Do Discount Rates Matter?

Bill has presented this paper at National Economics Conferences

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This article has been presented to:

- **Collegium of Pecuniary Damages Experts ("CPDE")**
- **National Association of Forensic Economists ("NAFE")**
- **American Academy of Economic and Financial Experts ("AAEFE")**
- **Western Economic Association International ("WEAI")**

The discount rate philosophy of an economist has a substantial impact on the future value of a claim. This paper reflects the discounting philosophy that I apply to future losses in all of the loss claims that I analyze.

There has been considerable controversy within the forensic economics community regarding the appropriate discount rate to apply to claims of future economic loss. I have presented this paper at the annual conferences for the groups listed above. I will also serve on a panel with two other Forensic Economists, the current and past Presidents of NAFE, to discuss these issues at the 2013 WEAI Conference in Seattle, WA. This paper will be published in two segments, with the first article slated for publication in *The Earnings Analyst* early next year.

Consideration of Inflation Risk and Market Risk in Deriving a Discount Rate

For Income Loss and Life Care Cost Claims

(Working draft, please do not quote without permission from the author.)

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Abstract:

In most venues, an award for future economic damages must be reduced to present value when the court finds a Defendant liable for those losses. The liability for those losses is effectively transferred from Defendant to Plaintiff when it is reduced to judgment at trial, and the Plaintiff accepts the judgment as compensation for discharge of the liability. The Forensic Economist ("FE") plays a critical role in assessing the appropriate "transfer price" to compensate the Plaintiff for the discharge of the future liability. The FE must (1) understand the risk characteristics inherent in the financial instruments on which his/her discount rate is based, and (2) evaluate how those risks correspond to the risk characteristics of the underlying loss. This involves an evaluation of the risks that are being transferred, from the perspectives of both the Plaintiff and the Defendant. This article focuses on the consideration of inflation risk and market risk in assessing the appropriate transfer price for future economic losses when the liability for those losses is effectively transferred upon reduction to judgment. There are two primary schools of thought regarding the appropriate discount rate to apply to a future stream of economic losses based, in part, on the directives of *Jones & Laughlin Steel Corp. v. Pfeifer*. They are referred to in this article as the "Dedicated Portfolio Method" and the "Short Term Rollover Method." This article makes the case that the "Short-Term Rollover Method" provides the most appropriate "transfer price" for income loss and life care cost claims.

Introduction:

The 1983 U.S. Supreme Court Decision in *Jones & Laughlin Steel Corp. v. Pfeifer* ("*Jones/Laughlin*") established the ground rules by which future losses are to be reduced to their net present value in loss claims. *Jones/Laughlin* stated the following

> The discount rate should be based on the rate of interest that would be earned on "the best and safest investments." Id., at 491. Once it is assumed that the injured worker would definitely have worked for a specific term of years, he is entitled to a risk-free stream of future income to replace his lost wages; therefore, the discount rate should not reflect the market's premium for investors who are willing to accept some risk of default.[1]

This has generally been interpreted within the forensic economics community as a constraint that effectively restricts economists to the use of high-grade bonds (such as U.S. Treasury instruments) in deriving discount rates for such claims, as those are the only investments that

[1] *Jones/Laughlin*, 462 U.S. 537 (1983)

appear to meet the "best and safest" criterion (originally defined in *Chesapeake & Ohio v. Kelly*, as cited in *Jones/Laughlin*), with no added premium for the risk of default.

The above passage of *Jones/Laughlin* also implies that the process of projecting future amounts of income loss is separate and distinct from the process of reducing those future amounts to present value. Thus, we apply a discount rate free from default risk in discounting future lost income streams only after "it is assumed that the injured worker would definitely have worked for a specific term of years." The underlying implication is that elements of uncertainty with respect to future losses should be addressed when we project those losses, and not absorbed into the discount rate that we apply against those future losses.

Jones/Laughlin is clear on the issue of default risk in discounting future losses, but the court left a broad degree of latitude regarding the issue of inflation risk. The opinion cited several acceptable approaches used by economists to deal with inflation in discounting future loss amounts. Two primary approaches are described in the following passage from *Jones/Laughlin*, concluding with the court not establishing any preference of one method over the other:

> On the one hand, it might be assumed that at the time of the award the worker will invest in a mixture of safe short-term, medium-term, and long-term bonds, with one scheduled to mature each year of his expected worklife. In that event, by purchasing bonds immediately after judgment, the worker can be ensured whatever future stream of nominal income is predicted. Since all relevant effects of inflation on the market interest rate will have occurred at that time, future changes in the rate of price inflation will have no effect on the stream of income he receives. For recent commentaries on how an appropriate discount rate should be chosen under this assumption, see Jarrell & Pulsinelli, Obtaining the Ideal Discount Rate in Wrongful Death and Injury Litigation, 32 Defense L. J. 191 (1983); Fulmer & Geraghty, The Appropriate Discount Rate to Use in Estimating Financial Loss, 32 Federation Ins. Counsel Q. 263 (1982). See also Doca v. Marina Mercante Nicaraguense, S. A., 634 F. 2d 30, 37, n. 8 (CA2 1980). On the other hand, it might be assumed that the worker will invest exclusively in safe short-term notes, reinvesting them at the new market rate whenever they mature. Future market rates would be quite important to such a worker. Predictions of what they will be would therefore also be relevant to the choice of an appropriate discount rate, in much the same way that they are always relevant to the first stage of the calculation. For a commentary choosing a discount rate on the basis of this assumption, see Sherman, Projection of Economic Loss: Inflation v. Present Value, 14 Creighton L. Rev. 723 (1981) (hereafter Sherman). We perceive no intrinsic reason to prefer one assumption over the other.[2]

It should be noted that *Jones/Laughlin* preceded the introduction of Treasury Inflation Protected Securities ("TIPS"), which were first issued in 1997. Some economists have speculated that a discounting approach relying on TIPS yields might be appropriate, although the majority of economists appear to prefer the use of yields on more traditional investments in deriving discount rates for their loss calculations. Accordingly, this article focuses primarily on the

[2] *Jones/Laughlin*, 462 U.S. 539, n. 23, (1983).

specific approaches addressed in *Jones/Laughlin* (traditional short-term versus long-term Treasury yields), rather than a TIPS-based approach, and primarily on the inflation and market risks associated with the duration of the instruments selected to derive the discount rate. There is a brief discussion at the end of this article addressing the potential pros and cons of the use of TIPS security returns, rather than those of traditional short-term or long-term bonds.

This article makes two key assumptions regarding the underlying intent of the above passages in *Jones/Laughlin*, as follows:

1. Uncertainties with respect to the magnitude and duration of future losses should be addressed in calculating the expected future value of those losses, and not absorbed into the subsequent process of discounting those future amounts to present value.

2. Uncertainties with respect to future changes in inflation may be incorporated into the selection of the instrument on which the discount rate is based. The selection of the most appropriate investment instruments to use for discounting is primarily the responsibility of the damages expert performing the analysis.

The discussion in this article will address the consideration of inflation and market risk in selecting the appropriate investment instrument on which to base the discount rate, and the degree to which the market dynamics of the different instruments correlates with the inflation risk of the underlying losses that the damage award is intended to offset. It will also evaluate the implied premise in *Jones/Laughlin* that expected future losses should be discounted in a risk-free manner, even though there are many uncertainties with respect to the ultimate timing, duration and magnitude of those losses.

"Dedicated Portfolio" versus "Short Term Rollover" Discounting Methods:

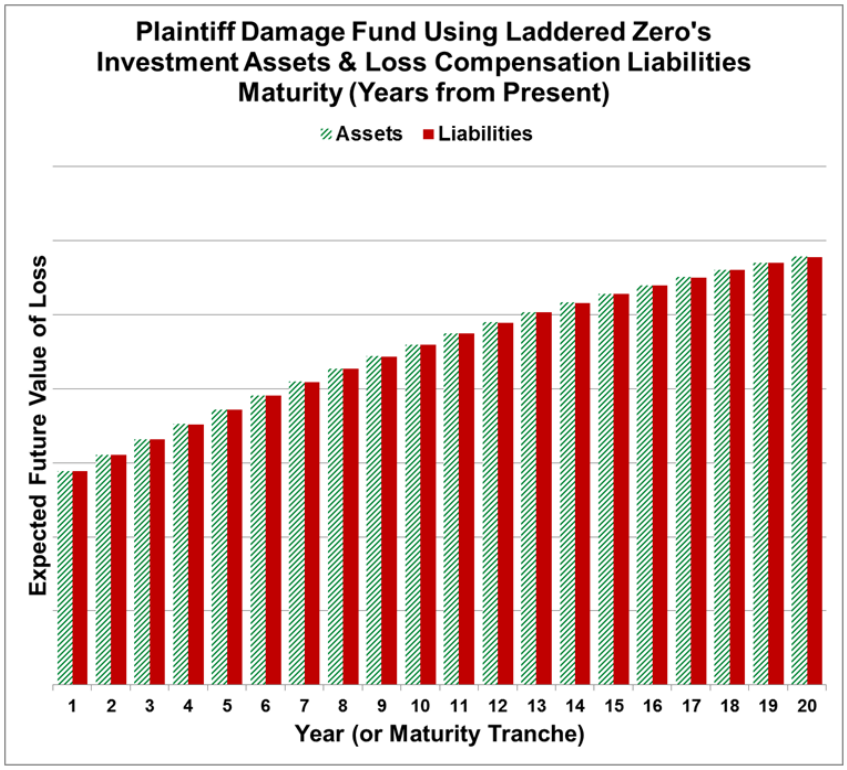
The two primary discounting approaches mandated above (in *Jones/Laughlin*) have been described as the "Dedicated Portfolio" and "Short Term Rollover" methods.[3] The "Dedicated Portfolio" method involves the construction of a hypothetical damage fund portfolio with fixed term investments and maturities that match the future value and timing of the expected future compensable losses. The most precise representation of the "Dedicated Portfolio" approach is the "laddered" zero coupon[4] approach, illustrated in Chart 1, which was described and analyzed by Rosenberg (Rosenberg 2010).[5] There are numerous variations of this approach. One involves a mix of short-term, medium-term and long-term maturity tranches with maturities that

[3] Rosenberg, Discounting Damage Awards Using the Zero Coupon Treasury Curve: Satisfying Legal and Economic Theory While Matching Future Cash Flow Projections, *Journal of Forensic Economics* 12(2), 2010, p. 181.

[4] Zero-Coupon Treasury securities are derivatives of standard Treasury securities with the interest coupons detached from the principal portion of the bond. A 20-year Treasury security with semi-annual interest coupons can thus be split into a set of "Zero Coupon" bonds, with the principal balance serving as a single 20-year "Zero Coupon" bond, and the remaining coupons becoming "Zero Coupon" bonds with maturities on the effective payment date for each respective coupon. A "Zero-Coupon" laddered structure allows a Plaintiff to schedule future nominal inflows to offset his/her projected nominal future losses by buying "Zero Coupon" bonds with maturity dates and nominal cash flows that match the underlying projected losses.

[5] Ibid., pp. 173 – 194.

Chart 1



DAMAGE FUND
Assets = Hypothetical Zero Coupon Bond Maturities
Liabilities = Expected Future Losses

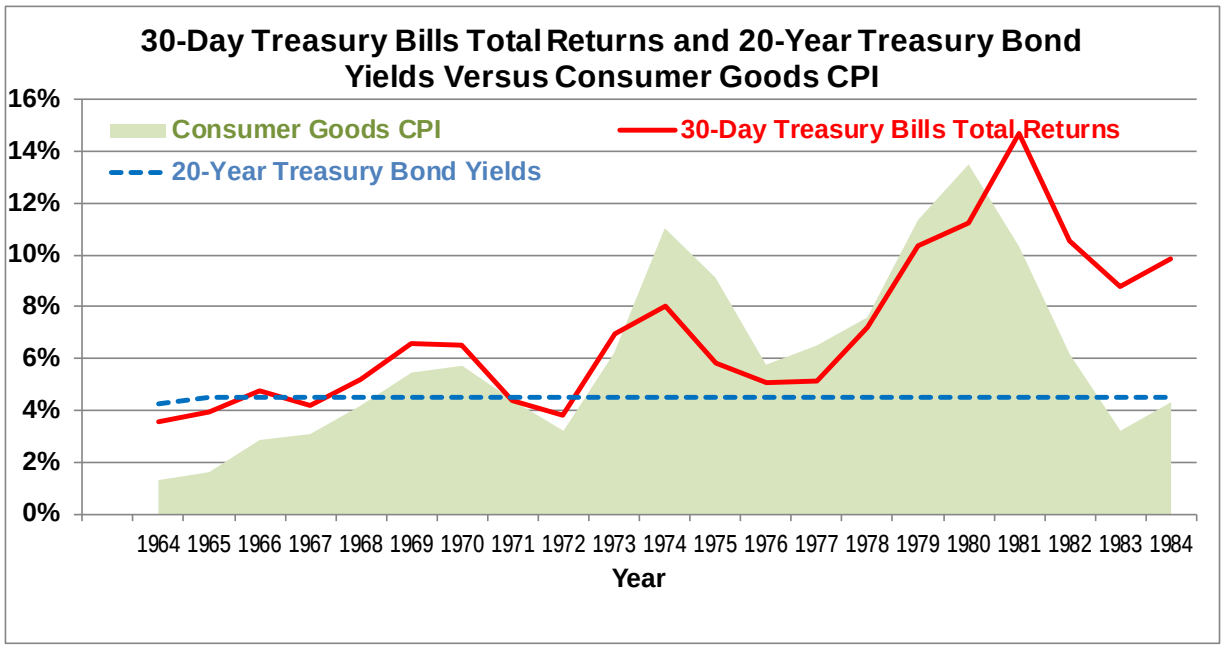
approximately match the timing and magnitude of expected future losses. Another is a simplified approach that applies a uniform discount rate against future expected losses based on the approximate average timing of those future expected losses (e.g., a 10-year rate might be applied uniformly against losses that extend over a horizon of 20 years).

The "Dedicated Portfolio" approach places a high degree of reliance on the Yield Curve (discussed in greater detail below) in assigning the appropriate discount rate to each tranche of future losses, based on the expected timing of those future losses. It also places a high degree of reliance on the accuracy of the FE's projection of future inflation. Variances between expected future rates of inflation and the subsequent actual rates can result in significant under-compensation or overcompensation of the Plaintiff. Proponents of the "Dedicated Portfolio" approach (in its various forms) generally concede that it requires the Plaintiff to assume a significant level of inflation risk against the "real" value of future losses. They generally point out, however, that this risk is two-sided (with a probability of overpayment approximately equal to the probability of underpayment). Some also assert that the Plaintiff is effectively compensated for the added level of inflation risk by the elimination of uncertainties in the future income streams that were lost (see "Does *Jones/Laughlin* Violate 'Parity in Risk,'" below).

The "Short Term Rollover" approach also involves the construction of a hypothetical portfolio to compensate the Plaintiff for future expected losses. Discounting under this method, however, is applied under the assumption that all damage funds will be invested only in short-term bills, with the investment balance "rolled-over" at new market rates whenever the short-term bills mature. This approach places a high degree of reliance on the FE's ability to forecast the future spread between the rate of inflation and short-term yields. Proponents of this approach generally assert that this method is more appropriate for the discounting of future loss claims, since variations from the expected rates of future inflation will likely be offset, at least in part, by corresponding variances in future short-term yields (due to the positive correlation between changes in inflation and changes in interest rates). Chart 2 provides an illustration of the self-adjusting nature of a "Short Term Rollover Portfolio" versus a "Dedicated Portfolio" when

covering an inflation-sensitive loss (as shown for a hypothetical loss occurring in 1965, with subsequent actual inflation shown in the shaded area of the graph).

Chart 2:



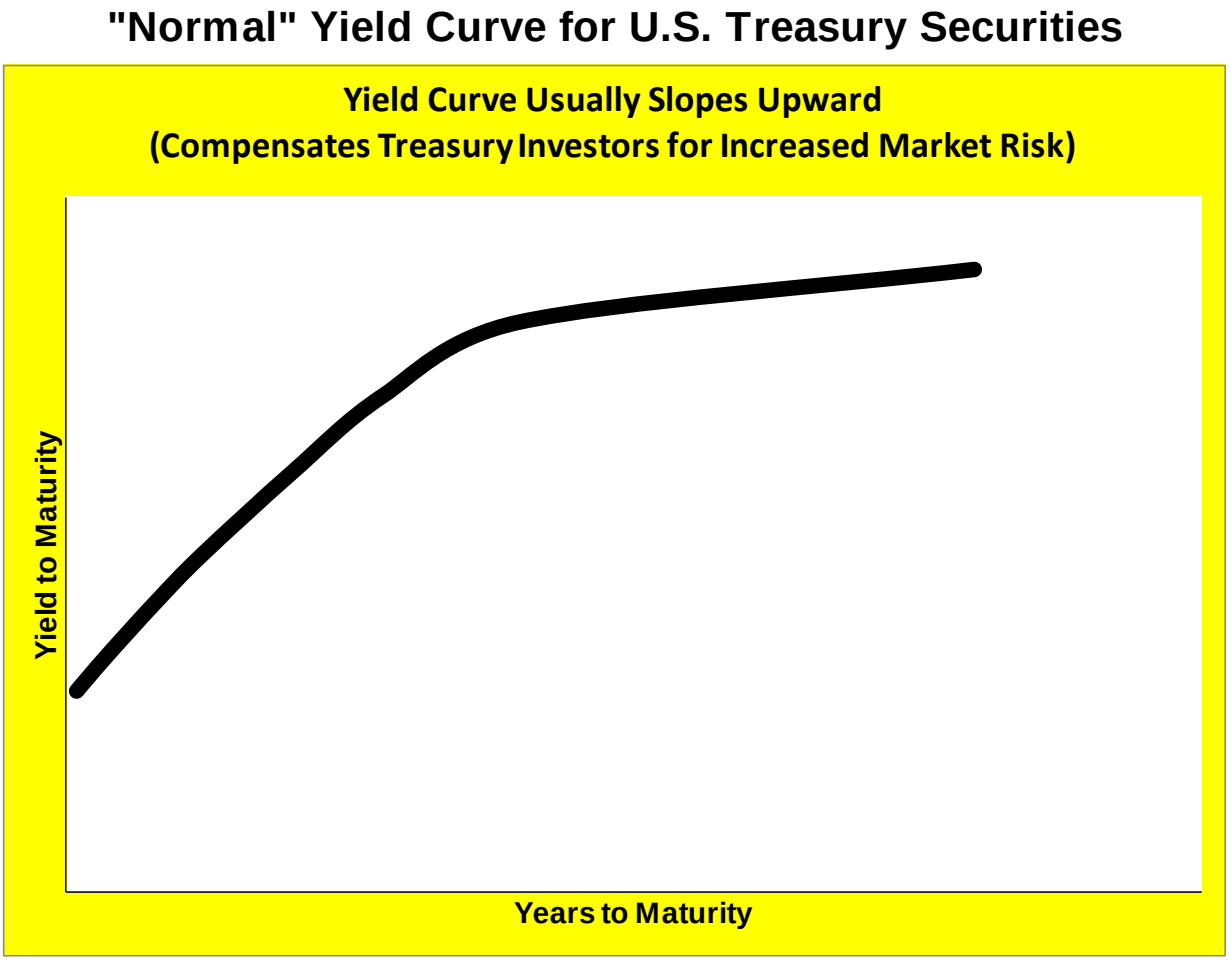
Example comparing the "Dedicated Portfolio" Approach versus the "Short-Term Rollover" Approach. This illiustrates the comparative yield on a portfolio of short term (30-day) Treasury Bills versus a "dedicated" 20-year Treasury Bond for a 1985 income loss forecasted on a 1965 trial date. The short-term portfolio allows the Plaintiff to adjust to unexpected post-trial inflationary pressures, while the yield on the 20-year "dedicated" bond does not change, regardless of post-trial changes in the economy.

Sources:

Inflation	All Items: Series #CUUR0000SA0 (1913 - Present)
Base	Ibbotson SBBI 2011 Classic Yearbook, Table A-14
Subject	Ibbotson SBBI 2011 Classic Yearbook, Table A-9

Understanding of the Yield Curve Used in the “Dedicated Portfolio” Approach:

Chart 3:



It is important to understand the market dynamics of the bond yield curve if one is to use the curve in discounting future losses, as done under the “Dedicated Portfolio” approach. Chart 3 is an illustration of a typical bond yield curve. The “normal” yield curve for U.S. Treasury securities is upward-sloping, with the yield to maturity “normally” increasing as the duration of the investment increases. However, the curve is occasionally “inverted” (downward-sloping), under certain market conditions, and there are other times when the curve is unusually steep. This is an apparent reflection of the respective roles that market risk and interest rate expectations play in the Treasury markets. Default risk is generally not considered a significant factor in the shape of the yield curve for Treasury securities, since the U.S. Treasury has no history of default.

Market risk is generally cited as the primary reason for the “normal” upward slope of the Treasury Yield Curve (“TYC”). The TYC shifts as market conditions change. The value of existing Treasury securities bears an inverse relationship with shifts in the TYC: their value increases when interest rates fall, and their value decreases when interest rates rise. The risk of an upward shift in the yield curve grows progressively as one goes farther into the future, so

long-term Treasury bonds carry a greater risk of unfavorable shifts in the TYC than short-term Treasury bills and notes. The value of long-term bonds is also more sensitive to general changes in interest rates than short-term securities, because the effect of those changes compounds over a greater number of periods. Thus, the "normal" upward slope of the TYC reflects the compensation that purchasers of long-term securities receive for assuming the additional level of market risk associated with securities that are farther to the right on the TYC (as shown on Chart 3).

Some refer to this market risk as "liquidity risk," but it is important to understand that Treasury securities are fully transparent, with a well-established and highly efficient secondary market. Treasury securities are highly liquid, regardless of the maturity date of the underlying bond. The risk of capital loss associated with pre-maturity liquidation of Treasury bonds arises strictly from changes in market value, as expressed by shifts in the TYC. It is not the result of inefficiencies in the Treasury market or any barriers to the sale of these securities. The added compensation for long-term Treasury bond investors in a "normal" upwardly-sloping yield curve (sometimes referred to as the "horizon premium") reflects the increased risk for those investors to potential unfavorable shifts in the TYC. The Treasury market requires increased yields for longer maturities in order to entice buyers to purchase riskier long-term bonds in a risk-averse society.

The TYC is not always upward-sloping, however, as noted above. Long-term interest rate expectations also impact the shape of the TYC. An "inverted" (downward-sloping) yield curve can occur when there is a strong consensus that interest rates will fall, as is the case when there are recessionary expectations, or when emerging from periods of unusually high inflation and interest rates. The market risk premium for long-term bonds still exists, but the premium during these periods is more than offset by the market expectation of declining future rates. Conversely, a steep upward-sloping TYC can result when there is a strong consensus that interest rates will rise. The "normal" upward slope of the TYC is likely a reflection of the role that market risk plays in the Treasury market, but the occasional presence of "inverted" and steep yield curves yield curves shows that interest rate expectations also play a significant role in the shape of the TYC.

<u>"Treasury Curve Valuation Paradox</u>:"

Economists using the "Dedicated Portfolio" approach rely heavily on the TYC when determining the discount rates to apply to future losses in a damage claim. Chart 4 illustrates a phenomenon that might be described as the "Treasury Curve Valuation Paradox." This phenomenon can be very problematic for Economists that use a "Dedicated Portfolio" approach, such as the "Zero Coupon Laddered Approach," in discounting future losses. Chart 4 illustrates how an event (or series of events) that heighten inflation risk can shift the TYC upward, as bond investors require additional compensation, in the form of higher yields, to purchase those riskier bonds. The higher yields properly compensate Treasury bond purchasers for the additional inflation risk that they take if they purchase the bonds.

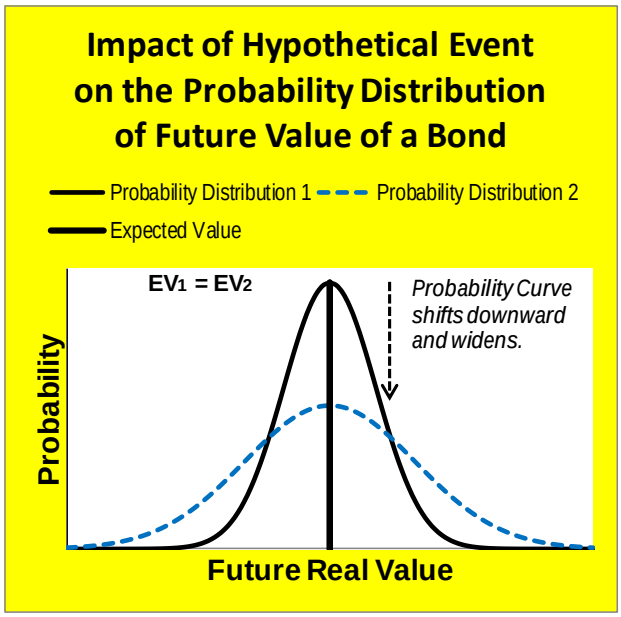
Use of that upwardly-shifted TYC in discounting loss claims, however, effectively awards that inflation risk compensation to the wrong party. The Economist using the Long-Term Treasury approach, or the laddered approach, in discounting loss claims will apply the upwardly

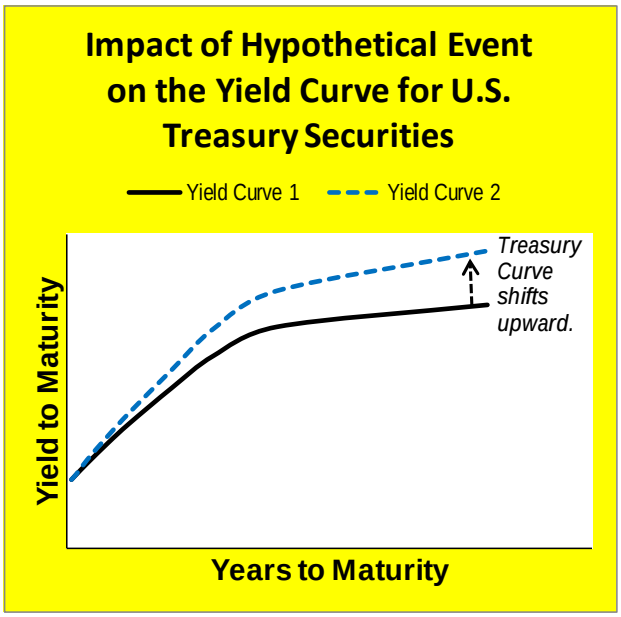
Chart 4:

Treasury Curve Valuation Paradox

Impact of Hypothetical Event that Increases Inflation Uncertainty

(Assume Expected Future Value Remains Unchanged, but Probability Distribution widens)





Probability curve widens, but expected value remains unchanged.

Yield increases to entice bond buyers to purchase riskier bonds.

Impact of Hypothetical Event on Treasury Bond Transaction:

Treasury Securities Buyer ← Cash / **Inflation Risk** / ← Inflation Risk Compensation → **Treasury Securities Seller**

1) Uncertainty event flattens the future value distribution curve, thereby increasing inflation risk.
2) Treasury Curve shifts upward, enticing the Treasury Buyers to purchase the riskier bond.
3) Amount paid by Treasury Buyer is reduced at a higher discount rate to compensate for the added level of inflation risk.

Impact of Hypothetical Event on the Reduction to Judgment in a Loss Claim:

(When Treasury Curve is used to value long-term future losses)

Defendant ← Cash / **Inflation Risk** → / ← Inflation Risk Compensation → **Plaintiff**

1) Uncertainty event flattens the future value distribution curve, thereby increasing inflation risk.
2) Treasury Curve shifts upward, enticing Treasury Buyers to purchase the riskier bond.
3) Amount paid by Defendant (to the Plaintiff) is reduced at a higher discount rate, based on the Treasury Curve.
4) **Inflation risk compensation is effectively paid to the wrong party.**

shifted yield curve to the loss award, resulting in a greater discount against future loss amounts. The Plaintiff will thus incur a reduction in his/her compensation for a loss claim that carries an increased level of inflation risk, even though the expected value of the loss has not changed. The defendant will benefit from the reduction in compensation that he/she has to pay the Plaintiff by liquidating a liability that now carries a greater degree of inflation risk. Thus, the defendant receives the market compensation for the risk that the plaintiff ultimately assumes. The compensation for that increased inflation risk is effectively paid to the wrong party.

This phenomenon calls into question the entire approach of using the TYC to discount future losses, as done in the "Dedicated Portfolio" approach. It makes little sense, for example, that

future long-term losses carrying a greater degree of inflation risk should be discounted more heavily than short-term losses, for which inflation and other factors are more certain and predictable. The inflation risk is ultimately borne by the Plaintiff once the claim is reduced to judgment, and any risk compensation implicit in the discount rate should be awarded to the party bearing that risk. The only plausible explanation for discounting long-term claims at a higher rate is that the Plaintiff also eliminates some of his/her other uncertainties (in an income loss claim), but *Jones/Laughlin* effectively eliminates those factors from consideration in the calculation of the discount rate. I will nonetheless address the elimination of those other uncertainties later in this article (see "Does *Jones/Laughlin* Violate 'Parity in Risk,'" below).

Duration of Dedicated Portfolio Investments versus Future Losses:

The Macauley Duration of a financial asset or liability is a measure of the average time period to maturity of that instrument. The sensitivity of the value of financial instruments to changes in market interest rates is greater when the duration of the instruments is longer, since the interest rate change will compound over a greater number of periods. A traditional 20-year Treasury bond with semi-annual interest coupons, for example, has a duration of less than 20 years, since each of the first 39 semi-annual coupons "matures" in less than 20 years. A 20-year Zero Coupon Treasury bond, however, has a duration of exactly 20 years, since there are no interest coupons associated with that bond. The market value of a 20-year Zero Coupon Treasury bond is thus more sensitive to changes in interest rates than the value of a traditional Treasury bond with semi-annual coupon payments.

Matching of the duration of assets and liabilities is particularly important to financial institutions. A significant mismatch can make a financial institution highly vulnerable to changes in the economy. The Savings and Loan industry, for example, placed high reliance on the traditional positive spread between the interest income that it earned on its assets (primarily long-term loans) and the interest expense that it incurred on its liabilities (primarily short-term demand deposits, savings accounts and certificates of deposit). Many of the industry's assets had long durations (e.g., 30-year fixed rate mortgages), and many of industry's liabilities had very short durations.

This mismatch created a crisis in the 1970's, when interest rates throughout the economy increased dramatically. The interest rates paid on liabilities increased, as the short-term deposits and accounts turned over very quickly at the new market rates. The interest rates received on assets, however, grew very slowly, as old mortgages continued to sit on the books. The result was an industry that suddenly experienced a negative spread between the interest income earned on its (old) loans and interest expense paid on its (new) deposits. This mismatch in the duration of its assets and liabilities was one of the root causes of the Savings and Loan Crisis. Surviving financial institutions addressed this duration mismatch by emphasizing other types of assets, such as adjustable-rate mortgages and floating-rate consumer debt, to reduce the functional duration of their assets, while performing similar counter-measures to increase the functional duration of their liabilities.

A Plaintiff with a Zero Coupon Treasury portfolio "matched" against future losses is in a very similar position as the pre-crisis Savings and Loan industry. The duration of a 20-year Zero

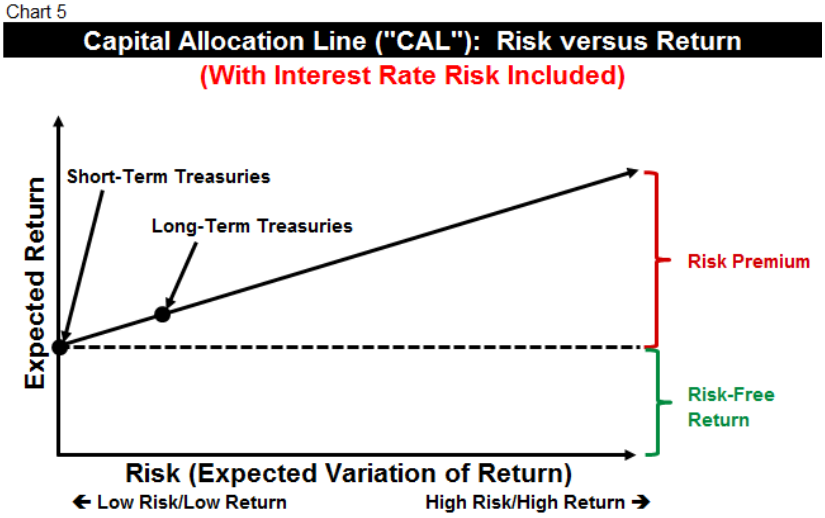
Coupon bond is 20 years. Its nominal future value on the maturity date will not change regardless of changes in the economy over the ensuing 20 years. The expected value of a future loss occurring 20 years after the trial date, however, changes constantly. A 20-year expected loss calculated one month, one year, ten years or 20 years after the trial would have a different value than that which was calculated by the Economist on the trial date. The re-pricing duration of a loss occurring 20 years after the trail is effectively zero, since its expected value is constantly re-pricing. The duration of a 20-year Zero Coupon bond "matched" against that loss, however, is 20 years. Thus, a 20-year Zero Coupon bond is actually a very poor "match" against a loss occurring 20 years after the trial date. The re-pricing duration of the Zero Coupon bond in a hypothetical "Dedicated Portfolio" is 20 years, while the re-pricing duration of the corresponding loss is effectively zero. A "Short-Term Rollover" portfolio, on the other hand, carries a re-pricing duration very similar to that of the underlying loss.

Relevance of Likely Use of Damage Funds:

Economists must ask whether it is appropriate to consider inflation risk in their calculations when it is likely that many Plaintiffs will not consider that risk in the actual investment of their damage awards.

This issue is addressed in Chart 5. The economist has no influence over the ultimate disposition of the funds awarded to the Plaintiff. However, the Damages Expert can focus on a hypothetical award structure that best replicates the inflation risk of the underlying loss that the fund is intended to offset. The Capital Allocation Line ("CAL") on Chart 5 illustrates the trade-off between risk and return of available investments. Items on the left end of the "CAL" line (closest to the Y-axis) represent investments that carry the minimum level of risk and return. Investors must assume greater levels of risk if they seek to gain higher levels of return. Chart 5 is a variation of the traditional version of CAL, which ordinarily classifies all Treasury Securities as "risk-free." The version in Chart 5 places Long-Term Treasuries to the right of Short-Term Treasuries because those securities "normally" carry a higher yield, and they

Chart 5



Long-term Treasury securities carry more risk that short-term Treasuries when interest rate/inflation risk is taken into consideration.

The FE's job is to discount the losses based on the safest investments that carry a similar inflation risk to the underlying loss. A potential subsequent decision by the Plaintiff to "move up" on CAL should not influence the FE's calculation.

also carry a greater degree of market risk that is related, at least to some extent, to uncertainties in inflation.

The economist has the responsibility to design an award structure that best matches the inflation risk of the hypothetical award (in his/her loss calculation) with the inflation risk of the underlying loss. The Plaintiff's ultimate decision on whether to assume additional risk cannot be anticipated. In any case, it isn't relevant in the economist's effort to match the risks of the hypothetical award structure with the underlying loss. The income streams replaced by the damage fund would have reflected the changing inflationary conditions in the economy. Life care costs included in the damage award will likewise be subject to inflationary pressures within the economy. The re-pricing duration of a "Short-Term Rollover Portfolio" provides a better match to the re-pricing duration of the underlying losses than a "Dedicated Portfolio" of long-term fixed-rate investments, regardless of the Plaintiff's ultimate disposition of the funds.

Does *Jones/Laughlin* Violate "Parity in Risk?":

Many economists assert that *Jones/Laughlin* violates parity in risk, because it appears to mandate a damage award for the expected value of future losses, rather than the lesser "certainty equivalent" of those losses for a risk-averse Plaintiff. Margulis invoked the principle of "parity in risk" in the following passage, which addressed the *Jones/Laughlin* admonition against the use of a discount rate reflecting a market premium for investors who are willing to accept some risk of default:

> Parity in risk refers to consistency between the certainty of future lost earnings or profits and the choice of discount rate. It would be inconsistent to discount an expected, but uncertain, stream of future losses by a rate of return earned on investments that are certain, or risk-free.[6]

Margulis noted that it is impossible to eliminate uncertainty in the projection of future losses, and he thus concluded that "to discount expected but uncertain, future sums of money by a risk-free rate of return lacks parity in risk."[7]

The position expressed by Margulis does not, however, consider a transactional view of a loss claim from the perspective of both parties. An assessment of compensation for an income loss can be viewed as a two-step process. The first step is a forecast of the expected income streams, but for the alleged tort. The second step is an analysis of the transfer of liability for that loss when the claim is reduced to judgment. Chart 6 (on the following page) addresses both of these steps.

The economist must recognize that the pre-loss Plaintiff faced uncertainty with respect to his/her future income streams. The Plaintiff thus derives economic benefit from the valuation of those losses at their "expected" level, rather than the Plaintiff's "certainty equivalent." Once it is established that the Defendant is responsible for those losses, but before the judgment is for-

[6] Margulis, Compensatory Damages and the Appropriate Discount Rate, *Journal of Forensic Economics* 6(11), 1992, p. 36.
[7] Ibid., p. 38.

Chart 6:

Does *Jones/Laughlin v. Pfeifer* Violate "Parity in Risk?"

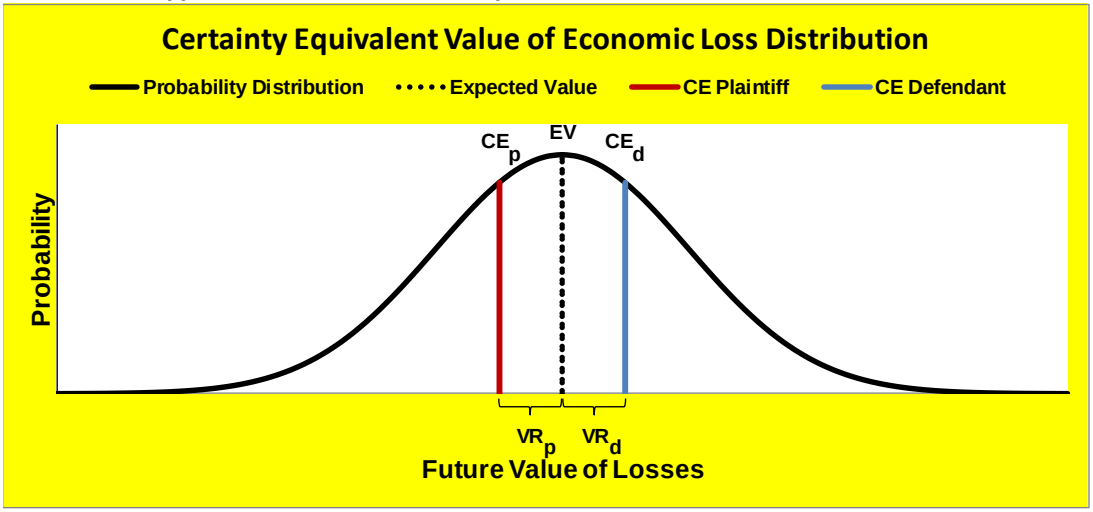
Transfer of Liability under *Jones/Laughlin v. Pfeifer*

Certainty Equivalent of an Income Loss to the Plaintiff & Defendant

Assumptions Before Liability Transfer:

- Before reduction to Present Value.
- Approximately normal distribution curve, with **all relevant inputs** properly accounted for.
- Both Plaintiff and Defendant are risk-averse.
- Let Expected Value = EV, Plaintiff Certainty Equivalent = CE_p, Defendant Certainty Equivalent = CE_d,

Transactional approach to the transfer of liability from Defendant to Plaintiff:



The Defendant and Plaintiff both prefer a certainty equivalent (at a "price" less favorable than Expected Value) to the uncertainty of the distribution curve. The risk premium reflects the economic value of the elimination of uncertainty to each party when the claim is reduced to judgment.

Liability Transfer Amount based on Value of Consideration Received/Paid to Both Parties:

Defendant		Plaintiff
	Cash (EV) →	
	VR_p →	
	← Discharge of Liability (EV)	
	← VR_d	

Both sides benefit from the elimination of risk when the claim is reduced to judgment.

Consideration to Plaintiff = EV + RP_p, consideration to Defendant = EV + RP_d

If $RP_p \approx RP_d$, *Parity in Risk* is not violated under *Jones/Laughlin v. Pfeifer*.

Alternative Valuation Approach: Equilibrium Price of Liability Transfer in a "Perfectly Competitive" Market

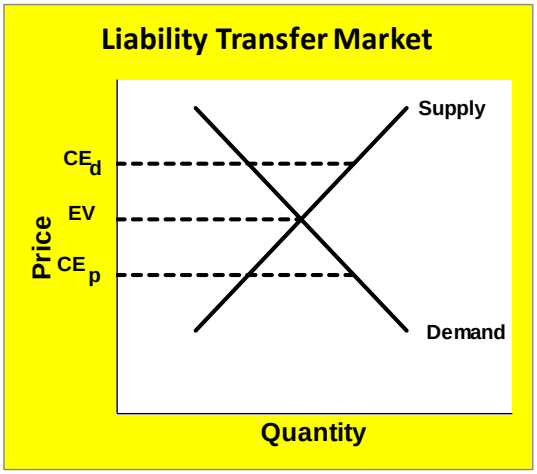
What would market price be if liability transfers were sold in a free market setting?

Assumptions (Imagination is required):

1) "Perfect Competition"
2) Plaintiffs & Defendants can freely enter/exit market.
3) Plaintiffs "supply" liability transfers.
   (Quantity supplied varies directly with price)
4) Defendants are "purchasers of liability transfer:
   (Quantity demanded varies inversely with price)
5) $RP_p \approx RP_d$
6) Plaintiffs' price sensitivity ≈ Defendants' price sensitivity

Equilibrium price ≈ EV

***Parity in Risk* is not violated under *Jones/Laughlin v. Pfeifer*.**



mally reduced to a lump sum, the Defendant is liable for those future losses. The Defendant thus temporarily bears a burden of uncertainty with respect to those losses until the claim is formally reduced to a lump sum compensation amount. The reduction of those future losses at their "expected" value, rather than the Defendant's "Certainty Equivalent," also conveys an economic benefit to the Defendant.

Thus, both parties derive some economic benefit, in the form of reduced uncertainty, when the claim is reduced to judgment. The transfer of liability can be valued as a transaction. Chart 6 illustrates the perspective of both parties in that transaction. A risk-averse plaintiff, under "free market" conditions, would accept a certainty equivalent less than the expected value of losses represented by the income loss distribution curve. This would effectively eliminate downside risks such as disability (unrelated to the subject of the lawsuit), unemployment, mortality risk, etc. A risk-averse defendant, under similar conditions, would accept a certainty equivalent greater than the expected value of losses represented by the distribution curve. This would effectively eliminate upside risks such as an extended worklife exceeding the average in the workilfe tables, earnings in excess of those projected, earnings exceeding the expected level, etc. The benefit gained by both parties should be approximately equal, assuming the economist has properly calculatied all of the appropriate risk factors (including all upside and downside risks) in constructing the distribution curve, and assuming that both parties are equally risk-averse. The benefit will only be exactly equal when the distribution curve is symmetrical and the risk aversion of the parties is identical, but both sides benefit from reduction to judgment at the sum-certain expected value, rather than the uncertainty of the distribution curve.

The "market value" of that liability transfer, summarized in the middle section of Chart 6, shows the economic value of consideration gained by both sides when the liability for future losses is transferred upon reduction to judgment. The consideration received and paid to each party is approximately equal when the liability is liquidated based on the expected value of the future loss (subject to the assumptions noted on Chart 6).

Chart 6 also shows an alternative valuation approach addressing the value of that liability transfer under "perfectly competitive" market conditions. There is no established market for liability transfer, outside of the insurance industry, so this represents an attempt to simulate an activity that cannot be tested. Nonetheless, the market forces in the non-existant "Income Loss Liability Market" would likely arrive at an equalibrium price approximately equal to the expected value of the losses, given the assumptions listed on Chart 6.

A market valuation that gives consideration to the interests of both parties in the transfer of an income loss liability indicates that the expected value is an appropriate transfer price (before consideration of inflation risk, which is borne exclusively by the plaintiff after the trial date). Thus, the implicit premise in *Jones/Laughlin*, that future expected losses should be valued after "it is assumed that the injured worker would definitely have worked for a specific term of years," does not appear to violate "parity in risk." The offsetting nature of risks eliminated by the two opposing parties preserves "parity in risk." Alternatively, *Jones/Laughlin* may simply reflect a desire by the court to leave risk aversion out of the damages question entirely, effectively

relieving the trier of fact from an arcane and highly subjective analysis of the comparative risk aversion of the respective parties.

This is an important point in choosing between the "Dedicated Portfolio Method" (and similar variants employing long-term or medium-term yields or structured annuity packages) and the "Short Term Rollover Method" in discounting claims of future income loss. Proponents of the "Dedicated Portfolio Method" often cite a lack of "parity in risk" in *Jones/Laughlin* as a justification for using a method that requires the Plaintiff to assume a discount rate burdened with inflation and market risk against future lost income streams that would have adjusted to unexpected changes in future inflation. The above analysis, however, indicates that "parity in risk" is not violated.

The use of a "Dedicated Portfolio Method" is even more problematic with in calculating compensation for future life care costs, as shown in Chart 7:

Chart 7:

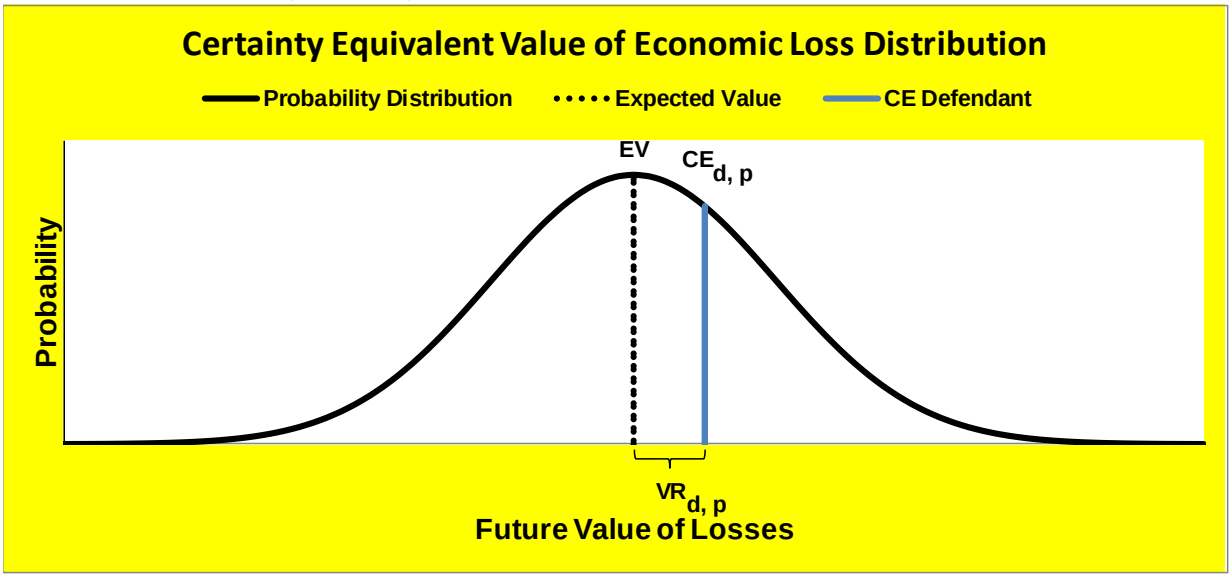
Expected Value of Life Care Plans & "Parity in Risk"

Transfer of Liability for Life Care Costs

Certainty Equivalent of Life Care Costs to the Plaintiff & Defendant

Assumptions Before Liability Transfer:

- Before reduction to Present Value.
- Approximately normal distribution curve, with **all relevant inputs** properly accounted for.
- Both Plaintiff and Defendant are risk-averse.
- Let Expected Value = EV, Plaintiff Certainty Equivalent = CE_p, Defendant Certainty Equivalent = CE_d, Plaintiff Value of Risk = VR_p = EV - CE_p, Defendant Value of Risk = VR_d = CE_d - EV



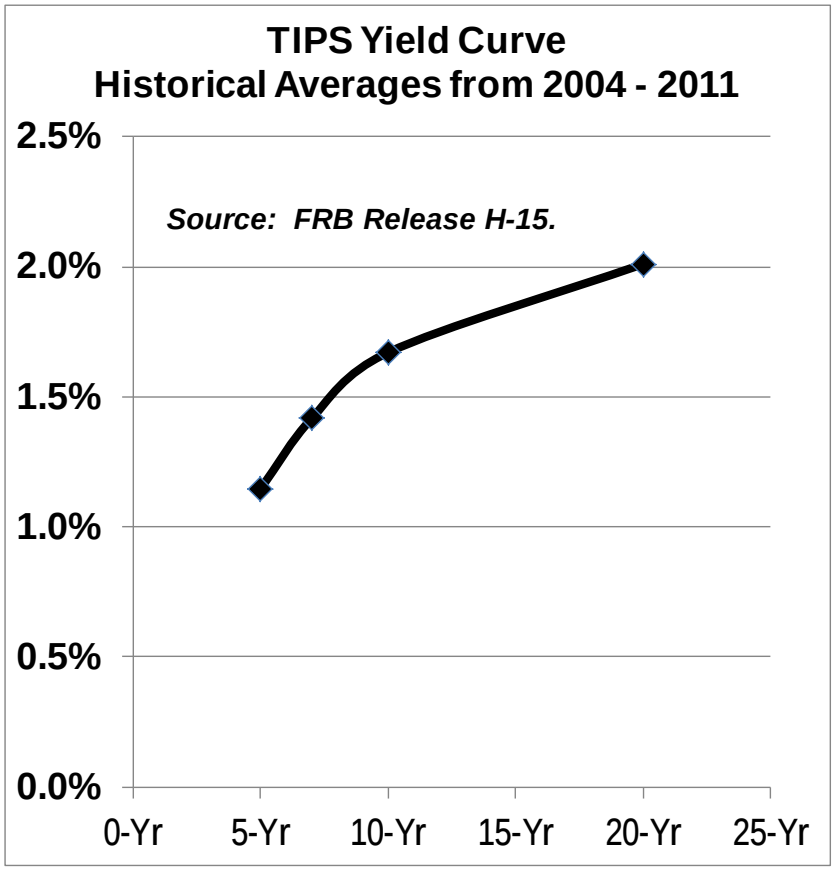
The Defendant benefits from the transfer of life care liabilities at expected value AT THE EXPENSE OF THE PLAINTIFF. The Plaintiff is required to assume risky liabilities that did NOT EXIST before the loss at the Expected Value, with no compensation for his/her risk, and no offset of risks that existed before the loss.

Claims for life care costs were not specifically addressed in *Jones/Laughlin*. Chart 7, however, illustrates that the transfer of liability for these costs places a burden of uncertainty on the Plaintiff that did not exist before the loss. In compensation of life care costs, however, there is no offsetting relief of pre-loss risk (in contrast to income loss compensation per Chart 6, where the Plaintiff at least derives economic benefit from the elimination of pre-loss uncertainties in his/her future income streams). The Plaintiff's compensation for life care costs falls below the "certainty equivalent" of those costs from the perspective of both the Defendant and the Plaintiff. Thus, "parity in risk" is violated in favor of the Defendant even before the loss is discounted to present value. The further application of a discount rate derived from long-term or medium-term bonds further exacerbates the lack of "parity in risk," since it effectively compels the Plaintiff to assume inflation and market risk in his damage fund portfolio, beyond the uncertainties that he/she assumes on the future liabilities themselves.

Alternative Method: Discounting Based on Treasury Inflation Protected Securities ("TIPS"):

An alternative discounting method not available when *Jones/Laughlin* was issued is the use of yields on Treasury Inflation Protected Securities ("TIPS") as the basis for the discount rate. TIPS were first introduced on the financial markets in 1997, approximately 14 years after *Jones/Laughlin*. Discounting based on TIPS yields would potentially provide some recognition of the inflation risk that a Plaintiff has to manage in administering his/her damage fund. The payment mechanics of TIPS securities are similar to those of traditional Treasury Bonds, except for an annual adjustment that is made to the principal balance of the bond, based on changes in the Consumer Price index.

Chart 8:



TIPS securities still carry a significant level of market risk, however, as shown in the TIPS yield Curve on Chart 8. The upward slope of the yield curve indicates that there is a significant level of non-inflation market risk implicit in TIPS yields, in spite of the inflation protection provided by the annual principal adjustments. TIPS yields also reflect an added premium to compensate buyers of those securities against the unfavorable tax consequences of those securities The annual principal adjustment is treated as current taxable income in the year

that the adjustment is made, even though the added principal is not actually paid to the bond holder until maturity of the bond. Thus, Long-Term TIPS yields reflect a market premium to the bond investor to compensate him/her for those unfavorable tax consequences (note: yields on Zero Coupon Treasury bonds reflect a similar market premium for the unfavorable tax treatment of the annual discount accretion on those bonds, not actually "received" by the bondholders until maturity of the bonds). Use of the TIPS yield curve as the basis for discounting loss claims has a similar effect as the use of the Zero Coupon Treasury Yield Curve on the discounted compensation to the Plaintiff. The economic burden of the market risk and the unfavorable tax consequences implicit in these yields is improperly assessed against the Plaintiff when the future losses are discounted at those higher rates.

The upward slope of the TIPS yield curve also underscores the significant level of non-inflation-related market risk inherent in long-term Treasury bonds. The value of Treasury bonds fluctuates for a variety of reasons, many of which are unrelated to changes in the domestic rate of inflation. Monetary policy, administered by the Federal Reserve Bank and other Central Banks, can significantly impact the demand for Treasury securities. The "flight to safety" during turbulent economic times can increase the value of Treasury securities, and the subsequent easing of economic turbulence can, in turn, reverse the "flight to safety" and reduce demand for Treasuries. Fiscal policy of both the U.S. and foreign governments can impact the supply of Treasuries on the market, as well as the supply of other high-grade government securities that compete on the market with Treasuries. Market risk is reflected in the higher yields of all long-term Treasury bonds, including TIPS. Thus, the use of TIPS in discounting claims for future economic losses effectively awards the market risk compensation to the Defendant, who liquidates all risks upon reduction to judgment, at the expense of the Plaintiff, who retains those risks upon reduction to judgment. The risk compensation inherent in those rates is effectively awarded to the wrong party.

Conclusion:

The "Short-Term Rollover Method" of calculating the net present value of future losses provides a more appropriate "transfer price" for income loss and life care cost claims than the "Dedicated Portfolio Method." It provides a hypothetical portfolio with changing yields that approximately match the changing pricing dynamics of the underlying losses. The "Dedicated Portfolio Method," on the other hand, provides a hypothetical portfolio that leaves the Plaintiff with a static series of cash inflows to offset a dynamic series of future losses. Moreover, the "Dedicated Portfolio Method" employs discount rates that are designed to reward risk-takers in the bond market, and it applies those rates against future losses in a manner that improperly rewards the risk-liquidator (the Defendant) at the expense of the risk-taker (the Plaintiff, who has to bear the burden of uncertainty for his/her future losses).