 usable responses to this question with the following mean and quartile values:

Mean = $ 37,637

QUARTILE VALUES	BASE IN DOLLARS
100% (maximum)	47,000
75%	40,200
50% (median)	36,500
25%	34,000
0% (minimum)	23,571

Analysis:

The mean and median are closest to an average of the last 3 years of earnings ($35,000) and the last full year of earnings ($34,000). Many respondents want more information about the drop in earnings that has occurred since 1987. This may be the clearest indication thus far that forensic economists do *not* estimate earning "capacity" in an earnings base as the best ever earned by that individual. Rather, they are looking for the earnings level that is *expected*, and they give disproportionate weight to data and facts from more recent years. The mean and median are some average of the last years when Mr. James is at his lowest earnings rather than from 1987 when his earnings were the highest.

Question 7

Ernest Sample was a 42-year-old railroad worker (locomotive engineer) for 20 years before his wrongful death in an automobile accident. You have seven years of his earnings history before his death early in 1994, as follows, but no further information.

Year	Age	Earned Income (In 1994 Dollars)
1987	(35)	$37,000
1988	(36)	$43,500
1989	(37)	$56,000
1990	(38)	$44,000
1991	(39)	$49,000
1992	(40)	$42,000
1993	(41)	$51,000

What full-year, dollar base would you choose for 1994?
(Please continue to use a before-tax base, as FELA law does not apply in this example.)

1994 Base = $

Results:

There were 63 usable responses to this question with the following mean and quartile values:

Mean = $ 48,567

QUARTILE VALUES		BASE IN DOLLARS
100%	(maximum)	54,687
75%		51,000
50%	(median)	48,357
25%		46,071
0%	(minimum)	42,000

Analysis:

The mean and median responses are closest to an average of the last 5 years of earnings, although the averages for the last 7 years, 6 years, 5 years, and 3 years are not far from the mean and median responses. When a variable history exists, economists do construct a base from some average of past years, with the only question being the number of years that should be averaged. No "rule" seems to have emerged regarding the number of past years to be considered. Rather, forensic economists exercise judgment in making the wage base decision, case-by-case. For example, an economist may decide to drop the first two years from the average because these years seem to be different from what is happening in the last five years. Forensic economists also seek more information on the why's of the past earnings history and data on the future, such as overtime or promotions, to help make sound judgments on wage bases that will be projected through the future. From the scores and comments, it is apparent that the rationale for wage base decisions is the desire to reflect what future earning capacity is expected to be. If, in contrast, earning capacity were considered to be the highest earnings level that had ever been reached, $56,000 and $51,000 were available choices and $51,000 was in the last year.

Question 8

Kristi Doe was wrongfully killed at age 34, early in 1994. After obtaining a liberal arts degree in music, she enjoyed a modicum of fame and fortune as a singer at ages 24 and 25. After a year of personal problems, Kristi married, became a music teacher in the city schools, and worked continually in that vocation until her death.

Year	Age	Earned Income (In 1994 Dollars)
1984	(24)	$ 93,600
1985	(25)	$167,000
1986	(26)	Can't obtain; assume no or low earnings
1987	(27)	$ 28,000
1988	(28)	$ 29,500
1989	(29)	$ 29,500
1990	(30)	$ 31,250
1991	(31)	$ 32,000
1992	(32)	$ 32,500
1993	(33)	$ 33,600

What full-year, dollar base would you choose for 1994?

1994 Base = $

Results:

There were 64 usable responses to this question with the following mean and quartile values:

Mean = $34,095

QUARTILE VALUES	BASE IN DOLLARS
100% (maximum)	47,700
75%	34,637
50% (median)	33,600
25%	33,600
0% (minimum)	30,907

Analysis:

With a mean of $34,095, base decisions obviously reflected teacher earnings, not the previous, high earnings as a singer. The mean and quartile scores are somewhat high because several respondents trended the 1993 earnings to 1994. Therefore, the median of $33,600 (which is her last-year earnings in a continually increasing series as a teacher) is probably more representative of the responses. In this question, clear choices were available for an earning capacity that reflects the best earnings that the individ-

ual ever made, but this is clearly rejected. She is not *expected* to return to this higher earning capacity. As in previous questions, there is a desire by respondents for more information to fine tune their future projection, such as labor contracts for teachers.

Question 9

Linda Lawson was single and worked approximately 40 hours per week as a waitress in a local restaurant. Her income history, if available, for the 7 years before her death (early in 1994) is as follows:

Year	Age	Earned Income (In 1994 Dollars)
1987	(34)	$4,200
1988	(35)	$6,300
1989	(36)	$6,700
1990	(37)	$5,892
1991	(38)	$7,200
1992	(39)	can't obtain
1993	(40)	$9,020

Her mother states that Ms. Lawson made at least 15 percent of her waitress income in tips that were unreported on her income tax return and not reflected in the above figures. What full-year, dollar base would you choose for 1994?

1994 Base = $

Results:

There were 60 usable responses to this question with the following mean and quartile values:

Mean = $ 9,452

QUARTILE VALUES		BASE IN DOLLARS
100%	(maximum)	12,379
75%		10,373
50%	(median)	9,480
25%		9,020
0%	(minimum)	-0-

Analysis:

Forensic economists utilize the last year of earnings when faced with a fluctuating earnings history that trends upward to the last year. The mean and median responses are above the earnings level reported for the last year, with the upper quartile (75%) at the last full year reported earnings level plus the full 15 percent in unreported tips. There is sharp disagree-

ment over whether unreported income should be considered in establishing an earnings base.

Question 10

Dr. George Egghead, the owner of an established, consulting business in economics, retired early at age 55 and turned the business over to his son. Wrongfully killed early in 1994, Dr. Egghead, Sr. had engaged in part-time consulting in an unrelated field for three years after his age 55 "retirement." While Dr. Egghead was working on his first novel since age 55, nothing had been submitted to a publisher. Excluding passive income from his original business, Dr. Egghead's reported income for the 10 years before his death is as follows:

Year	Age	Earned Income (In 1994 Dollars)
1984	(49)	$195,000
1985	(50)	$247,000
1986	(51)	$235,000
1987	(52)	$170,252
1988	(53)	$183,212
1989	(54)	$167,920
1990	(55)	$132,517
1991	(56)	$ 36,918
1992	(57)	$ 41,620
1993	(58)	$ 45,920

What full-year, dollar base would you choose for 1994?

1994 Base = $

Results:

There were 60 usable responses to this question with the following mean and quartile values:

Mean = $ 54,826

QUARTILE VALUES		BASE IN DOLLARS
100%	(maximum)	190,129
75%		49,338
50%	(median)	45,920
25%		45,920
0%	(minimum)	41,000

Analysis:

The mean value of $54,826 in this question is somewhat deceiving because of the large difference between pre- and post-retirement earnings. There were four responses out of sixty in the $160,000-$190,000 range. The

median response is exactly the same as the last-year earnings after the retirement and after the career change.

Forensic economists were also asked to consider the possibility of earnings from a novel. Respondents did not consider this possibility. Dr. Egghead had written no previous novels, and a manuscript had not been completed or submitted to a publisher.

Question 11

Shirley Smith had worked steadily as a real estate agent for ten years, and her earnings history for this period is shown below. Mrs. Smith was killed in an automobile accident, when driving to "show" a home, early in 1994.

Year	Age	Earned Income (In 1994 Dollars)
1984	(37)	$17,620
1985	(38)	$33,214
1986	(39)	$28,912
1987	(40)	$36,227
1988	(41)	$40,003
1989	(42)	$38,212
1990	(43)	$32,918
1991	(44)	$48,663
1992	(45)	$27,212
1993	(46)	$39,716

What full-year, dollar base would you choose for 1994?

1994 Base = $

Results:

There were 60 usable responses to this question with the following mean and quartile values:

Mean = $ 37,539

QUARTILE VALUES	BASE IN DOLLARS
100% (maximum)	43,500
75%	38,829
50% (median)	37,454
25%	36,120
0% (minimum)	31,344

Analysis:

Again, forensic economists focus on the individual earnings history, but they also give special consideration to the cyclical nature of the industry in which this individual works. Most respondents opted to average several past years in determining the base that is expected. Their disagreement is in regard to the number of past years to average.

Question 12

Mr. Evan Edwards either moved, or was recruited, to new companies and jobs frequently in his post-college career as a computer systems analyst. You have his wage earnings and his employer contributions to fringe benefits for nine years before his untimely death early in 1994. His career, and his annual wage earnings, were steadily progressing. Using your own methods, you have valued the employer contribution to fringe benefits, as a percentage of salary earnings, in each past year as follows:

1985 = 21.6%
1986 = 21.9%
1987 = 27.6%
1988 = 24.3%
1989 = 18.8%
1990 = 32.3%
1991 = 23.5%
1992 = 21.6%
1993 = 23.0%

What percentage-of-salary estimate would you make for the value of lost fringe benefits in 1994?

1994 Fringe Benefit Base = _____%

Results:

There were 63 usable responses to this question with the following mean and quartile values:

Mean = 23.25%

QUARTILE VALUES	FRINGE BENEFIT PERCENT
100% (maximum)	24.30
75%	23.84
50% (median)	23.00
25%	23.00
0% (minimum)	22.50

Analysis:

Forensic economists are most likely to use a last-year fringe percent to project the future even with a 9-year pattern that is highly variable. The median response and the mean response reflect the last-year, fringe benefit percentage. As in previous questions that addressed wages, forensic economists focus on how the past yields what is *expected* for the future. Years with values as high as 32.3 percent are not emphasized, as they would be if capacity meant the best ever attained. Also, as with the wage base, forensic economists look for reasons behind the numbers. While focusing on this person's specific history, their judgment may be affected by the mix of fringe benefits.

Question 13

Assume that you must make an estimate of post-injury (residual) earning capacity for an age 37 male, who was permanently and partially disabled early in 1991 just before his 34th birthday. His full-time earnings at age 32-33 (in 1989-1990) as an engineering technician, working full-time, were $31,000 and $32,300 (in 1994 dollars), respectively. After annualizing the absence of two post-injury months off work, his full-time earnings in the same job, still working full-time, were $33,400 in 1991 and $34,128 in 1992 (1994 dollars). Through one-half of 1993, his (annualized) earnings would have been $34,479 (in 1994 dollars). Your side's Ph.D. vocational expert says that, by January 1, 1994 because of pain, Mr. Doe's annual earning capacity will be $16,000 annually (in 1994 dollars) at best. What full-year, dollar base would you choose for post-injury (residual) earnings in 1994?

1994 Base = $

Results:

There were 58 usable responses to this question with the following mean and quartile values:

Mean = $ 19,419

QUARTILE VALUES		BASE IN DOLLARS
100%	(maximum)	35,700
75%		18,479
50%	(median)	16,000
25%		16,000
0%	(minimum)	7,500

Analysis:

With a mean score of $19,419, it is obvious that respondents gave more weight to the opinion of the vocational expert than to the actual, post-injury earnings. The median response was the vocational expert's opinion. There was a problem with several respondents misreading the question and subtracting $16,000 from the 1993, annualized earnings of $34,000 to derive a net loss of $18,000. The question asked for the post-injury base, and this mistake was one reason for the higher mean score. It is clear from the answers and comments that forensic economists defer to the vocational expert—even with many caveats expressing discomfort regarding the past earnings track record.

Question 14

In the space which follows, please make additional comments about principles or guidelines that you follow in establishing the lost earning capacity base, or any other comments related to this topic or this survey.

Respondent Comments:

Focus on earning capacity, not the job or industry. Yet the longer the work history, the stronger the case that recent (if earnings had steady growth) or average (if earnings varied) actual earnings is the best measure of earning capacity. Without a work history, use census median for education level.

Use common sense.

As much as possible reconstruct actual case situation and estimate base based on the historical record. Attempt to estimate a base from historical facts plus estimate of future condition had no injury or death intervened.

Tend to be on conservative side, particularly if data is limited and/or record is variable and/or inconsistent.

I often provide alternative calculations so the jury has an option.

I sometimes compare actual earnings over a certain time period to average earnings in the same profession or industry over the same time period. I then assume that actual earnings from the time of injury to trial would have maintained the same proportional relationships. This approach can be easily grasped by a jury and works well when there is a considerable lag between injury and trial.

The guiding principle is to project what we, using our best judgment, expect would have been earned absent death or injury. Abstract notions of earning "capacity" (rightly) make no sense to a trier of fact because they make the injured, or survivors, more than whole.

To establish guidelines would be difficult-each case requires different information and the use of different methods—this survey does not reflect the real world or the cases I work on-earnings very seldom rise at a constant rate.

Answering questions about the base amount without also addressing the rate of increase into the future jeopardizes the validity of the answers. Decisions on base and rate of increase must be made somewhat jointly.

I try to look at as much information as possible behind the earning record to understand, if possible, the factors at work. I then use what makes the most economic and common sense.

Would look at historical earnings and make projections from these values. Would make significant adjustments to such data in the event case specific info justified it.

First, good survey! I'm increasingly driven as a principle and guideline to use a "simple-to-explain" and "appears-fair" approach to picking the base.

My most important comment is that some surveys, if not all, should be sent to practitioners (like me) with decades of experience. (30 years so far.) It makes no sense to ask economists with only a few years—except to reveal their ignorance—which is, itself, useful knowledge.

Summary and Conclusion

In choosing a lost earnings base, forensic economists look to the specific earnings history of the individual, when available, and exercise judgment in determining the earning capacity that should be expected in future years. When addressing the damages category of lost earning capacity or earning power, therefore, they are estimating the *expected* loss of earning capacity,

rather than capacity in the sense of what it has been at its greatest or might possibly be. Principles of establishing the lost earnings base are as follows:

1. In determining an earnings base, forensic economists rely when possible upon the earnings history of the specific individual, versus government statistics or other sources.
2. Overtime wages will be considered in a base, although the overtime portion of the base may be calculated differently than is the straight-time earnings portion of the overall earnings base.
3. Straight-time earnings which have trended upward may lead the forensic economist to use the last full year of earnings as the earnings base; many would nevertheless take an average of several years of past earnings.
4. Forensic economists may choose a base by relying upon fact witnesses, often as an additional scenario to a base chosen without the opinions of such witnesses.
5. When the base cannot be derived from an individual earnings history, the forensic economist may be more likely to show alternative scenarios.
6. There is no consensus on the issue of earning capacity versus expected earnings in a situation where a working-age adult has no recent history of participation.
7. Recent and continuing activity in an education or training program is often considered in establishing an earning capacity base that is expected.
8. Even when an established earnings history does not continuously move upward, forensic economists place disproportionate weight on the last full year of earnings. This is especially true if wages have generally progressed upward to the last-year value, and absent information that the last year value does not result from one-time effects that should not be considered in estimating lost earning capacity.
9. Forensic economists do not utilize a "capacity" approach to choosing an earnings base for an individual with an established earnings history. Even if the individual achieved a high "capacity" through his or her own earnings history in a previous year, the forensic economist views the entire earnings history in choosing an earnings base that is expected. Disproportionate weight is given to data and facts from more recent years.
10. When the earnings history of an individual has been significantly varied, up and down, from year to year, the base is an average of several, past years. The number of years utilized from the recent past appears to be a matter of judgment and may depend upon the particular earnings pattern and the facts of the particular case.
11. Forensic economists disagree about whether earnings that are expected but have not been reported should be included in the earnings base.
12. In establishing the base, earnings before a retirement or career change are not considered, unless a return to the previous earnings pattern is expected.
13. In judging an earnings history, forensic economists may seek and consider information on the peculiarities of specific occupations and of the product market.

14. In establishing the base of employer contributions to fringe benefits, as a percentage of wages, forensic economists also focus upon the earnings record of the individual; also choose what is expected versus the highest capacity ever attained; and either use a last-year value or some average of recent years.
15. In establishing the base for residual (post-injury) earning capacity, forensic economists give great deference to the opinion of a vocational/rehabilitation expert.

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The Role Of Economics In Regulatory Takings Cases

Robert R. Trout and William W. Wade*

Introduction

Two classes of takings stem from the language of the Fifth Amendment of the Constitution: physical takings and regulatory takings.[1] Physical takings result from governmental condemnations, while regulatory takings often impose an inverse condemnation on a property owner. This article considers the role of economics in determining when property owners have been subject to a taking of property, and how they should be compensated for their economic loss.

Government action that results in a physical taking of private property for public use requires *just compensation* for the loss of the property. If the government entity does not make appropriate compensation, the property owner has the right to seek an inverse condemnation.[2] The loss to the property owner is the fair market value of the property, including, if appropriate, the business goodwill value of a displaced business. In California, the just compensation guarantee of the constitution has been characterized as cost-spreading to *socialize the burden* where society as a whole ought to foot the bill.[3]

Governmental regulatory actions, such as enforcement of the Endangered Species Act, also may deny the use of property and result in the loss of its economic benefits to the owner. The Supreme Court's 1922 *Pennsylvania Coal*[4] decision extended the Fifth Amendment protections to property owners for regulations that go *too far*. The law on compensating private property owners due to regulatory takings lacks clarity in comparison to the rulings on physical takings cases. While the criteria to examine in Chief Justice Holmes' balancing standard have been clarified, particularly since the 1978 *Penn Central* case, a clear balancing test has eluded the courts. The decision test remains dependent on *ad hoc factual inquiries* into the *character of government action* compared to the *severity of private eco-*

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[1]The Fifth Amendment states, in part: "Nor shall private property be taken for public use, without just compensation."

[2]*Rose v. State*, 19 Cal. 2d 713, 720 (1942).

[3]See *Holtz v. Superior Court* 3 Cal. 3d 296, 303 (1970) cited in Michael Berger, "'Customer' Service: When Does a Police Action Become a Claim for Inverse Condemnation?" Los Angeles *Daily Journal*, July 6, 1995.

[4]*Pennsylvania Coal v. Mahon*, 260 U.S. 393 (1922). The Supreme Court ruled that when regulation inflicts a loss of "a certain magnitude" on the property owner, then "regulation goes too far" and just compensation is due for the taking. Besides struggling with the *global* constitutional/philosophical notion that society's rights must be balanced with property owners' losses to determine if compensation should be paid, jurists have been consistently unable to agree *locally* what that *certain magnitude* is. (Global and local are italicized to emphasize their mathematical meaning in context.)

nomic impact.[5] Little *just compensation* has been paid by governments over the years, apparently because courts have been reluctant to *socialize the burden* of regulatory takings. The recent passage by the House of Representatives of the Private Property Rights Act and the pending Senate version[6] would remove one source of uncertainty about compensation for a regulatory taking, and would change the form of economic analyses required in federal regulatory takings cases. The differences between the types of analyses needed under the proposed legislation and under historic judicial decisions, are shown in Figure 1. Because the courts have awarded so little compensation to property owners, and made the awards with such inconsistency, the decision test is labeled as a judicial decision in Figure 1 to call attention to the vagaries of the past applications of the *Pennsylvania Coal* balancing standard.[7]

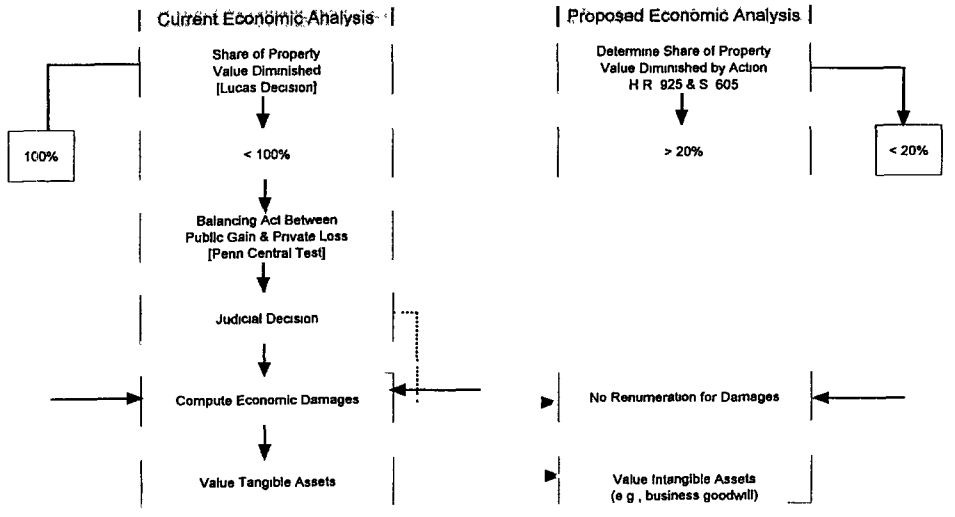

Figure 1. Comparison of Current and Proposed Methods of Determining Takings Compensation

Economic Analysis Within Regulatory Takings

Economic analysis is central to the assessment of a regulatory taking at three stages of the judicial process:

[5]*Penn Central Transportation v. New York City*, 438 U S. 104 (1978). The Penn Central case established the two prongs in italics to evaluate in the balance, but did not say how they should be balanced. The case introduced the now-famous parcel-as-a-whole ruling as the basis (denominator) for determining the diminution of value, as well as the "distinct investment-backed expectations" language. On the basis of these factors, Penn Central was denied its claim.

[6]H.R. 925 and S. 605.

[7]See Wade (1995). This article reviews the changing views of criteria on both sides of the balance and concludes that reform should be based on a predictable economic test that incorporates both efficiency and equity measurements to eliminate the vagaries evident in the published case law.

1. The Categorical Screen: To determine the share of the property value denied to the owner by the regulation. According to the *Lucas* standard, if the property owner has been denied all economic beneficial use, it is a categorical taking and compensable without case-specific factual inquiry into the public interest balance.[8]
2. The Balancing Process: To examine the balance between public gain and private economic loss as a result of the regulation. The *Penn Central* Test for less than categorical takings provides the best discussion of the elements to examine for balancing the *character of government action* versus the *severity of economic impact* on affected private property owners.
3. Measuring Damages: Where a taking did occur, just compensation (damages) must be determined for the economic injury. These damages consist of lost tangible asset values, and when appropriate, lost intangible asset values, primarily *business goodwill.*

Tangible assets are those that show up on a balance sheet, including real property. Examples include land, buildings, equipment, accounts receivable, notes receivable, etc. Intangible assets are other assets of the business that can be individually identified and valued. Examples include rights, privileges, assemblages of data and know-how, patents, copyrights, trade secrets, customer lists, special libraries, reputation, management skills, trained labor force, a favorable location, etc. Goodwill is the economic value of a business apart from tangible and other identified intangible assets, representing an extra return to characteristics of the property that cannot be separately valued.

Goodwill is defined in *California Code of Civil Procedure* (section 1263.510(b) as:

> . . . benefits that accrue to a business as a result of its location, reputation for dependability, skill or quality, and any other circumstances resulting in probable retention of old or acquisition of new patronage.

Most intangible assets can be transferred to a new business location without any significant economic loss. However, business goodwill is often tied to a specific physical location, and therefore its value is often diminished when a business is forced to relocate, or denied a permit to expand due to a regulatory prohibition. While many states allow recovery for business goodwill losses, they are not currently recoverable in federal takings cases.[9]

The Current Standard

The current method of determining economic damages recoverable by a property owner is based on the three stages of the judicial process listed above. The denial of the *total* economic beneficial use of a property constitutes a *per se* compensable taking under the *Lucas* decision. If the property

[8]*Lucas v. South Carolina Coastal Council*, 112 S. Ct. 2886 (1992)
[9]*U. S. v. General Motors Corp.*, 323 US 373 (1945).

owner has lost all economic productive use of his property, then the taking of the property is compensable without any further investigation into legitimate government purpose and the balance between public interest and protection of private property. Economic analysis therefore plays an initial role in determining the extent of economic loss to a particular property owner resulting from a regulation. In most cases regulations reduce, rather than eliminate, the economic uses of someone's property; thus, the *Lucas* standard will apply to only a small portion of situations.[10]

If the loss of productive economic use is not 100 percent, as shown in Figure 1, then the evaluation process moves forward into a balancing of the character of the government action and the severity of the private economic impact due to the taking. The balancing standard is derived from various court cases, beginning with *Pennsylvania Coal,* and continuing through the *Penn Central, Nollan,* and *Dolan* cases.[11] The taking determination depends on the *balance* of public interest versus severity of private loss, and requires an examination of the case-specific facts to sort-out this balance.[12]

Published case records have not examined economic evidence for the balance of public benefits and private losses, although it would appear natural, especially from the vantage point of 1995, to evaluate the *Penn Central Test* in a cost-benefit framework. The benefits to the public could be measured concretely if the courts followed the dictates set forth in the Attorney General's 1988 *Guidelines for the Evaluation of Risk and Avoidance of Unanticipated Takings*, which was issued pursuant to Executive Order 12,630. The *Guidelines* lists attributes of the character of government regulation and the steps in the determination of private economic losses to guide the assessment of whether a regulation will likely result in a compensable taking. Updated to reflect *Nollan,* and *Dolan*, and advances in the tools of economic measurement in recent years, public benefits could be estimated for balancing with private losses based on the five criteria listed below.

Criteria to Determine Societal Benefits of Government Regulation

1. Demonstrate that the regulation achieves, and *substantially advances,* a legitimate state interest.
2. Demonstrate that the regulatory constraints are no more than necessary to achieve the desired effects, and could not be obtained in a more cost-effective way.
3. Determine the degree to which the instant property-related activity or use contributes to (has *nexus* with) the harm that is the target of the proposed regulation:
   - The less direct, immediate and demonstrable the contribu tion of the instant activity, the greater the likelihood that a taking will be found.

[10] A possibly perverse effect of *Lucas*, noted in Justice Stevens' dissent, is presented by Mandelker (1993, p. 295): "The result is that *Lucas* allows courts to reject, not approve, taking claims in the vast majority of land use cases in which they are likely to arise."

[11] *Dolan v. City of Tigard*, 114 S Ct. 2309 (1994); and, *Nolan v. California Coastal Commission*, 483 U. S. 825 (1987).

[12] The shortcomings of the balancing process are described more fully in Wade (1995).

4. Quantify the impacts of the unconstrained use of the property, and compare those to the regulatory solution imposed on the property owner:
   - Is there a measurable impact avoided, and does the regula tory action mitigate it, even *roughly proportionately* as held in *Dolan*?
5. Estimate the value of public benefits achieved by the regulation.

These guidelines provide a framework to evaluate the *Penn Central Test* in a cost-benefit context. Economists' tools of benefits measurement have been sufficiently advanced in the last ten years for the courts to demand quantitative evidence of benefits in the balancing process.[13]

Economic analysis plays an obvious role on the cost side of the ledger. Published case law has made considerable progress at conforming court determined notions of value to good economic practice. The following steps, which are developed from published cases, suggest the criteria that go into the measurement of private economic losses caused by a regulation.

Criteria to Evaluate Private Losses due to Regulation

1. Establish the timing and amounts of invested capital, and property interests to demonstrate a legitimate, *reasonable* investment-backed expectation.
2. Document actual and/or planned activities at the site proscribed by the regulation that show the lost opportunity for the property's economic use:
   - To show the ability of the property and business to supply the activities/uses intended; and,
   - To show market conditions that create the opportunities foreclosed by the regulation.
3. Establish time period of the loss: a specific temporary period, or in perpetuity.
4. Estimate tangible asset values reduced by the regulatory constraint:
   - Determine portion of property retaining any economic use, if any.
5. Estimate intangible asset values, including business goodwill, reduced by the regulatory constraint:
   - Does economic viability remain, although at a lower level?
   - How severe is the economic loss as measured by the change in net present value of the ongoing and planned enterprise?
6. Determine elements of risk related to the project:
   - Project completion risk;
   - Product market risk (i.e., sales);
   - Financing risk; and,
   - Other risks.

[13]Appendix D—Compensatory Restoration Scaling Methods, to NOAA's Notice of Proposed Rulemaking for 15 CFR Part 990, Natural Resources Damage Assessments, 60 *Federal Register* 149, August 3, 1995, 39,825 - 39,826, provides a list of methods for valuing ecosystems in relation to restoring natural resource to their non-injured baseline. The economic methods on the list are deemed to be suitable empirical estimation approaches under 15 CFR Part 990, and, therefore, would be suitable for similar applications under a regulatory taking, for instance, in relationship to denial of use to protect habitat under ESA.

7. Estimate the reduced reasonable investment-backed profit expectations caused by the regulation.
8. Capitalize the lost earnings at a discount rate consisting of the market cost of money, plus risk factors to reflect the level of uncertainty of future cash flows.

The greater the diminution of profit expectations, the greater the likelihood that a taking has occurred and compensation should be paid. Except for the *Lucas* 100 percent standard, however, the percentage of diminution of property value is not a stand-alone determinant of a compensable taking. Walter's review of 26 regulatory takings cases between 1915 and 1994 revealed that the taking determination is unrelated to the percentage diminution of property value. Walter's data show nine examples where the diminution ranged between 75 percent and 97.7 percent for which no compensation was paid for a regulatory taking. Another seven examples with reduced values ranging from 88 to 100 percent were judged regulatory takings and compensation was paid.[14] Under the current standard, unless the loss is total, the private loss must be compared to the public benefits directly related to the proscribed use of the property in order to rule on a takings case. In cases reviewed, case-specific facts other than the degree of economic loss governed the judicial decisions as to whether a taking had occurred that should be compensated, *Lucas* excepted.

While no court has done so yet, the evaluation of case-specific facts could be done using economic analysis to match private costs against public benefits. This cost-benefit framework would facilitate a predictable economic test to correct the arbitrary nature of prior takings decisions and preclude the *ad hoc* threshold approach of the 104th Congress' proposed legislation to reform regulatory takings law.

The Proposed Standard

The proposed legislation emphasizes a "no fault" interpretation of the Fifth Amendment, which requires government compensation when regulatory action reduces the value of private property by a certain "bright line threshold." The pending Congressional bills substitute a 20 percent threshold for the *Lucas* 100 percent standard, and eliminate the balancing provisions that have developed through case law since 1922. Under the proposed law, diminution of economic value alone is the basis for compensation. Claimants need only demonstrate that their property value has been reduced by more than 20 percent to be compensated. Issues related to the legitimate public interest (other than nuisance exclusions) no longer apply. The damages *per se*, or the amount of compensation that would keep the property owner whole, would be equivalent to the amount calculated in conducting the 20 percent threshold test.

On its face, this is a simple economic test that looks at the value of the affected property before and after the effect of the regulation. The drawback

[14]Walter (1995), p.338. Walter's discussion emphasized methods to improve economic loss measurement and ignored the important judicial question at the heart of regulatory takings cases: How far can a regulation diminish economic viability before just compensation must be paid? Clearly, the decision in the cases listed in his article hinged on judicial views of offsetting public benefits not the economic losses to property owners. Methods to improve the evidence on both sides of the ledger are needed.

is that both the pre-regulation property value, and the post-regulation property value have to be measured by the two parties. Any disagreement in property values will likely result in protracted litigation, just as we observe now. The eight criteria listed above still apply to the process of measuring a takings loss. The *Florida Rock* and the *Whitney* marathon cases illustrate how government entities and affected property owners will fundamentally disagree over estimates of market demand, the ability to supply, and the risk of the project foreclosed by regulation, as well as valuation methods, even if Congress passes a new "simplified" takings law.[15] Opposing sides will continue to litigate on the criteria listed above. If the regulatory impact is, for example, real but "small," opposing sides will have difficulty in agreeing that the reduction in property value is 19.9 rather than 20.1 percent. Estimates by opposing experts will have ranges of error that may render the "bright line threshold" as murky as the existing balance approach. In reality the proposed threshold test for a taking may be no more certain than the existing balancing approach.[16] Neither does it allow any consideration of the efficiency consequences of regulation; all prior decisions under the case-specific balancing standard considered the public's right to public health, safety and welfare as well as basic fairness to the property owner.

Estimating Economic Damages

The basic economic methods used to measure both personal and corporate damages are well founded and presented in a variety of text books and journal articles.[17] Value for any asset is generally determined by computing the present value of future cash flows to the owner of the asset. This type of model can be used to determine the value in place, or investment value, of the asset. Another concept of value is fair market value, which requires a notion of some trading market for assets where buyers and sellers determine prices, such as a securities market.

In takings cases economic losses are of two types: loss of economic use of the taken property, and where allowed, loss of business goodwill. Walter (1995) summarizes the different economic models that have been applied in previous condemnation and takings cases. In the case of a condemnation and physical taking of property, the property value as a rental asset (or

[15] *Florida Rock Industries v. United States* 8 Cl.Ct. 160 (1985) entered the court system ten years ago over denial of a permit by the Corps of Engineers to mine 98 acres of aggregate purchased in 1972 for $2.9 million, before any regulatory prohibition subsequently passed by federal law. The case was tried by U.S Court of Claims, reversed by the Federal Circuit court in 1986, *Florida Rock II*, 791 F. 2d 893 (1986); retried by Claims court in 1990, *Florida Rock III*, 21 Cl.Ct. 161 (1990); and, reversed again in 1994 by the federal circuit, *Florida Rock IV*, 18 F. 3d. 1560, 38 ERC 1297. So far, no damages have been paid.
Whitney Benefits, Inc. v. United States, 926 F. 2d 1169 (1985); 18 Cl.Ct. 394 (1989); 752 F.2d 1554 (1985) cert. denied., 116 L.ED 2d 354 (1991) was a coal case. Like the prior case, plaintiff purchased the coal property before the 1977 passage of the SMCRA, which prohibited mining the coal. Government witnesses claimed that the coal property was valueless while Whitney demonstrated a competent mining plan, market demand, and reasonable investor expectations. The United States finally paid $60 million in damages in 1995.

[16] See Shabman and White (1995, p. 21) for more discussion of the analytic problem of "establishing(ing) fair market values with precision and without dispute from either the agency or the landowner."

[17] Brookshire (1987) contains a good review of estimating damages for a variety of litigation cases. See also Foster, Trout and Gaughan (1994) for damage models relating specifically to businesses.

other highest and best use) is usually determined by using a DCF model or a comparable sales model. Other types of experts may be necessary to value property that has rights to underground resources, such as coal, water or petroleum, for example.[18] In cases involving a loss of business goodwill, diminution of business goodwill value is usually measured by an economist or business appraiser. The loss of business goodwill is related to, but not always identical with, a loss of business profits. Past profits, and expectation of future profits, primarily determine total business value. Total business value can be described as the sum of tangible asset value plus intangible asset (goodwill) value.[19]

(1) Total Value = Tangible Asset Value + Intangible Asset Value

The value of business goodwill, when recovery is allowed, can be determined by valuing the total business entity, and then subtracting the market value of the tangible assets, or by using what is called the "excess earnings model". The excess earnings model divides the earnings into two streams, one stream of income related to a return on the tangible assets and one stream of income related to a return on the intangible assets. The segmenting of the income streams allows the appraiser to value each component separately, and thereby determine a separate value for business goodwill.[20]

The diminution in economic value of the property and related business is the proper measure of loss in a takings case. The change in economic value should reflect the change in expected future cash flows to be earned from using the property, in present value terms. The correct expression of the change in value is the change in discounted cash flow, as measured by the DCF model. The DCF model is shown in Equation 2, below.

(2) $$\text{Price} = \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t}$$

Where CF_t = Cash flows in period t, k is the discount rate, and t is the time period.

While economists believe this is the most appropriate model for measuring damages, published case records indicate courts have considered numerous damage concepts and approaches in measuring takings related damages. The eight criteria listed previously emphasize the *Wheeler IV* standard—lost opportunity—as the appropriate measure of loss.[21] Loss in estimated income from the property's planned (demonstrable) highest and best use is the appropriate damage concept in 1995. Damages under this concept are best measured using a DCF model.

[18]For a discussion of valuing coal in a takings case, see *Whitney Benefits, Inc. v. United States*, op cit. Another noteworthy case involving valuing limestone in a takings case is *Florida Rock Industries, Inc. v. United States*, op. cit.

[19]Business valuation is discussed in many available texts. A summary of the concepts and sources can be found in Trout (1994).

[20]Goodwill valuation is discussed in many valuation texts See Pratt (1989); or, Desmond and Kelley (1980), for example.

[21]*Wheeler (IV) v City of Pleasant Grove*, 833 F.2d 267 (11th Cir 1987).

Walter's survey of regulatory takings cases indicates that the DCF model has been neither widely embraced, nor roundly condemned.[22] He is correct in asserting that this model took several years of acceptance in the academic world and the investment world before being accepted by regulatory commissions for use in utility rate cases.

The DCF model is one of two market based models which can be used to demonstrate and measure a change in economic value.[23] The DCF model is directly related to both the Net Present Value (NPV) and Internal Rate of Return (IRR) models used in investment analysis, which in turn can be used to examine the original *investment backed expectations* associated with any property.[24]

In cases of partial economic loss, diminution of goodwill value can be measured by initially computing the change in operating profits to the affected business owner resulting from the regulation, and then examining how that change to profits would affect the value of the business. The change in value of the business can be determined with the DCF model, or with a market capitalization model, which is a derivative of the DCF model. It is possible that the change in total value could be partially related to a change in the value of the tangible assets and also to a change in the value of the intangible assets (e.g., goodwill). However, if the tangible assets are not affected by the regulation, then all of the impact from the regulation to operating profits should be allocated to the goodwill portion of the business value.

As shown in Figure 1, the first step is an examination of the *Lucas* test: was 100 percent of the economic use taken away from the property owner. This step requires an economic analysis of the potential for economic use after the effect of the regulation on the landowner. If there is no economic value left, then the *Lucas per se* rule applies, and the landowner should be fully compensated for loss of economic use of the property.

If the taking is not 100 percent, then under current law the balancing between private property owner losses and public gains must be examined and evaluated. At the federal level, this means the portion of the property taken must be determined, and the owner must compute its economic loss. This loss would most often be the value of the property taken, as measured by the economic models described above.

At the state level, the taking may impose a compensable business goodwill loss on the property owner. For example, a fruit grower in California was denied use of a significant portion of his land for fruit production. The grower lost not only about half of his fruit bearing trees, but also incurred a significant loss in the amount of fruit through-put to his nearby fruit canning and fruit processing plants. The taking caused not only a loss of property and its use, but also a secondary "down stream" loss to the remaining businesses of the grower. Any loss to the economic use of the remaining portion of the property is referred to as a severance damage. In some states, severance damages are compensable to the property owner separate from any loss directly related to a condemnation.

[22]Walter, op. cit., p 346.

[23]The other model is the market capitalization valuation model. In valuing common stock investments it is referred to as the price/earnings (P/E) model.

[24]This was an important factor in the *Penn Central* case.

The economic analysis in this particular case extended to the reduction in gross revenues, and the loss of profits resulting from the effect of the taking on the direct use of the land as well as the downstream business required the produce of the land as an economic input. The loss of a significant portion of the fruit caused a decline in the economic value of the related businesses resulting from the state's taking of a portion of the grower's land. The DCF model was used to determine both the value of the physical property taken and the size of the severance damages to the grower resulting from the taking. In this case, the taking was a physical taking, rather than a regulatory taking. The economic analysis would be the same in either situation.

In other cases the economic impact on the business is more direct, but the effect on the value of the business may be less obvious. For example, a bank branch was required to move to a less desirable location as a result of local regulations. The move to a new location affected the branch's level of potential deposit growth, but not its instant level of deposits. The loss of potential deposits in turn reduced the potential future lending capacity of the branch, which thereby reduced potential branch operating profits. The reduction in potential profits affected the value of the branch and its related business goodwill.

In this case, the loss of deposit growth was computed by comparing the condemned branch deposits with an index of deposits for six similar branches that did not move, as shown in Figure 2. Notice that deposits for the affected branch do not keep up with the growth in deposits of the bank's nearby branches. Once the loss of deposits was determined, profits and reduced business goodwill value were estimated using standard financial accounting and valuation tools. This is an example of a business goodwill loss resulting from a physical taking of the property through condemnation. The economic analysis would be the same if a regulatory taking had occurred which prohibited expansion of the bank's business at its original location.

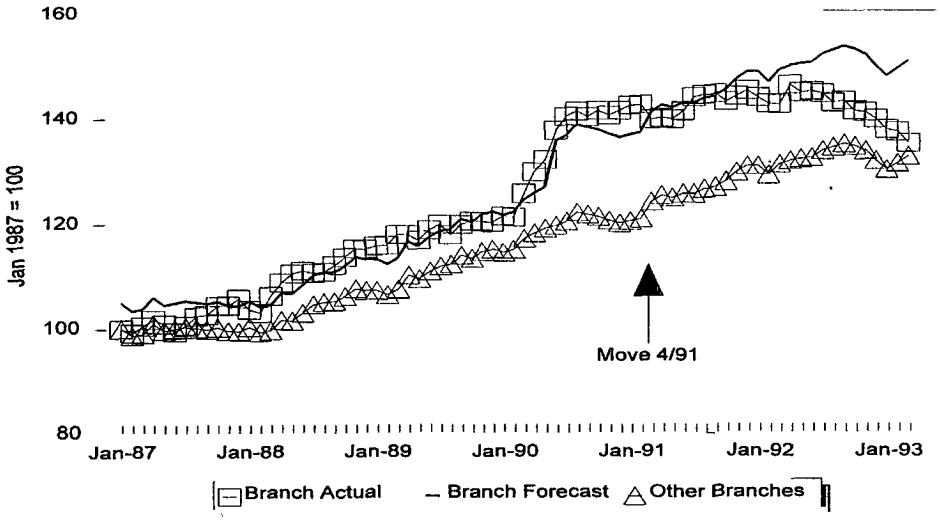

Figure 2. Regression of Bank Branch Index, Jan. 1987 - Mar. 1993

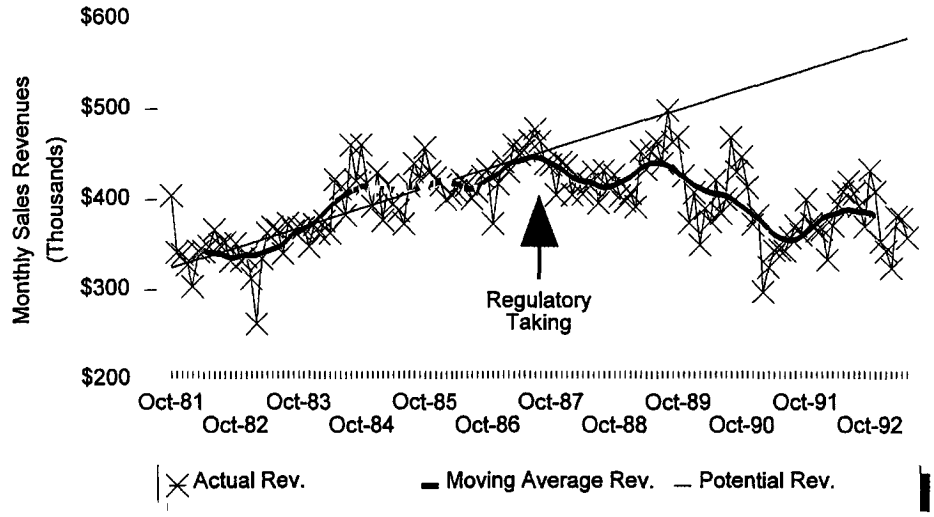

Figure 3. Total Revenues: October 1981 to May 1993

In another case involving an inverse condemnation, a business faced the loss of use of a portion of his property because of certain land use regulations that affected only a portion of the landowner's property. The loss of partial use of the property severely affected the level of business conducted on the unaffected parcel of land, thereby rendering the business nearly worthless. Figure 3 compares revenues before and after the impact of the regulations. The graphical presentation of historic revenues shows that revenues declined significantly after the regulation was implemented. The change in revenues which are quite obvious in Figure 3, can easily be translated into a change in net profit. The DCF model was used to translate the change in profits to a change in economic value, and thereby a determination of the business goodwill loss resulting from the regulations. This is an example of a regulatory taking case; however, the analysis of the goodwill loss would be the same if a portion of the property had been physically taken in a condemnation, rather than reduced in value through the effect of government regulations.

Conclusions

Estimating economic damages is the traditional role of economists in both regulatory takings and condemnation cases. However, there are two additional roles for economists identified herein: examining the effect of the *Lucas* standard, and determining the costs and benefits under the Penn Central Test. If the Congress passes a new regulatory takings law, there will no doubt be substantial valuation disputes about economic losses, particularly those near the 20 percent threshold figure that would trigger compensation. If the Congress does not pass its version of regulatory takings reform, benefits estimation should become the basis for providing the evidence on the public's side of the regulatory ledger. The cost-benefit framework should become the economic tool of choice for resolving takings cases.

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Litigation Economics Digest 1(1), 1995, pp 75—84

Jumping The Hurdle To NAFE's Internet Site And Data Galore

Charles W. de Seve*

As an introduction to NAFE's Internet World Wide Web Site, this discussion will guide you through several simple exercises of finding data and extracting it. First we will employ *America Online* to connect to the Internet and use its "Web Browser" to reach the NAFE "Home Page" screen. Next we will use the NAFE screen as a springboard to the Securities Exchange Commission (SEC), the Bureau of Labor Statistics (BLS) and other data sources. At each location, we will browse informational screens which explain their data and how to get it. Finally, we will download a BLS employment file onto our hard drive to use in Excel or other spreadsheets.

The "Web" or "WWW," as it is known, is simply one of many methods of using the Internet to reach information and extract it. Its advantage is its color graphics and its embodiment of other methods which you may know as "FTP" or "Gopher" to reach data. Whether or not these are familiar to you, the Web embraces them and does their work for you as necessary.

Another advantage of the Web is its "hypertext" linking. This means that the key words or icons which appear in a screen are portals to other screens containing information related to those keys. This is much like an automatic index which not only references a page but turns to it. By mouse-clicking a key word your screen will jump to underlying information and subsequently jump *ad infinitum* through key words on those screens. Your Web Browser also lets you easily move backward and forward among these links.

It is beyond the scope of this article to help you connect to the Internet and start Web Browsing. There are many ways to reach the Internet and many Web Browsers to connect you to NAFE using Macs or PCs. If you know how to get on-line you will follow the rest of this discussion easily. If you have never reached the Web, or even the Internet, there are simple ways to do so: just sign on AOL or Pipeline using their free software. (Can there be anyone who by now has not received a dozen AOL disks in the mail?) Follow their instructions to reach the Internet and their Web Browser.

If you have a university or other Internet connection, seek out a student nerd who will automate you in an hour or two for student wages. The opportunity cost for forensic economists to initiate themselves is high without computer expertise or something like an AOL connection.

The next step is reaching NAFE's "Home Page," the image you see in Figure 1. It is both NAFE's greeting and a set of hypertext links to virtually all economic data on the Internet. When your Internet service requests a "URL" or address for linking somewhere, type in NAFE's Web address:

http://cei.haag.umkc.edu/nafe[1]

(Type it in exactly as shown, then put this in the address book or "Hot List" that your software saves for future reference.)

*American Economics Group, Inc , Washington, DC.

[1] NAFE's new address effective September 20, 1995.

NATIONAL ASSOCIATION OF FORENSIC ECONOMICS

About NAFE

Ethics Statement of NAFE

The Nafe Newsletter

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Members of the Board and Officers

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The Bureau of Labor Statistics

The Panel Study of Income Dynamics

Financial Resources on the Internet

Economics Related Resources

Jokes about Economists and Economics

[NAFE] [JFE] [LINKS]

Questions or Comments
National Association of Forensic Economics

Figure 1

NAFE's Home Page (Figure 1) will appear in a few seconds for you to scroll up and down. Notice the italicized key words and icons you may click to jump elsewhere. To reach the Bureau of Census, for example, just click on that name next to the census icon. Click on "The NAFE Newsletter" to view it or click the "Directory of NAFE Members" to see the latest alphabetical listing.

In the next few pages we will demonstrate how to retrieve a company's 10K SEC filing, examine information about "The Panel Study of Income Dynamics," and download some BLS employment data for your spreadsheet to use.

Reaching Securities Exchange Commission Data

Use the NAFE Home Page as the springboard to the SEC by clicking on the phrase "Economics Related Resources." You will jump to the screen shown in Figure 2. Note that the address changes to the one shown under "Current URL." Imagine typing in one of these cumbersome strings each time you move about and the advantage of hypertext links becomes apparent.

The arrow points to "EDGAR Database" which is the data bank for 10K returns and is well known to SEC aficionados. Almost instantly the screen jumps to that of Figure 3, a welcome and description of the EDGAR project. Clicking on "Securities and Exchange Commission" brings Figure 4 into view and prompts you to search their index. Let us say you were looking for a description and financial report on USAir Group, Inc. By typing "USAir" into the search field, and clicking "Search," the screen jumps to Figure 5.

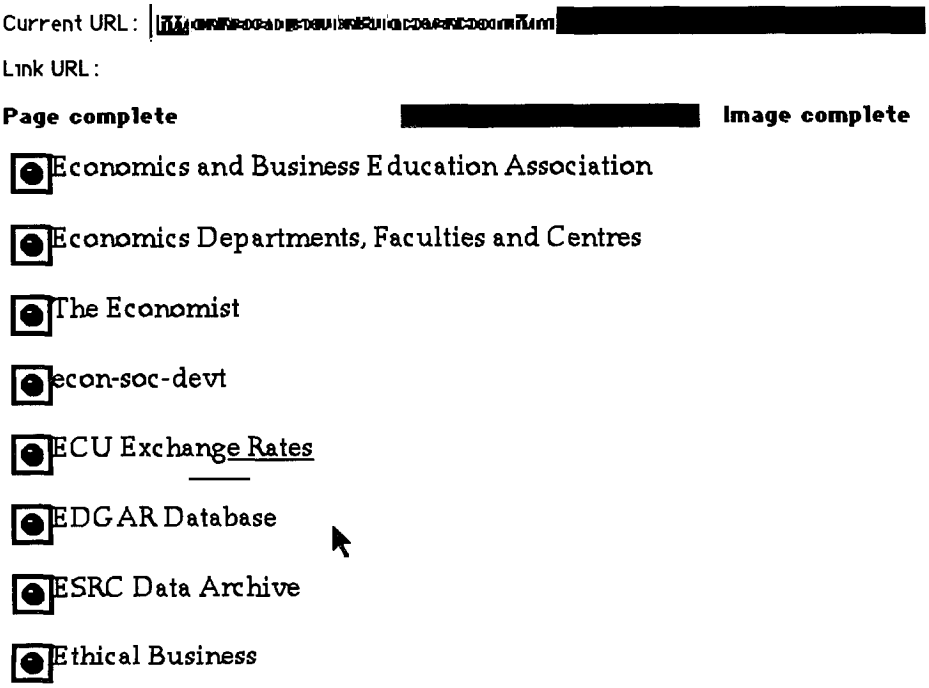
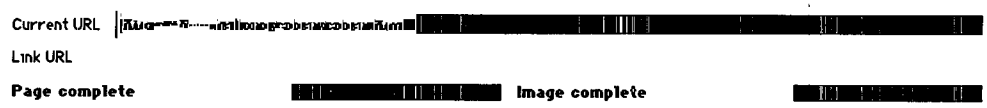


Figure 2



Welcome to the Internet EDGAR Dissemination project. The Internet EDGAR Dissemination project will allow you to receive any 1994 and 1995 filings to the Securities and Exchange Commission that are available to the public. Non-electronic filings, filings that are not available to the public, and any data prior to 1994 will not be available here.

The Internet EDGAR Dissemination project is a research project to investigate how such large data archives can be made easily available to the general public. This demonstration project uses the Internet as a testbed for research into ways that EDGAR can easily be used by the general public. We will make available any special-purpose code that is developed as a result of this project.

This project is being performed in conjunction with New York University's Stern School of Business EDGAR development project.

Access to underlying legal documents, including the Securities Act of 1933 and the Securities Exchange Act of 1934 are available from the Legal Information Institute and the Center for Corporate Law.

Figure 3

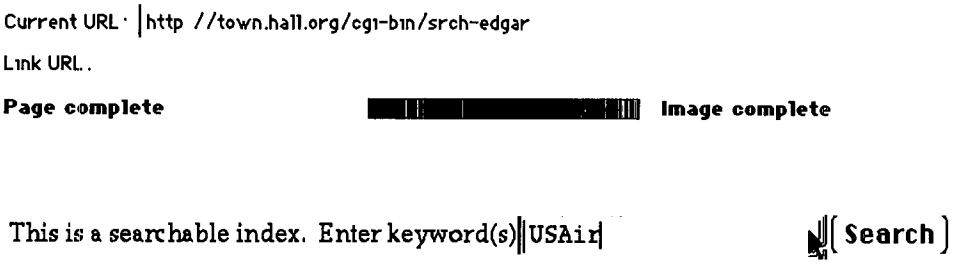


Figure 4

The query for "USAir" found 53 matches which can be seen by scrolling the screen. The first few are shown in Figure 5. We clicked on the key indicating the 10K filed 12/31/93 (not shown), and the screen jumped to Figure 6. This is an index of USAir's entire filing of that data and allows further jumping to each of the descriptions and financial tables indicated. Try it yourself and see the versatility and depth of data available. By making the appropriate selection in your Browser, the screens can be copied or dumped onto your disk and then brought into a word processor or spreadsheet.

Inspecting "A Panel Study Of Income Dynamics"

Return to the NAFE Home Page by exiting the EDGAR and SEC screens. To do this select "Back" several times in your Browser menu or enter the NAFE address directly or from your Hot List. The NAFE image in Figure 1 again appears.

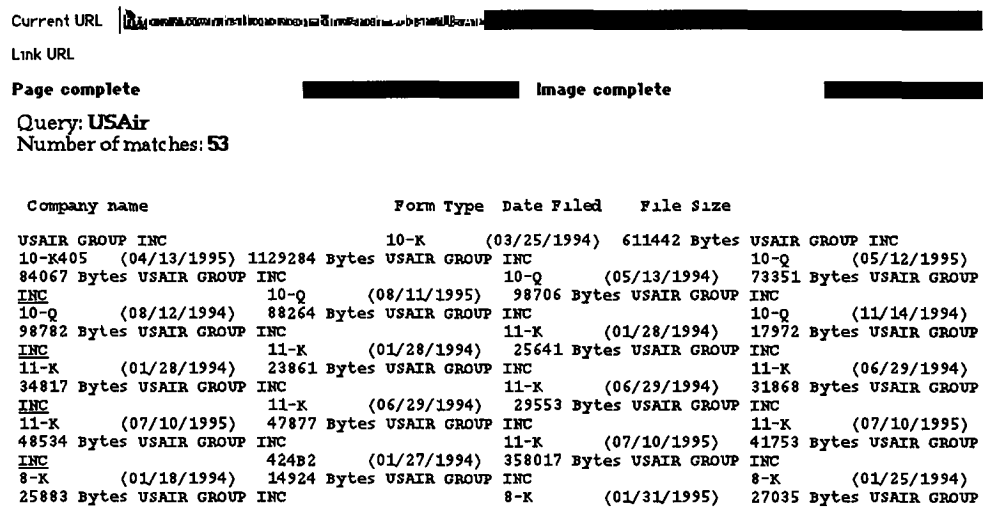


Figure 5

This time click on the words "The Panel Study of Income Dynamics" next to its colorful icon. The home page (Figure 7) of that program at the University of Michigan appears, as confirmed by the new URL address showing at the page top. Scrolling down brings Figure 8 into view and shows a new set of key words.

At your leisure click and browse the user's guide and other PSID information. Clicking on "PSID dataset information" jumps to Figure 9 and further information on data availability and key word links to the complete questionnaires. This introduces other possibilities but also barriers to new PSID users.

To read the questionnaire for 1992, as noted at the bottom of the screen, requires special software. You will be able to download the file to your hard drive, but to access it you need software called "Acrobat." Scrolling the screen further (not shown) reveals how you can find and download "Acrobat" to read the questionnaire and other files. On the Web, barriers often pose their own solution.

Downloading BLS Employment Data

Again return to the NAFE Home Page. When there click on the link for the Bureau of Labor Statistics and watch the screen jump to the image in Figure 10. Several choices are available including "BLS Data (LABSTAT)" the BLS main datasets. Click on it and when the next screen appears click on "Time Series."

The Web Browser automatically switches to "Gopher" mode to reach BLS files which reside off the Web. Eventually, Figure 11 comes to the screen displaying icons of folders containing lists of data series and tables which can be accessed. By clicking on the "EI" folder another list appears containing titles of both formatted tables and unformatted data files of various time series. (If you download files rather than formatted tables, you will need the files layout and variable dictionary, to which you will be directed at the time.)

Current URL [redacted]

USAir Group, Inc
and
USAir, Inc
Form 10-K
Year Ended December 31, 1993

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Figure 6

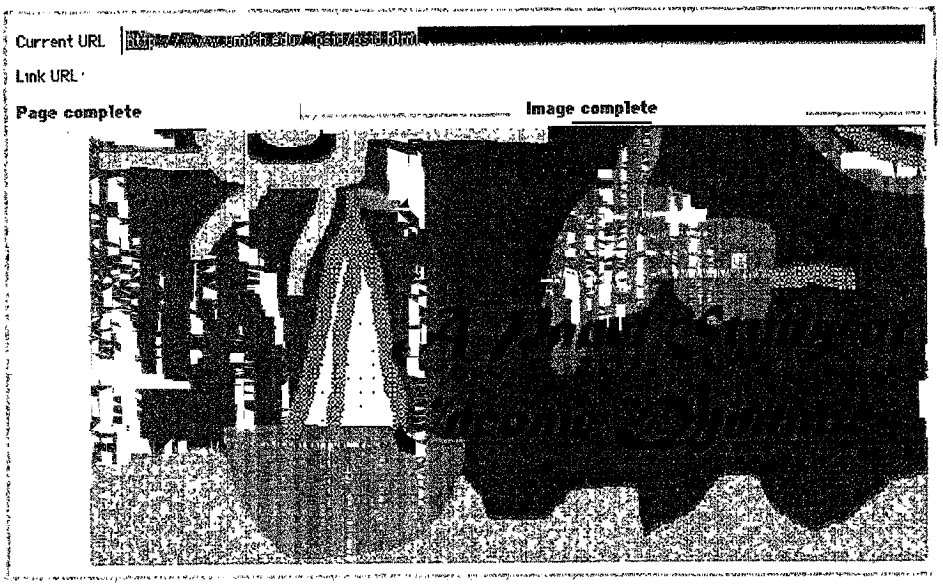


Figure 7

The Panel Study of Income Dynamics

The PSID is a longitudinal survey of a representative sample of US individuals and the families in which they reside. It has been ongoing since 1968. The data are collected annually, and the data files contain the full span of information collected over the the course of the study. PSID data can be used for cross- sectional, longitudinal, and intergenerational analysis and for studying both individuals and families.
For more information click on one of the following highlighted topics:

- Whats new?
- Newsletter (English)
- Users Guide
- PSID dataset information
- PSID documentation (English)
- Bibliography
- Address and contact information
- Transitional Data Analysis

bressan@umich edu

Figure 8

Current URL [redacted]

Link URL

Page complete [redacted] **Image complete** [redacted]

- limited PSID staff counseling (since nobody wants the release of these files to add significantly to the time it takes to release the fully-cleaned and documented versions.

The data is provided in an ASCII format with SAS and SPSS data definition statements.

- 68-94 Individual File - Early Release 12,480K expands to 100,145K; LRECL=xxxx and xxxx cases 8/24/1995
- 94 Family File - Early Release 4,138K expands to 37,106K; LRECL=xxxx and x,xxx cases 8/24/1995
- 93 Family File - Early Release 3,469K expands to 30,299K; LRECL=3,034 and 9,980 cases 6/16/1995

Images of our Questionnaires can be found here!

Questionnaires

- 1993 questionnaire 2,607,677 bytes
- 1993 notes 425,828 bytes
- 1992 questionnaire 2,101,989 bytes *Please note...Section K (Latino Family Background) uses very small fonts. You can use the Acrobat reader to expand the type or you can print it. This effects the pages numbered 102-109 which is referred to by the reader software as 103-111 (due to the presence of cover sheets).*

Figure 9

Current URL [redacted]

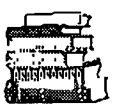
Link URL

Page: 1228 of 1651 bytes [redacted] **Image: 0 bytes received**

Bureau of Labor Statistics

BLS

Click on the following topics



Major BLS Programs

BLS Data (LABSTAT)

Employment and Unemployment Statistics

- *Labor Force Statistics from the Current Population Survey*
- *Nonfarm Payroll Statistics from the Current Employment Statistics Survey*
- *Covered Employment and Wages*
- *Occupational Employment Statistics*
- *Foreign Direct Investment*

Figure 10

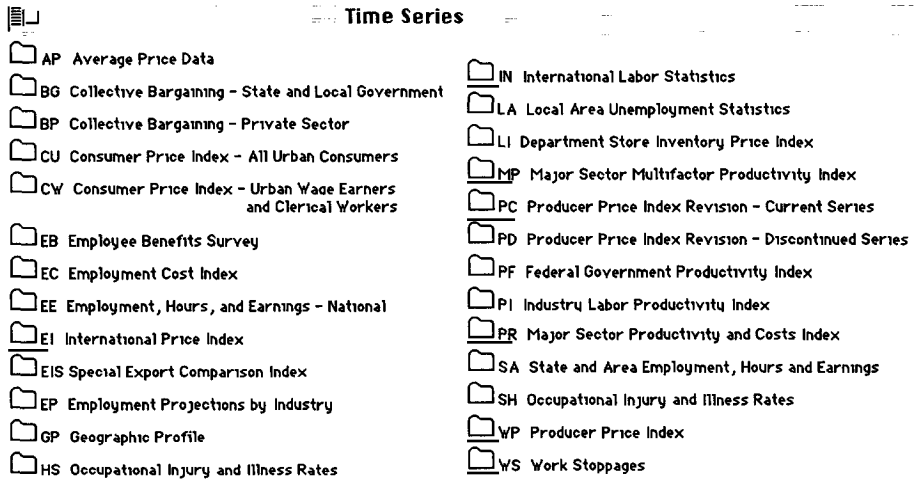


Figure 11

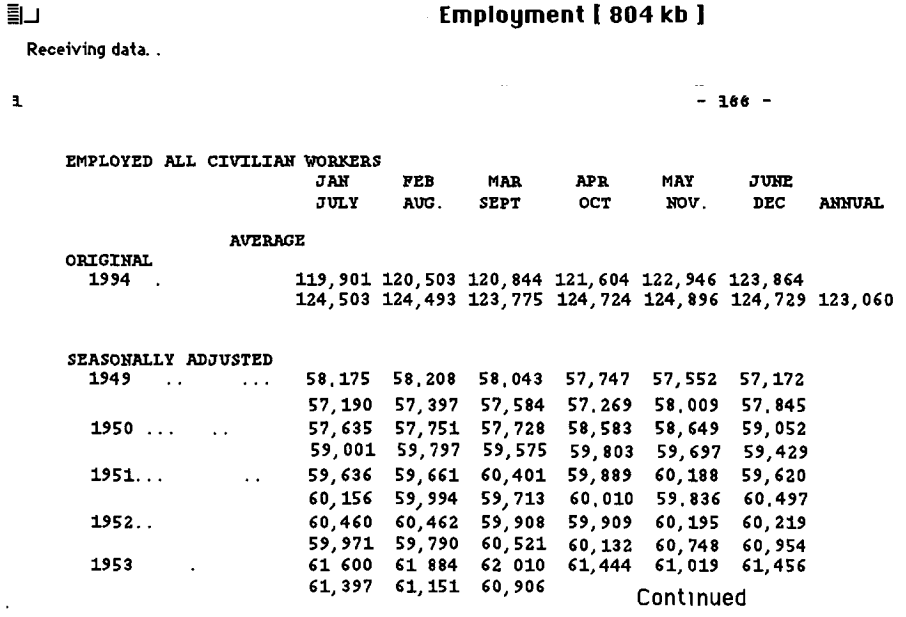


Figure 12

Selecting the table of employment causes Figure 12 to scroll onto the screen, line by line. By previously setting your Browser's menu option to save the screens to disk or now selecting its download option, the table will be placed on your hard drive. Time series are downloaded only and do not appear on the screen. Either can be read into a spreadsheet and, using the

parsing commands found in Excel, for example, moved into columns and rows for analysis.

Note that some BLS files are compressed because their extreme size would make downloading outlast your patience. These must be decompressed using the complement of the software that compressed them. Common decompression programs are found free or as shareware on most commercial services, PKZIP or STUFFIT, for example. This is an inconvenience only the first time you encounter compression, after that, with your toolkit complete, decompression is a mouse-click or two away on either the MAC or PC. It may surprise you that software can be found to decompress PC- compressed files on the MAC and vice-versa, but they are available in various "Shareware" directories on AOL and other services.

A Final Word

The Internet and Web need not be a mysterious abode of economic data reached only by experts. You will encounter the highest hurdle the first time or two you try to log on. By getting some local help from your university computer science students or by using one of the high end commercial services, your first encounter will be streamlined. After that, practice and experiment. There is nothing at risk but a few dollars and your time to become familiar with data sources and find clever new routes to comprehensive data sets. Like it or not, the Web is the way of the future, and at some point will be the only source for many data items you will need as a forensic economist. Government agencies have begun to scale back printed data, relying instead on electronic media to disseminate what used to be printed.

Litigation Economics Digest 1(1), 1995, pp 85—93

Use Of Hedonic Loss Claims In The United States: A Survey

Stanley R. Keil and H. Brian Moehring*

This paper reports the findings of a survey over the years 1992 and 1993 on the pervasiveness of claims for hedonic damages and other non-monetary losses in 49 states. The paper is part of an ongoing research project regarding hedonic damages.

Our interest in hedonic damages versus other non-monetary claims stems from a debate in economic theory which is of interest to practitioners only because it will explain the specific form of the questionnaire. Hedonic losses originally were based on an approach that used the victim's own decisions regarding occupational and product injury risk (prior to the loss) to evaluate the damages due to injury or loss of life. It has since evolved into a notion of "joy of life" or, in economic jargon, "consumer surplus." Our survey was designed, in part, to determine whether hedonic damages are being used as one more non-monetary damage, e.g., consumer surplus, or as a way to place a value on the victim's "whole life." Further, this survey was designed to reveal the current disposition of states towards accepting hedonic damages. Our intention is to use the results in correlation studies of other political/legal issues.

Initially, 152 questionnaires were distributed to the supreme court clerks, bar associations, and trial lawyer associations of the 50 states and the District of Columbia (which does not have its own supreme court). Forty nine states (excluding Pennsylvania) and the District of Columbia returned usable responses and two or more responses were received from six states. No usable responses were returned by state supreme clerks. Nine supreme court clerks responded that they were not in a position to answer the questionnaire. No other supreme court clerks responded. By and large the responding clerks interpreted the questionnaire as a request for data that was not kept. The bar and trial lawyer associations that responded interpreted the questionnaire as a request for information about practice. Many bar associations responded with letters indicating that they had referred the questionnaire to that state's trial lawyer association as they thought that body could more appropriately respond to the issues raised. As a result more than ninety per cent of the respondents were trial lawyers and/or officers of their state associations. The initial survey drew responses from 23 states. We then resurveyed only the trial lawyer associations in the nonresponding states. This survey was followed up by telephone calls. If the trial lawyers association office did not have anyone willing to respond, we solicited names of knowledgeable lawyers in private practice and telephoned them to see if they were willing to respond. As a final resort we used the listings of all law firms in *Martindale-Hubbell Law Directory* (1991) and

*Respectively, Economics Department, Ball State University, and Competitiveness Council Of Indiana, Inc.

chose three firms specializing in personal injury cases in the capital cities or largest cities of the final non-responding states. At the end of two years of re-contacting associations and firms we closed the survey with usable responses from all states except Pennsylvania. The questionnaire is shown as Exhibit 1.

Exhibit 1. Economic Losses Questionnaire

Please Identify your State

Please check the affiliation to which this questionnaire was addressed
State Trial Lawyers Association
State Bar Association
Private Practice

The following questions ask that you rate your state with regard to each of several kinds of compensation that may be sought by a plaintiff. Circle the most appropriate response.

I. Please respond with respect to the *acceptance of testimony* in your state for:

Type of loss claimed	Prohibited in my state acceptable	Virtually unacceptable	Acceptable but used infrequently	Widely
Economic loss due to the loss of a child	0	1	2	3
Pain & suffering	0	1	2	3
Grief & bereavement	0	1	2	3
Love & affection	0	1	2	3
Acts of kindness unique to a child[1]	0	1	2	3
Act of kindness unique to a marriage[1]	0	1	2	3
Joy of life - hedonic[2] loss	0	1	2	3

II. Please respond with respect to whether *explicit compensation may be sought*, in your state, for:

Economic loss due to the loss of a child	0	1	2	3
Pain & suffering	0	1	2	3
Grief & bereavement	0	1	2	3
Love & affection	0	1	2	3
Acts of kindness unique to a child[1]	0	1	2	3
Act of kindness unique to a marriage[1]	0	1	2	3
Joy of life - hedonic[2] loss	0	1	2	3

Notes: [1]These would exclude loss with a market equivalent such as mowing a lawn, doing dishes and like household chores, but would include such things as watching a child sing in a grade school assembly.
[2]Hedonic damages refer to monetary awards intended to compensate victims for loss of the joy of life to the victim only. They would be separate from pain and suffering which the victim may have incurred or be incurring and/or the grief and bereavement felt by survivors.

III. To your knowledge, in your state has compensation been granted for:

Type of loss claimed	Prohibited in my state	Virtually no grants	Granted infrequently	Granted frequently
Economic loss due to the loss of a child	0	1	2	3
Pain & suffering	0	1	2	3
Grief & bereavement	0	1	2	3
Love & affection	0	1	2	3
Acts of kindness unique to a child[1]	0	1	2	3
Act of kindness unique to a marriage[1]	0	1	2	3
Joy of life - hedonic[2] loss	0	1	2	3

Notes: [1]These would exclude loss with a market equivalent such as mowing a lawn, doing dishes and like household chores, but would include such things as watching a child sing in a grade school assembly.
[2]Hedonic damages refer to monetary awards intended to compensate victims for loss of the joy of life to the victim only. They would be separate from pain and suffering which the victim may have incurred or be incurring and/or the grief and bereavement felt by survivors.

IV. In the next ten years do you foresee hedonic damages in your state becoming:

a. prohibited.
b. pragmatically insignificant.
c. more important but remaining less so than categories such as pain and suffering, loss of earnings, grief and bereavement, etc.
d. as important any of the other categories of loss mentioned above.

V. Which of the following best describes your best guess regarding the use of hedonic damages in your state:

a. currently prohibited but their use is not an issue.
b. currently prohibited but a topic of significant controversy.
c. not explicitly prohibited but not yet tested and not an issue.
d. not explicitly prohibited and currently the topic of significant controversy.
e. currently being used without controversy but not frequently
f. currently being frequently used without controversy.

VI. If you are prohibited from arguing explicitly for hedonic damages are there other phrases that can be used to imply to the jury that a victim or his or her survivors should or could be compensated for such losses? If yes please provide an example:

Are these other phrases likely to met with sustained objections from the defendant?

If you have not explicitly introduced evidence regarding a particular category of loss are you likely to meet with a sustained objection if you discuss the compensability of such losses during final summary?

_____ Please send a copy of the results of this questionnaire to:

The questionnaire inquired about current and prospective practices for a variety of torts including some types of claims that would seem to preclude direct calculations by economists. The categories included 1) *pain and suffering*, 2) *grief and bereavement*, 3) *love and affection*, 4) *loss of acts of kindness unique to a child*, 5) *loss of acts of kindness unique to a marriage*, and 6) *"joy of life" or hedonic losses*. These six categories exclude pecuniary losses. We did, however, include one pecuniary loss category, the economic loss that a family might incur due to the loss of a child. Some states allow such claims for a child who might have contributed to family income through part-time work and household chores.

The objective part of the questionnaire asked the respondent to rank the acceptability of testimony, the use of explicit (itemized) claims, and the actual awarding of compensation for a variety of non-monetary losses on a scale ranging from "prohibited" to "widely used." We felt that this scale would not reveal complete information about use of hedonic damages. Therefore we included an open ended question designed to allow the respondent to indicate the approach he/she might use to indicate to a jury how and why hedonic damages could be included in award considerations. The objective part of the questionnaire also provided a range of responses to describe current use of hedonic damages and to indicate the respondent's forecast of the expected change in use over the next ten years.

This paper does not include the open ended responses. However, it is important to note that the open ended responses clearly indicate that nomenclature is not uniform across states. The written responses indicated, in particular, that loss of "love and affection," "acts of kindness unique to a child," and "acts of kindness unique to a marriage" are lumped together, in various ways, under loss of consortium, company, society or companionship. For example, in Illinois, loss of love and affection is termed "loss of society" and loss of acts of kindness unique to a marriage are termed "loss of consortium." In Arkansas all of these losses can come under the general concept of "mental anguish."

In each section of the questionnaire the last category was "hedonic losses." A minimal description was given for what such losses would be or, rather, might not be. We did indicate that they should be considered separate from pain and suffering or grief and bereavement. Respondents were left to fill in the definition in light of their own knowledge and experience. Again, the written responses indicate that hedonic loss overlaps but is not coincidental with the other losses. In some states the explicit use of the term hedonic loss is not permitted or would be so unfamiliar to a jury that the term is not used.

The state by state responses to the objective part of the questionnaire are tabulated in the tables in Exhibit 2. Pain and suffering and loss of love and affection are the most widely used loss claims. However, with only one exception, the modal response was "frequently used" for "permissibility of testimony," "requests for explicit compensation," and "grants of compensation" in each category of compensation. The one exception was actual grants of compensation for economic losses resulting from the loss of a child. The mode was "infrequently used" in this category. Grief and bereavement is the most commonly prohibited form of compensation both in acceptance of testimony (16 out of 50) and explicit compensation (20 of 50). Indeed, only 22 of the responding states indicated that compensation for such losses have been made on a regular basis. In contrast, only New Jersey prohibited explicit listing of an amount for pain and suffering and it prohibits any listing of specific amounts for any of the categories in the questionnaire. Hedonic claims are prohibited in more states than economic loss due to the loss of a child and are treated just about the same as acts of kindness (society, consortium) unique to a child.

Exhibit 2.1 Acceptance of testimony

State	Child Loss	Pain & Suffer.	Grief & Bereav.	Love & Affect.	Kindness Child	Kindness Marriage	Hedonic Loss
Alabama	2	3	3	3	1	1	3
Alaska	3	3	3	3	2	2	3
Arizona	2	3	3	3	3	3	3
Arkansas	2	3	3	3	3	3	0
California	0	3	0	3	1	1	1
Colorado	3	3	2	3	0	0	3
Connecticut	3	3	0	0	0	3	3
Delaware	2	3	3	2	2	3	0
Dist. Columbia	3	3	0	m	1	1	0
Florida	2	3	3	3	3	3	m
Georgia	0	3	0	3	3	3	3
Hawaii	2	3	3	3	3	3	2
Idaho	2	3	0	3	3	3	0
Illinois	3	3	1	3	2	3	3
Indiana	3	3	1	3	1	1	3
Iowa	3	3	0	0	3	3	3
Kansas	2	3	3	3	2	2	2
Kentucky	0	3	0	2	0	2	1
Louisiana	m	3	2	3	2	2	1
Maine	2	3	2	3	0	3	3
Maryland	2	3	3	3	3	3	1
Massachusetts	0	3	0	3	0	0	3
Michigan	0	3	3	3	0	3	3
Minnesota	3	3	1	2	3	3	1
Mississippi	2	3	2	3	2	2	2
Missouri	3	3	0	3	3	3	3
Montana	3	3	3	3	3	3	3
Nebraska	2	3	0	3	3	3	3
Nevada	1	3	3	3	2	3	2
New Hampshire	1	2	2	2	1	1	1
New Jersey	3	3	0	3	3	3	3
New Mexico	3	3	0	1	3	3	2
New York	2	3	0	3	2	2	3
North Carolina	3	3	3	3	3	3	3
North Dakota	3	3	3	3	2	2	1
Ohio	2	3	3	3	2	2	3
Oklahoma	3	3	3	3	3	3	2
Oregon	3	3	3	3	3	3	3
Rhode Island	3	3	0	3	3	3	0
South Carolina	3	3	3	3	2	2	1
South Dakota	3	3	3	3	3	2	2
Tennessee	2	3	0	3	0	0	3
Texas	2	3	3	3	3	3	3
Utah	2	3	3	3	3	3	2
Vermont	2	3	3	3	3	3	0
Virginia	m	3	3	3	2	3	0
Washington	3	3	3	3	3	3	3
West Virginia	3	3	3	3	3	3	3
Wisconsin	2	3	3	3	2	3	3
Wyoming	2	3	0	3	3	3	3

Key: 0 = prohibited 1 = virtually unaccepted 2 = used infrequently
3 = widely used m = missing

Exhibit 2.2 Can explicit compensation be requested for...

State	Child Loss	Pain & Suffer	Grief & Bereav.	Love & Affect.	Kindness Child	Kindness Marriage	Hedonic Loss
Alabama	0	3	3	3	1	1	3
Alaska	3	3	3	3	3	3	3
Arizona	3	3	3	3	3	3	3
Arkansas	2	3	3	3	3	3	0
California	0	3	0	3	1	1	1
Colorado	3	3	3	m	0	0	3
Connecticut	3	3	0	0	0	3	3
Delaware	2	0	0	0	0	0	0
Dist. Columbia	2	1	0	3	1.5	1	0
Florida	2	3	3	3	3	3	m
Georgia	0	3	0	3	0	0	3
Hawaii	2	3	3	3	3	3	2
Idaho	2	3	0	3	3	3	0
Illinois	3	3	1	3	1	3	1
Indiana	3	3	0	3	0	0	3
Iowa	3	3	0	0	3	3	3
Kansas	2	3	3	3	2	2	2
Kentucky	0	3	0	3	0	0	0
Louisiana	2	3	2	3	2	2	1
Maine	2	3	2	3	0	3	3
Maryland	2	3	3	3	3	3	1
Massachusetts	0	3	0	3	0	0	3
Michigan	0	3	3	3	0	3	3
Minnesota	3	3	1	2	3	3	1
Mississippi	2	3	2	2	2	2	2
Missouri	3	3	0	3	3	3	3
Montana	2	3	3	3	2	2	2
Nebraska	3	3	0	2	2	2	2
Nevada	2	3	3	3	2	3	2
New Hampshire	0	2	2	2	0	0	0
New Jersey	0	0	0	0	0	0	0
New Mexico	3	3	0	1	3	3	2
New York	2	3	3	m	0	0	0
North Carolina	3	3	1	3	3	3	3
North Dakota	3	3	3	3	1	1	1
Ohio	2	3	3	3	2	2	3
Oklahoma	3	3	3	3	2	2	2
Oregon	3	3	0	3	3	3	m
Rhode Island	3	3	0	3	3	3	0
South Carolina	3	3	3	2	2	1	1
South Dakota	3	3	3	3	1	1	2
Tennessee	3	3	0	2	0	0	3
Texas	2	3	0	0	3	3	0
Utah	2	3	3	3	3	3	2
Vermont	3	3	3	3	3	3	0
Virginia	m	1	1	1	2	3	0
Washington	3	3	0	3	3	3	0
West Virginia	3	3	3	3	3	3	3
Wisconsin	2	3	3	3	2	3	3
Wyoming	2	3	0	3	3	3	3

Key: 0 = prohibited 1 = virtually unaccepted 2 = used infrequently
3 = widely used m = missing

Exhibit 2.3 Has Explicit Compensation Been Granted For...

State	Child Loss	Pain & Suffer.	Grief & Bereav.	Love & Affect.	Kindness Child	Kindness Marriage	Hedonic Loss
Alabama	1	3	3	3	1	1	3
Alaska	2	3	3	3	2	2	3
Arizona	2	3	3	3	3	3	2
Arkansas	2	3	3	3	3	3	0
California	0	3	0	3	1	1	1
Colorado	2	3	3	3	0	0	2
Connecticut	3	3	0	0	0	3	3
Delaware	3	3	3	3	3	3	0
Dist. Columbia	3	3	0	2	2	1	0
Florida	2	3	3	3	3	3	m
Georgia	0	3	0	3	0	0	3
Hawaii	2	3	3	3	3	3	2
Idaho	2	3	0	3	3	3	0
Illinois	3	3	1	3	1	3	1
Indiana	3	3	0	3	0	0	3
Iowa	3	3	0	0	2	2	2
Kansas	2	3	3	3	2	2	2
Kentucky	0	3	0	3	0	0	0.5
Louisiana	1	3	2	3	2	2	1
Maine	1	3	1	3	0	3	3
Maryland	2	3	3	3	3	3	1
Massachusetts	0	3	0	3	0	0	3
Michigan	0	3	3	3	1	3	3
Minnesota	3	3	1	2	3	3	1
Mississippi	2	3	2	2	2	2	2
Missouri	2	3	0	3	3	3	3
Montana	2	3	3	3	2	2	2
Nebraska	2	3	0	3	3	3	3
Nevada	2	3	3	3	2	3	2
New Hampshire	0	2	2	2	0	0	0
New Jersey	3	3	0	3	3	3	3
New Mexico	3	3	0	1	2	2	2
New York	2	3	0	0	0	0	0
North Carolina	3	3	3	3	3	3	3
North Dakota	3	3	3	3	1	1	1
Ohio	1	3	3	2	2	2	3
Oklahoma	3	3	3	3	1	2	2
Oregon	3	1	0	3	3	3	1
Rhode Island	3	3	0	3	3	3	0
South Carolina	2	3	3	3	2	2	1
South Dakota	3	3	3	3	1	1	1
Tennessee	2	3	0	3	0	0	3
Texas	3	3	0	0	3	3	0
Utah	2	3	3	3	3	3	2
Vermont	3	3	3	3	3	3	0
Virginia	2	1	1	1	2	3	0
Washington	3	3	0	3	3	3	0
West Virginia	3	3	3	3	3	3	3
Wisconsin	2	3	2	3	2	2	2
Wyoming	2	3	0	3	3	3	3

Key: 0 = prohibited 1 = virtually unaccepted 2 = used infrequently
3 = widely used m = missing

Exhibit 2.4 Current Use and Next Ten Years

State	Current Use	Ten Years
Alabama	e	c
Alaska	e	c
Arizona	c	c
Arkansas	b	m
California	c	c
Colorado	d	b
Connecticut	f	d
Delaware	b	a
Dist. Columbia	b	b
Florida	d	m
Georgia	e	c
Hawaii	c	c
Idaho	c	d
Illinois	d	c
Indiana	a	a
Iowa	b	c
Kansas	d/e	c
Kentucky	a/b	b
Louisiana	d	c
Maine	f	c
Maryland	c	a
Massachusetts	f	b
Michigan	c	c
Minnesota	c	b
Mississippi	e	c
Missouri	c	b
Montana	e	d
Nebraska	e	c
Nevada	d	c
New Hampshire	c	c
New Jersey	f	d
New Mexico	d	d
New York	m	m
North Carolina	e	c
North Dakota	c	c
Ohio	f	c
Oklahoma	e	d
Oregon	c	c
Rhode Island	b	d
South Carolina	c	b
South Dakota	d	c
Tennessee	d	c
Texas	c	a
Utah	c	c
Vermont	a	b
Virginia	m	m
Washington	a	b
West Virginia	f	d
Wisconsin	e	b
Wyoming	c	d

Key: Best estimate of current use

a = currently prohibited and not an issue
b = currently prohibited but a topic of controversy
c = not explicitly prohibited but not yet tested or an issue.
d = not explicitly prohibited and currently topic of controversy.
e = currently used w/o controversy but not frequently
f = currently being frequently used without controversy

Key: Next ten Years

a = still prohibited
b = pragmatically insignificant
c = more important than now but less than other categories
d= as important as other categories

Some states' responses across the five sections of the questionnaire were not consistent. In those states in which hedonic damages may be and frequently are explicitly claimed, it should not also be the case that their use is

prohibited. A response in Part II of "widely used" is strongly inconsistent with a response in Part V of "prohibited but not an issue" or "prohibited but significant controversy." Nonetheless, two states responded in that way. One state responded that explicit claims were prohibited and that such claims are frequently used without controversy. Both of these inconsistencies could arise from the respondent having in mind that hedonic claims can be made under various guises even if explicit use of hedonic terminology is not allowed. Unfortunately, they could also be explained by respondent carelessness.

Conclusions

A full statistical analysis of the results of the questionnaire has been done in another paper and is available on request. However, two main conclusions follow directly from the questionnaire responses. First, while 34 of the 49 states responding to the questionnaire indicated that testimony regarding hedonic losses is accepted, the number in which explicit grants can be requested or have been awarded is only 28. Further, the written comments strongly suggest that there is very little acceptance of calculations of hedonic amounts. Rather these losses are highly subjective and likely to be couched in language that is not specifically meaningful to an economist. The second is that trial attorneys in 32 states expected that hedonic claims would grow in importance. Whether or not that means a growing use of expert witness testimony can not be inferred from our questionnaire, but growing use is the likely interpretation that some of the attorneys had in mind when responding. It appears to us that for many practicing attorneys there is a clear cut distinction between claiming hedonic loss and using an expert witness to calculate such a loss. There are so many avenues to implying hedonic losses that specific restrictions on claiming such losses have no practical impact in many states.

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Recent Developments In Ethics, Credentials, Standards And Disclosure

Thomas R. Ireland*

In January of this year, the Federal Judicial Center published a Reference Manual on Scientific Evidence, including a module entitled, "Reference Guide on Estimation of Economic Losses in Damage Awards" by Robert E. Hall and Victoria A. Lazear. The Federal Judicial Center is a part of the judiciary branch of the federal government. Under its charter, copies of this reference manual were mailed to all federal judges. Copies cannot be obtained directly from the Federal Judicial Center, but are available through the Superintendent of Documents, Shepherd's and most other law publishing series (e.g., West's) at various prices, ranging from $13 to about $32. As a document of the federal government, it is in the public domain and can be reprinted by anyone wishing to do so. It is a "must read" for any practicing forensic economist—or forensic expert in any other field for that matter.

This publication was not anticipated by the Board of Directors of the National Association of Forensic Economics (NAFE), but proved the wisdom of a major NAFE project that was already well underway when the Reference Manual on Scientific Evidence was published. The ESQD (Ethics, Standard, Qualifications and Disclosure) Committee of NAFE was already working on a series of modules whose goal was to provide the judiciary with some guidance in determining whether a given report of economic loss had been done in a qualified manner. This project was undertaken to provide an alternative to a process of establishing credentials for economic experts themselves.

The NAFE membership has continued to indicate major opposition to a direct process of establishing credentials for economic experts in litigation contexts [see Adams, Brookshire and Slesnick, 1993]. This opposition to a credentialling process is shared by the NAFE Board of Directors and members of the ESQD Committee not on the NAFE Board of Directors. As a result, the ESQD Committee had committed itself to the development of modules that would be concerned with helping judges determine the qualifications of a report as compared with determining the qualification of the expert compiling the report. This was the exact approach taken by the Federal Judicial Center with its Reference Manual on Scientific Evidence.

Just prior to the January 1995 meeting of the NAFE Board of Directors, the past, present and incoming presidents of NAFE and the chair of the ESQD committee met with Dr. Joe Cecil, project director for the Reference Manual, to discuss the direction of the NAFE module project. At that time, the project consisted of preliminary work being done on a module being written by myself on Personal Injury and the authorization of a module on Business Valuation to be prepared by Robert Trout. These projects (and a

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decision to prepare a Wrongful Death module that would be similar to the Personal Injury Module) had been authorized at the July 1994 meeting of the NAFE Board of Directors.

After hearing reports of the meeting with Joe Cecil, the NAFE Board of Directors decided to solicit additional offers to develop modules in Employment Discrimination and Commercial Litigation. Michael Piette was authorized to work on developing the Employment Discrimination module. After the July meeting of the NAFE Board of Directors Pat Gaughan was authorized to develop a Commercial Litigation module. As of this writing, a second draft has been prepared for the Personal Injury module, a first draft is almost completed for the Employment Discrimination module, and work is currently underway on the Wrongful Death Module. In addition, the Business Valuation module has been sent to Dr. Cecil for his comments and review.

The goal of this activity is to develop a set of modules for distribution to federal judges. Modules developed by NAFE could not have the direct sanction of the Federal Judicial Center, but Joe Cecil of the FJC has given NAFE encouragement in the development of NAFE modules. Dr. Cecil also indicated that modules developed by NAFE might affect decisions made by the FJC with respect to its development of a volume on economic damages in a second edition of the Reference Manual on Scientific Evidence. At the end of the completion of the first edition, there was considerable sentiment within the Federal Judicial Center for doing so.

The goal of NAFE modules is to cover the range of issues that should be considered by a qualified expert in the area treated by a module. It is not to set up a "best way" for various controversial issues to be treated. Both the NAFE Board's desires, and Joe Cecil's advice, pointed at making the modules as "neutral" as possible with respect to controversial issues in methodology. All NAFE Board members are committed to this objective, and all board members will be involved in the reviewing process as modules continue to be developed.

It has also been decided to divide the work of developing the modules from other ongoing responsibilities of the ESQD Committee. At the July meeting the NAFE Board of Directors created a three person committee to be in charge of the module project. The committee consists of Stephen Horner, Jim Rodgers and myself. Charles W. de Seve took over chairing other ongoing work of the ESQD Committee as of the July.

This approach is being tentatively supported, pending review, by the Board of Directors of the American Academy of Economic and Financial Experts. My term on the NAFE Board of Directors expired in January, 1995, but I am a new member of the AAEFE Board of Directors, and close cooperation between the two organizations is anticipated in the development of this approach to the challenges posed by the Daubert v. Merrill Dow decision and the December, 1993 changes in the Federal Rules of Evidence.

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Litigation Economics Digest 1(1), 1995, pp. 97—98

Book Review

Litigation Services: Information Sources for Expert Witnesses (1995 Disk Edition)

by Howard R. Sheppard (New York: Wiley, 1995)

G. Michael Phillips and David T. Fractor*

Litigation Services: Information Sources for Expert Witnesses (1995 Disk Edition) by Howard R. Sheppard is a Windows–based bibliography program published by John Wiley & Sons. Selling for $105, the program includes hypertext access software and a bibliographic database to perform keyword searches on document titles and general topics. No author, journal, or date search capacity is provided. The program comes in compressed form on four diskettes and includes a fifth "demonstration" disk which can be evaluated before installing the complete program. Uncompressed, the program takes about 10 mbytes of hard disk space. The program provides standard bibliographic citation information, including title, but no abstracts, summaries, or keywords are included.

According to this program's documentation, its objective is "providing a reference source of books, journals, and published materials on a wide variety of topics that would make it convenient for the litigation services practitioner to find answers to a multitude of questions that are frequently raised in litigation. It is not intended to be an all–inclusive listing but rather a starting point for research.". The manual's published description of the bibliography is enticing and describes a thorough research tool. With over 14,000 items collected into over 200 topical categories, there is a topic for virtually everyone, ranging from "Abnormal Performance Measurement", "Hedonic Damages", "Damages and Economic Loss", and "Wrongful Death" to even quite specialized topics such as "Theme Parks", "Typesetting and Commercial Art Businesses: Appraisal", and "Baseball Players' Contracts: Valuation".

The bibliographic listings are another thing altogether. While representing many sources, the listings appear to be primarily compilations from various business valuation and accounting references and legal continuing education materials. The resulting listing is certainly novel, including some references probably not easily found anywhere else (e.g. a forensic economist's newsletter) and a wide array of legal journals, bar reviews, and accounting publications. While economics references are included, there appears to be no particular rhyme or reason why particular references were included and others were excluded except, perhaps, that somebody had included them in a different bibliographical compilation.

Consider the first topic, one also provided for evaluation purposes, "Abnormal Performance Measurement". This topic includes a single reference, a 1987 Journal of Financial and Quantitative Analysis article seem-

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ingly regarding econometric techniques for performing event studies. Why just this article? Why no reference to the efficient market hypothesis or journal article discussing the possible roles of abnormal stock performance in securities litigation?

Consider the perpetual forensic economics favorite "Hedonic Damages". Fourteen citations were identified using the software. However, two were duplicates. Of the actual twelve articles, nine were in law reviews, legal journals, or continuing education volumes. Two were in expert witness newsletters. The only "economics" citation was Penelope Caragonne's psychometrically oriented 1993 *Journal of Forensic Economics* article on the Berla Scale. Without judging the merits of this particular research, it is rather specialized and thus would not have been our own choice as the only citation from the controversial hedonic damages literature. For instance, the entire *JFE* 1990 special issue on hedonic damages was not cited.

Finally, consider a keyword search on "earning capacity". This identified nine apparent hits. Of these, five were law review articles and four were *Monthly Labor Review* articles. No references to economics journals were provided. Further, one of the *MLR* articles was nonexistent, being a duplicate citation with an incorrect date.

For comparison, consider what one might find searching for "earning capacity" using CompuServe's IQUEST access to the American Economic Association's Economic Literature Index. Over a dozen articles with abstracts were identified, including the three *MLR* citations found in the bibliographic program. This on–line search also produced abstracts from economics journals including the *Journal of Forensic Economics*, *Journal of Legal Economics*, and the *Journal of Risk and Insurance* but no references to legal publications were provided. This IQUEST search cost about $10.

It appears that the "Litigation Services" disk suffers from the inaccuracies of its source materials and is incredibly spotty in its coverage of some forensic economics issues. While this would be helped a little by including bibliographies from any of the standard forensic economics treatises, this product is primarily an accountant's tool of limited use to forensic economists. If a forensic economist was facing a trade–off between this product and the use of on–line resources (e.g. IQUEST, Internet), the on–line resources would be more useful. Even so, "Litigation Services: 1995" might have some potential value as a "desperation" resource or as a source of some esoteric references. It also provides insight into how accountants may perceive forensic economists' practice areas.

Forensic economists whose main interests lie in the areas of wrongful injury and death matters would be better served by perusing back issues of the *Journal of Forensic Economics* or the *Journal of Legal Economics* for bibliographic articles. Indeed, for $105, one could purchase several of the recent treatises on forensic economics which feature extensive reference lists and discussions of the literature.

In conclusion, while the largest economics consulting firms should consider purchasing the program, this software would probably provide little marginal value to the majority of forensic economists.