NOTE

Adding Insult to Injury: The Inappropriate Use of Discount Rates to Determine Damage Awards

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It is often assumed that it is necessary to discount future economic losses in order to determine the appropriate damage award in a tort action. The Supreme Court of Canada in the now-famous 1978 trilogy of damage cases sanctioned the net discount rate method of determining the present value of future economic losses. The net discount rate is simply the real rate of interest — the nominal rate minus the rate of inflation. Because there is substantial long term stability in the real rate of interest, the Rules of Practice in Ontario and Nova Scotia now prescribe a net discount rate of 2.5 %. The author agrees with criticism that the net discount method results in methodological error. A recently proposed alternative, the serial calculation method, is not feasible, however, because it is faultily premised upon the ability to forecast rates of inflation and rates of interest in isolation. The author contends further that, if the loss is one of future earnings, there is no justification for any discounting. Economic experience over the last fifty years indicates that the growth of real wages has, on average, exceeded the real rate of interest. This fact means that any discounting of lost future earnings adds insult to injury. Discounting proclaims that the injured person was a substantially below-average worker who would not have shared in the productivity gains of the economy had he been able to continue working.

L'on a souvent cru nécessaire de diminuer la valeur des pertes économiques à venir afin de déterminer le montant adéquat des dommages-intérêts à verser dans une action délictuelle. Dans une trilogie désormais célèbre d'arrêts sur la question de l'évaluation des dommages futurs, la Cour suprême a sanctionné la méthode du taux d'escompte net, qui pretend évaluer la valeur actuelle de pertes économiques futures. Le taux d'escompte net correspond en fait au taux d'intérêt réel, soit le taux d'intérêt nominal moins le taux d'inflation. Vu la stabilité à long terme du taux d'intérêt réel, les *Rules of Practice* de l'Ontario et de la Nouvelle-Écosse stipulent un taux d'escompte net de 2,5%. L'auteur se rallie à ceux qui ont suggéré que le taux d'escompte net est le produit d'une erreur de méthodologie. La méthode de calcul séquentiel, proposée comme substitut, n'est toutefois pas utile puisqu'elle dépend de la prévision exacte des taux d'inflation et taux d'intérêt. L'auteur suggère également qu'on ne peut justifier une diminution du montant des pertes lorsqu'il s'agit d'évaluer des gains futurs. L'histoire économique des cinquante dernières années révèle qu'en moyenne la croissance des revenus réels a dépassé le taux d'intérêt réel. La réduction des pertes de gains futurs apparaît alors comme un affront à tout réclamant, puisqu'elle insinue que la rémunération d'une personne blessée était bien en-dessous de la moyenne et que celui-ci n'aurait jamais profité des gains de productivité de l'économie.

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Introduction

An overdue clarification of the principles of compensation for the loss of future earnings in personal injury and wrongful death cases was undertaken by the Supreme Court of Canada in the famous 1978 trilogy.[1] The trilogy has stimulated a rich cornucopia of articles [2] and an outstanding treatise on the law

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[1] *Andrews* v. *Grand & Toy Alberta Ltd* [1978] 2 S.C.R. 229, (1978) 83 D.L.R. (3d) 452 [hereinafter cited to S.C.R.]; *Arnold* v. *Teno* [1978] 2 S.C.R. 287, (1978) 83 D.L.R. (3d) 609 [hereinafter cited to S.C.R.]; *Thornton* v. *Board of School Trustees of School District No. 57 (Prince George)* [1978] 2 S.C.R. 267, (1978) 83 D.L.R. (3d) 480 [hereinafter cited to S.C.R.].

[2] Bissett-Johnson, *Damages for Personal Injuries — The Supreme Court Speaks* (1978) 24 McGill L.J. 316; Boyle & Murray, *Assessment of Damages: Economic and Actuarial Evidence* (1981) 19 Osgoode Hall L.J. 1; Braniff & Pratt, *Tragedy in The Supreme Court of Canada: New Developments in the Assessment of Damages for Personal Injuries* (1979) 37 U.T. Fac. L. Rev. 1; Bruce, *The Calculation of Foregone Lifetime Earnings: Three Decisions of the Supreme Court of Canada* (1979) 5 Can. Pub. Policy 155; Bruce, *The Introduction of Economic Factors into Litigation Cases: Ontario's 2½ Percent Solution* (1982) 60 Can. Bar Rev. 677 [hereinafter *Ontario's 2½ Percent Solution*]; Charles, *The Supreme Court of Canada Handbook on Assessment of Damages in Personal Injury Cases* (1981-82) 18 C.C.L.T. 1; Cherniak & Sanderson, "Tort Compensation — Personal Injury and Death Damages" in *New Developments in the Law of Remedies* [1981] L.S.U.C. Special Lectures 197; Connell, *Discount Rates — The Current Debate* (1980) 2 Advocates' Q. 138; Dexter, Murray & Pollay, *Inflation, Interest Rates and Indemnity: The Economic Realities of Compensation Awards* (1979) 13 U.B.C.L. Rev. 298; Feldthusen & McNair, *General Damages in Personal Injury Suits: The Supreme Court's Trilogy* (1978) 28 U.T.L.J. 381; Gibson, *Repairing the Law of Damages* (1978) 8 Man. L.J. 637; Hasson, "Pensions or Damages?" in I. Saunders, ed., *The Future of Personal Injury Compensation* [:] *A Symposium held at The Faculty of Law University of Calgary, January 1978* (1979); Krishna, *Tax Factors in Personal Injury and Fatal Accident Cases: A Plea for Reform* (1978) 16 Osgoode Hall L.J. 723; Lipnowski, *The Economist's Approach to Assessing Compensation for Accident Victims* (1979) 9 Man. L.J.

of damages.[3] One of the most recent contributions prompted by the increased focus on economic and actuarial evidence is Professor Landsea's note, *How Workable are Net Discount Rates?*[4] He contends that there is a methodological error inherent in the use of a net discount rate to determine the lump sum award for future pecuniary damages and that the error leads to a substantial understatement of the present value of future economic losses. Because the Supreme Court of Canada sanctioned the use of the net discount method of determining the present value of lost future economic values in the 1978 trilogy of damage assessment cases, Landsea's indictment of this method warrants careful consideration. His challenge is of even greater significance in Ontario and Nova Scotia, where the net discount rate concept has been prescribed by the Rules of Practice. Rule 267a of the Ontario *Rules of Practice* stipulates that:

> The rate of interest to be used in determining the capitalized value of an award in respect of future pecuniary damages, to the extent that it reflects the difference between estimated investment and price inflation rates, is 2 ½ per cent per annum.[5]

My response to the Landsea challenge will be divided into four Parts. In the first Part, I will consider the methodological error, if any, in the concept of the net discount rate. I conclude that Landsea has made a valuable contribution in demonstrating methodological error. The second Part will be a consideration of whether Landsea is correct in concluding that the methodological error results in serious undercompensation of injured plaintiffs. I disagree, and submit that the net discount rate method is a reasonably good approximation given the range of probable variables, provided that the nominal rate of interest decreases to more traditional levels. The third Part will be a discussion of the feasibility of adopting the "correct" procedure, the serial method of calculation, to determine the present value of future economic loss, as advocated by Landsea. I am of the opinion that his technique is not viable because it is impossible to forecast accurately the long term inflation rate and the long term rate of interest independently of each other. In the fourth Part, I

319; McLachlin, *What Price Disability? A Perspective on the Law of Damages for Personal Injury* (1981) 59 Can. Bar Rev. 1; Patterson, *Effective Presentation of Actuarial Evidence In Permanent Disability Cases* (1979) 37 The Advocate 13; Paterson, *Loss of Future Income In Actions for Damages* (1980) 26 McGill L.J. 114; Rea, *Inflation, Taxation and Damage Assessment* (1980) 58 Can. Bar Rev. 280.

[3] K. Cooper-Stephenson & I. Saunders, *Personal Injury Damages in Canada* (1981). The gestation period for this excellent book was undoubtedly longer than the time which has elapsed since the handing down of the trilogy but the trilogy certainly had a significant impact upon it.

[4] (1982) 28 McGill L.J. 102.

[5] *Supreme Court of Ontario Rules of Practice*, R.R.O. 1981, Reg. 540, r. 267a, originally O. Reg. 379/80, s. 3. Rule 267a was made pursuant to *The Judicature Amendment Act, 1979*, S.O. 1979, c. 65, subs. 5(5). See also the Nova Scotia *Civil Procedure Rules*, r. 31.10(2), made pursuant to N.S. Reg. 170/80, which is identically worded.

will consider whether there should be any discounting at all in determining the present value of certain losses, specifically the loss of future earnings. I conclude, on the basis of historical data, that there is little or no justification for discounting to determine a lump sum damage award for the loss of future earnings.

I. Methodological Error of the Net Discount Rate

The compensatory lump sum damage award is determined on the basis that the sum will be invested in income-earning securities and that the capital and investment income should be exhausted in replacing exactly the lost future economic values. There are two critical parameters which must be quantified to calculate a lump sum award. The first is the gross discount rate — the nominal rate of interest which will be earned by the investment of the lump sum. The second is the rate of growth of the lost future flow of pecuniary values. To simplify the analysis, I will assume initially that the lost future flow is an amount which is constant in terms of real purchasing power and therefore increases in nominal terms in response solely to increases in the Consumer Price Index.

These two parameters, the nominal rate of interest and the nominal rate of growth of the economic loss, have an opposing impact upon the calculation of the lump sum award. The higher the nominal rate of interest which will be earned from the investment of the lump sum, the smaller the compensatory lump sum will be. However, the higher the rate at which the lost future flow would have increased in nominal terms (in this example the rate is assumed to equal the rate of inflation), the larger the compensatory lump sum must be. Using the net discount rate method, the lump sum award is calculated by discounting the lost future earnings flow at a rate which equals the difference between the nominal rate of interest and rate of inflation — a rate equal to the real or inflation-free rate of interest.

It is this netting of the two rates that causes the methodological error. Landsea is correct in contending that to calculate with precision the lump sum equivalent of a future flow of increasing nominal income, a serial method of calculation, which incorporates separately both the nominal rate of interest and the rate of inflation, is required.[6] The mathematics of compound interest produces the error and, as might be expected, the error is magnified by the length of time for which the compensation is awarded. Thus, a plaintiff who is compensated for a loss extending many years into the future is affected more adversely by the error than is a plaintiff whose loss persists for fewer years.

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[6] *Supra*, note 4, 108-12. The methodological error has also been noted by Bruce, *Ontario's 2½ Percent Solution, supra*, note 2, 683, fn. 24.

For a given and fixed net discount rate, the error increases as the nominal rate of interest, the gross discount rate, becomes higher. This means that in periods of high inflation, when the nominal yields on investment income will be high, a plaintiff will be affected more adversely than in times of more stable prices and lower rates of nominal interest. This problem is exacerbated by the fact that our *Income Tax Act*[7] levies tax on the basis of nominal and not real interest.

Landsea is certainly correct when he states that the net discount method of determining the present value of future economic values contains a methodological error. This error has been recognized by some advocates of the net discount rate method. An advisory committee[8] which was set up to assist the Committee of the Supreme Court of Ontario on Fixing Capitalization Rates in Damage Actions stated that: "A precise calculation of the lump sum amount that is equivalent in value to a future stream of increasing payments or costs would require a formula incorporating the gross rate of interest and the rate of increase as separate parameters."[9]

II.   Does the Methodological Error Result in Serious Undercompensation?

Acknowledging that there is a methodological error in the net discount rate technique, the issue is whether it results in serious error. Landsea contends that the net discount rate formula "is a mathematically inaccurate approximation and leads to substantial error in the determination of the present money value of future economic losses".[10] However, the Ontario advisory committee advocated the net discount rate method and concluded that:

> [V]ery close approximations within the range of past and foreseeable future economic scenarios will result from a simpler formula where the stream of payments or costs. . .is discounted at a net capitalization rate equal to the excess of the gross rate of interest over the assumed rate of increase.[11]

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[7] S.C. 1970-71-72, c.63, as am. Rea, *supra*, note 2, 287 states: "If inflation increases the interest rate, the increased nominal interest income is taxed as if it were real income. . . .Therefore, the tax rate, expressed as a percentage of real investment income, will increase as the rate of inflation increases. . . .Indexing the tax brackets does not eliminate this additional tax on capital."

[8] The advisory committee was composed of Dr Jack Carr, Murray A. Segal and Ronald M. Walker.

[9] *Report to the Committee of the Supreme Court of Ontario on Fixing Capitalization Rates in Damage Actions* (14 February 1980) 2.

[10] *Supra*, note 4, 104.

[11] *Supra*, note 9, 2.

Is Landsea right in stating that the net discount rate method produces substantial error when compared with the serial method of calculation? Or is the advisory committee right when it contends that the net discount method produces very close approximations for probable economic variables? Landsea is certainly correct in noting that the net discount rate method is sometimes a poor approximation. However, the advisory committee, after studying data relating to the interest rate on long term Government of Canada bonds and the Consumer Price Index, concluded that the real rate of interest or the net discount rate "will be in the range of 2% to 3% per year for the foreseeable future".[12] Accepting this range of net discount rates, many of the figures which Landsea presents in his Table 3 entitled "Understatement of Present Money Value Caused by Use of the Net Discount-Annuity Method"[13] become irrelevant. The largest percentage understatements shown there can be reasonably ignored. The only relevant part of Landsea's Table is produced in Table 1 below. When the gross discount rate is 10% and the net discount rate is 3%, the percentage error varies from 1.00% to 3.69% for economic losses over periods of 10 to 50 years. Given the inaccuracy of damage assessment in general, these percentage errors are not particularly disturbing. Of greater concern is the percentage error which occurs when the net discount rate is 3% but the gross discount rate is 15%. The error varies from 1.63% to 6.02% for economic losses over periods of 10 to 50 years. Furthermore, as Landsea emphasizes, an understatement in the present value has a serious impact upon future values because "[t]he present value understatement leads to shortfalls of much larger proportions in the replacement of future losses because of the cumulative effect of the loss of interest that would otherwise accrue on the present value shortfall".[14]

It should be recognized that the Ontario advisory committee reported on 14 February 1980. The committee was thus dealing only with data up to the

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[12]*Ibid.*, 5.

[13]*Supra*, note 4, 111.

[14]*Ibid.*, 113. Landsea does tend to exaggerate the loss which flows from the methodological error. He goes on to state: "For example, at an 8% growth rate, 15% gross discount rate, and 40 year period of economic loss, the present value damage award is understated by 5.96%. However, in that case, the insufficient award dooms the plaintiff to a recapture of only 51% of lost *future* wages — a shortfall of 49%." This is not a very meaningful calculation because it involves comparing apples with oranges. With an inflation rate of 8%, the dollars being compared over a 40 year period represent vastly different amounts of purchasing power. However, Landsea does qualify his statement, at 113: "It should be noted, however, that this 49% shortfall in dollar value does *not* mean correspondingly that the plaintiff will not be receiving payments for the last 49% of the years of his 40 year period of economic loss. In fact, his losses will be replaced fully for 31 years of the 40 year period, and partially replaced in the 32d year." The methodological error causing the present value understatement of approximately 6% in this example does have a compound effect and deprives the plaintiff of compensation for approximately 20% of the years in which he should be indemnified.

TABLE 1
UNDERSTATEMENT OF PRESENT MONEY VALUE CAUSED BY USE OF THE NET DISCOUNT-ANNUITY METHOD*

Gross Discount Rate	10%	15%	10%	15%
Growth Rate	9%	14%	7%	12%
Net Discount Rate	1%	1%	3%	3%

Number of Years of Economic Loss				
10	0.44%	0.66%	1.00%	1.63%
20	0.83	1.24	1.81	2.95
30	1.20	1.78	2.52	4.11
40	1.56	2.32	3.15	5.13
50	1.91	2.83	3.69	6.02

*Relative Understatement = $(PV_S - PV_A)/PV_S$

where PV_S = Present value calculated by serial method
$\quad PV_A$ = Present value calculated by net discount-annuity method.

end of 1979. If one accepts the assumption that the gross discount rate is measured by the average yield to maturity on long term Government of Canada bonds,[15] the highest average annual rate of 10.20% was achieved only in 1979.[16] Before that, in the 49 previous years that the committee surveyed, there had not been a single instance of a double-digit rate. However, in 1980, the annual rate rose to 12.48% and in 1981, to 15.27%, before it fell to 10.81% in 1982.[17] The committee would not necessarily have had these substantially higher gross discount rates in mind when it stated that the net discount rate method provides "very close approximations within the range of past and foreseeable future economic scenarios".[18] Thus, although Landsea's Tables present net discount rates outside the range of probable values and

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[15] The yield on long term Government of Canada bonds is the appropriate gross discount rate. The judiciary endeavours to reduce the future economic loss to a certainty through contingency deductions. If the loss is certain, the plaintiff is entitled to have the lump sum award calculated on the basis that it will be invested in risk-free securities. The closest equivalent to a risk-free investment is a Government of Canada bond. This approach has been challenged recently by Bruce, *Ontario's 2½ Percent Solution*, *supra*, note 2, 682-4. He argues that the rate should be based on five-year guaranteed investment certificates issued by trust companies. However, recent events have illustrated that such certificates are not risk free.

[16] See *infra*, Appendix.

[17] *Ibid.*

[18] *Supra*, note 9, 2.

thereby exaggerate the inaccuracy stemming from the net discount rate method, it is probably fair to say that the net discount method is a reasonably good approximation, provided that the nominal rate of interest decreases to more traditional levels. This result will occur only if the rate of inflation is reduced.

III.   The Feasibility of Adopting the Correct Serial Method

Landsea states that "[t]here can be little excuse for a court resorting to an inaccurate approximation when absolute accuracy is possible with the serial method".[19] This is a powerful argument, even if it could be proven that the net discount method was a good approximation for all reasonable values of nominal interest and inflation. Also, if plaintiffs were affected equally by the understatement, use of the net discount method would not be so disturbing because adjusting compensation could be provided. However, all plaintiffs are not affected equally. The plaintiff who suffers many years of economic loss is affected more adversely than is the plaintiff whose loss is restricted to fewer years. The net discount rate formula is simpler and present value tables are readily available. However, given the availability of computers and calculators, Landsea appears to be right in dismissing the argument that the net discount method is easier to apply because "the serial method formula can be reduced to an equally convenient one-step calculation".[20]

The case for the adoption of the correct serial method instead of the net discount rate formula appears to be overwhelming. There is, however, one insurmountable obstacle confronting the adoption of the serial method. The serial method is viable only if it is possible to forecast accurately the long term rate of inflation and the long term rate of interest independently of each other. However, these two rates cannot be forecast independently. No reputable economist would attempt to forecast them separately for more than two or three years into the future. Landsea's prescription for combating and eliminating error by replacing the net discount method with the serial method contains the very real potential of introducing far greater error than it eliminates.

The potential for serious error is exemplified well by the decisions of the Supreme Court of Canada in the trilogy. For instance, in *Arnold* v. *Teno*, judicial notice was taken of a pronouncement that the expected rate of inflation over the long term future was 3.5%.[21] This statement was attributed to Dr John Deutsch. Such a forecast was never made.[22] It appears that the

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[19]*Supra*, note 4, 110.

[20]*Ibid.*

[21]*Supra*, note 1, 327.

[22]It appears that the "Deutsch forecast" was introduced as evidence by Ms Doris Dadir, a home economist who testified in the trial of *Andrews* v. *Grand & Toy Alberta Ltd*, *supra*, note

3.5% figure was derived from a report of a Commission of Inquiry [23] to which Dr Deutsch was appointed on 4 September 1973. The purpose of the inquiry was to resolve a dispute about the cost of an agreed improvement in railway pension benefits. The costing of the pension improvement was based upon assumptions and not upon predictions of the future. Examining historical data from the ten previous years, Dr Deutsch assumed that consumer prices would increase by 3.5%; that wages would increase by 6.5% — representing a productivity gain of 3% plus an inflationary increase of 3.5%; and that the interest rate on long term Government of Canada bonds would be 7% — composed of a real rate of return of 3.5% and an inflationary component of 3.5%. These assumptions were, in no sense, predictions of each of the variables in isolation. They were assumptions based upon the relative stability of the interconnection between the various rates. Any individual error in the assumption would tend to be cancelled out by compensating changes in the other assumptions.[24] If Dr Deutsch's report had been studied carefully, the Court would have appreciated that the long term inflation rate and the long term interest rate cannot be predicted independently. Had all of Dr Deutsch's assumptions been used in *Arnold* v. *Teno*, the net discount rate would not have been 7%.[25] Instead, the net discount rate would have been either 3.5% or 0.5%. The 3.5% net discount rate would have been appropriate provided that the lost future income was regarded as a flow of a fixed amount of real income — a nominal income stream which increased at a rate equal to the inflation rate. This net discount rate of 3.5% would be the real rate of interest or the inflation-free rate. The rate of 0.5% would have been the appropriate net discount rate if the lost income stream were assumed to grow at a rate equal to the rate of inflation plus a real growth rate of 3%. This net discount rate of 0.5% would represent the real rate of interest reduced by the real growth rate

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1. When Dr John Murray, an economist called by the plaintiff in a subsequent case, contacted Ms Dadir by phone, she was unable to recall the source of the documents. See *Lan* v. *Wu* [1979] 2 W.W.R. 122, 128, (1978) 7 C.C.L.T. 314 (B.C.S.C.), leave to appeal to the S.C.C. refused [1980] 2 S.C.R. ix. No reference to Dr Deutsch's original statement was provided in the transcript of the *Andrews* case. In *Thornton, supra*, note 1, 279, Mr Justice Dickson stated: "Another expert witness, Mr. D. R. Badir, introduced into evidence the fact that the Economic Council of Canada have [*sic*] gone on record as suggesting that over the next 40-year period the average rate of inflation will be in the neighbourhood of 3½ to 4 per cent." Dexter, Murray & Pollay, *supra*, note 2, 304, fn. 13, state: "The evidence is incorrectly attributed to a 'Mr. Badir'" instead of Ms Dadir.

[23] Government of Canada, Department of Labour, *The Report of the Commission of Inquiry Appointed by the Minister of Labour Relating to an Agreement reached on Increased Benefits by the Unions and Railroad Companies* (1973) (a report to the federal Minister of Labour).

[24] See Feldthusen & McNair, *supra*, note 2, 393.

[25] The Court arrived at the 7% rate by subtracting Dr Deutsch's inflation rate assumption of 3½% from long term bond returns, then in excess of 10%. Thus, Dr Deutsch's inflation rate assumption was utilized independently of his 7% long term bond yield assumption on which it was based, as if the inflation rate figure was a prediction which could be used in isolation.

TABLE 2
PRESENT VALUE OF $10,000 PER YEAR

Rates of Discount	Number of Years				
	10	20	30	40	50
0.5%	$97,304	$189,874	$277,941	$361,722	$441,428
3.5%	83,166	142,124	183,920	213,551	234,556
7.0%	70,236	105,940	124,090	133,317	138,007

UNDERSTATEMENT OF PRESENT VALUE CAUSED BY SELECTING INAPPROPRIATE NET DISCOUNT RATES

	10	20	30	40	50
7% instead of 3.5%	15.5%	25.5%	32.5%	37.6%	41.2%
7% instead of 0.5%	27.8	44.2	55.4	63.1	68.7

of wages. As can be seen by comparing Table 1 with Table 2, the error caused by the methodological inaccuracy of the net discount rate technique pales into insignificance when one considers the horrendous error resulting from choosing the wrong net discount rate by forecasting the rate of inflation and the rate of interest independently of one another.

The only feasible approach to the problems caused by forecasting inflation and interest rates separately is to estimate the long term real or net rate of interest on the basis of historical data and to assume that this rate will hold true for the future. This approach means putting considerable faith in history, but there is no alternative. If inflation turns out to be greater in the future than it has been in the past, the error will tend to cancel out, because nominal interest rates will also be higher. The nominal yield on a financial security is made up of three components — a real rate of return, a risk premium and compensation for any erosion in value of the principal caused by expected inflation. As inflation increases, the nominal rate of return will increase and *vice versa*, but the real rate of return will tend to remain relatively stable. Thus, the net discount rate or the real rate of interest can be estimated on the basis of past experience without the need for an independent forecast of future inflation and interest rates.[26]

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[26]Parts of this note dealing with the net discount rate are based on the author's chapter entitled "Encouraging the Hearse Horse Not to Snicker: A Tort Fund Providing Variable Periodic Payments for Pecuniary Loss" in F. Steel & S. Rodgers-Magnet, eds, *Issues in Tort Law* (1983), 91.

By contrast, the serial method of calculation proposed by Landsea requires an independent forecast of the long term rate of inflation. As it is impossible to predict long term inflation in isolation, it is not feasible to adopt the serial method. Therefore, I am in fundamental disagreement with Landsea when he hopes "that the courts will, in the future, adopt the more accurate method".[27] This is not, fortunately, an option available to courts in Ontario and Nova Scotia where the net discount rate of 2.5 is mandated by the Rules of Practice. For those provinces which could adopt the serial method, my conclusion is that it could be an unmitigated disaster because it is faultily premised upon the ability to forecast rates of inflation and rates of interest in isolation.

IV.   Should There Be Any Discounting for Loss of Future Earnings?

We are all predisposed to assume, as does Landsea, that "[d]iscounting is required to reduce future economic losses to equivalent present money value damage awards".[28] We have been mesmerized unduly by the wonders of compound interest. There is no denying that a dollar in the future is not worth as much as a dollar today because today's dollar can be invested and, therefore, will be worth more than a dollar in the future. Discounting is required if one is to provide exact compensation for a future single loss or a future flow which is fixed in amount. If, however, the future loss is a flow of income which is not constant in terms of nominal dollars, it is not as clear that discounting is required. If the lost future flow of income increases at a rate equal to the rate of inflation, as has been assumed so far in my analysis, the present value should be determined by discounting at the real rate of interest or the inflation-free rate of interest. However, if the lost future flow of income increases at a rate which is greater than the rate of inflation, there is no reason to believe that discounting is required. It is clearly not required if the growth in real wages is equal to the real rate of interest. Therefore, one should focus upon the relationship between the growth of real wages and the real rate of interest. We must balance our knowledge of inflation and the effects of compound interest with information about the average growth of real wages over time.

The growth of average wages and salaries was considered by the Ontario advisory committee. The committee, after studying the Canadian economic experience from 1930 to 1979, concluded that "[e]mpirical evidence confirms that average wages and salaries have consistently increased at a faster pace than general price inflation".[29] This fact was attributed mainly to productivity increases of the economy and, in part, to redistribution in favour of wages and

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[27] *Supra*, note 4, 115.
[28] *Ibid.*, 103.
[29] *Supra*, note 9, 3.

salaries. The committee concluded that wage increases will continue to outpace general price inflation as "a permanent feature of our economic system".[30] The economy may stumble and splutter, as it has done for the last several years, but there is little reason to believe that there will not be real growth in the long run which will result in real increases in wages and salaries.

The critical issue for the purpose of determining whether a discount rate is warranted is the relationship between the real rate of interest and the real growth of wages and salaries. The empirical evidence presented in Table 3 [31] suggests that there is no justification for discounting to determine the present value of the loss of a future flow of wages or salaries, if that future flow conforms to the economic experience of the last 50 years. Only if Column 4, which represents the excess of real wage growth over the real interest rate, were to contain a preponderance of negative numbers would discounting be appropriate. The preponderance of positive numbers indicates that the loss should be compounded rather than discounted. For instance, the 50 year experience from 1933 to 1982 indicates that the present value of a flow of wages should be determined by compounding at a rate of 0.82%. The 25 year experience from 1933 to 1957 would also point to a compounding at 2.05% rather than to a discounting, whereas the 25 year experience from 1958 to 1982 would indicate a net discount rate of 0.41%. As might be expected, the experience for 10 year periods is more variable: two periods, 1930-1939 and 1960-1969, indicate discounting of 3.77% and 1.09% respectively; whereas three periods, 1940-1949, 1950-1959 and 1970-1979, indicate a compounding of the loss at 4.58%, 1.72% and 0.90% respectively. The most recent 10 year experience points almost conclusively to a zero discount rate as one could hardly expect anything closer to zero than minus 0.02%.

The economic experience of the last 50 years does not justify the view that discounting is required but, conversely, demonstrates that it should not be used. Plaintiffs who have been injured and who have lost future earnings have not been compensated adequately. We have been too cognizant of the wonders of compound interest and have been unjustifiably oblivious to the benefits derived from increases in general productivity of the economy. The growth in real wages has, on average, been greater than or equal to the real rate of interest. Therefore, discounting is not justified in determining the present value of a lost average income flow.

Advocating a zero discount rate is neither novel nor radical. Business professors, Dexter, Murray and Pollay, have concluded that a net discount rate of zero is appropriate for lost employment income. They state:

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[30] *Ibid.*

[31] Table 3 is reproduced from Appendix B of the Ontario advisory committee report, *ibid,* 9-10, with the addition of column (4). All the data on which the Table is based are reproduced in the Appendix to this note, *infra,* and have been updated for the period 1980-82.

TABLE 3
THE APPROPRIATE RATE OF COMPOUNDING
OR DISCOUNT
TO DETERMINE THE PRESENT VALUE
OF LOST FUTURE EARNINGS

(1)	(2)	(3)	(4)
Period	Real Wage Growth [Excess of increase in wages & salaries over increase in prices] (%)	Real Interest Rate [Excess of interest rate over increase in prices] (%)	Excess of real wage growth over real interest rate [Col. (2) — Col. (3)] (%)
Annual Average for 50 year period from:			
1930-1979	2.33	1.86	0.47
1933-1982	2.08	1.26	0.82
Annual Average for 25 year periods from:			
1930-1954	2.53	1.55	0.98
1955-1979	2.12	2.17	(0.05)
1933-1957	2.47	0.42	2.05
1958-1982	1.69	2.10	(0.41)
Annual Average for 10 year periods from:			
1930-1939	1.86	5.63	(3.77)
1940-1949	2.70	(1.88)	4.58
1950-1959	3.04	1.32	1.72
1960-1969	2.04	3.13	(1.09)
1970-1979	2.01	1.11	0.90
1973-1982	0.39	0.41	(0.02)

It is unreasonable to expect an investment portfolio designed to replace a relatively stable income stream to achieve a real rate of return in excess of 2 to 3%, based on an analysis of the last 40 years. In as much as real wages have also risen at an average rate of 2 to 3% annually, a net discount rate of zero to 2% seems more appropriate, depending on the extent to which lost labour income is an issue.[32]

Law professors, Feldthusen and McNair, also recognize that a zero discount rate is economically justifiable for lost earnings:

If, as has been argued, the 7% rate used by the court is not valid and should be replaced by a real interest rate of, say, 3%, this would be entirely offset by anticipated productivity gains. As a result, the appropriate discount rate would be 0%, that is, the award for future earnings loss would be calculated by a simple addition of the amount earned at the present level for the number of earning periods lost as a result of the accident.[33]

Connell concurs and states: "It is quite justifiable mathematically in many cases to utilize a 0% discount rate."[34] He believes a net discount rate of zero to be appropriate for determining the loss of wage income because the growth in

[r]eal wages, resulting from the excess of wages over inflation, is expected to continue at the 2% level. As noted earlier the expected annual increase in real wages offsets the expected annual increase in real interest rates so we deduct one from the other, to arrive at a rate equivalent to discounting at approximately minus 1% to plus 1%.[35]

Professor Fleming has also concluded that there is economic justification for a zero discount rate for lost future wages.[36] He notes further that, by eliminating discounting for lost future wages, damage awards would become more predictable and settlements would be encouraged.[37] Professor Sherman, on the basis of the American economic experience, has also concluded that a zero discount rate is appropriate for lost wages:

The conclusion, based upon the historical pattern of the past 32 years, is that future wage increases of the injured party should at least match the present value discount factor (interest rate). Therefore, future wages would be calculated, if one simultaneously ignores the offsetting factors of wage increases and discount factors, by an arithmetic calculation of the last annual wage...times the number of working years remaining.[38]

He later says that "it makes the most sense when determining the present value of future earnings simply to use the figure that results from multiplying the current wage by the deceased's actuarial life expectancy".[39]

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[32] *Supra,* note 2, 306.

[33] *Supra,* note 2, 414.

[34] *Supra,* note 2, 138.

[35] *Ibid.,* 148.

[36] Fleming, *The Impact of Inflation on Tort Compensation* (1977) 26 Am. J. Comp. L. 51, 69.

[37] *Ibid.*

[38] Sherman, *Projection of Economic Loss: Inflation v. Present Value* (1981) 14 Creighton L. Rev. 723, 731.

[39] *Ibid.,* 733.

It is not, however, academic writers only who have been persuaded that there should be no discounting to determine the present value of a lost flow of wages. In *Olacke's Estate* v. *Kenting Aircraft Ltd*, Mr Justice Moore of the Alberta Court of Queen's Bench used a discount rate of zero. He stated: "In my view, based on the evidence of an assumed return on investment of a fixed income of 10%, less an allowance of 8% for future inflation and less an allowance of 2% for future productivity, a zero discount rate should be used." [40] The Supreme Court of Alaska in *Beaulieu* v. *Elliott* [41] had earlier used a net discount rate of zero.

Conclnsion

There is very strong empirical evidence indicating clearly that no rate of discount should be used to determine the present value of a lost future flow of earnings sustained by an average wage earner. If the net discount rate is zero, there will be, of course, no error in the calculation of the present value of such a lost income stream. Its present value is calculated by simply adding the lost current annual earnings for the appropriate number of years. There will be no methodological error of the kind indicated by Landsea.

In all provinces that have not adopted a Rule of Practice specifying a net discount rate, it is submitted that no discounting should be employed to determine the present value of a lost flow of future earnings suffered by an average wage earner. In Ontario and Nova Scotia, the Rules of Practice specify a net discount rate of 2.5%. However, it should be noted that this interest rate is relevant only "to the extent that it reflects the difference

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[40] (1979) 20 A.R. 215, 220 (Q.B.).

[41] 434 P. 2d 665 (1967) (S.C. Alaska). More recently, the Supreme Court of Pennsylvania in *Kaczkowski* v. *Bolubasz*, 421 A. 2d 1027 (1980) approved of the total offset or zero discount method of the *Beaulieu* case. Nix J. stated, at 1038-9: "[We] find as a matter of law that future inflation shall be presumed equal to future interest rates with these factors offsetting. Thus, the courts of this Commonwealth are instructed to abandon the practice of discounting lost future earnings." The *Kaczkowski* case does not establish simply that in Pennsylvania the present value of lost future earnings is to be determined without resort to discounting. The case goes much further because it disapproves specifically of the restrictive recognition of productvity gains accorded by the Alaska Court in *Beaulieu*. Thus, in addition to no discounting, Nix J. states that courts are to consider the victim's lost future productivity as a further factor. If expert evidence establishes that the plaintiff would have achieved real wage gains, the damage award for loss of earnings will be determined by compounding the first year's wage loss at a rate equal to the real wage growth for the appropriate number of years. See Shoot, *Lost Earnings: The Discount/Inflation Problem* (1983) 15 Trial Lawyers Q. 27; and Hurney, *Tort Damages: The Adjustment of Awards for Lost Future Earning Capacity to Compensate for Inflation and Increased Productivity* (1981-82) 7 U. Dayton L. Rev. 139.

between estimated investment and price inflation rates".[42] Because the rule mentions only investment rates and price inflation rates and not the growth of real wages, the rule establishes only the real or inflation-free rate of interest. The rule therefore provides only the appropriate net discount rate to determine the present value of a future flow of income which is increasing at the same rate as inflation. It is not the appropriate rate to determine the present value of the lost future earning of an average wage earner because his wage will rise in response both to inflation and to rates of growth in productivity.[43] The advisory committee report helps to clarify this point. The report, after concluding that the real rate of interest is between 2% and 3%, stated that:

> [T]o estimate the lump sum equivalent of a stream of future amounts that...would have been expected to increase at the same pace as average wages and salaries, it would be appropriate to discount those amounts...on the basis of a capitalization rate that is about 2% per year less than the [real rate of interest], i.e., at around 1% per year.[44]

Thus, in Ontario and Nova Scotia, a zero discount rate will be appropriate for a lost flow of future earnings, provided it can be established that those earnings would have increased in real terms at a rate of approximately 2.5%. In *Lewis* v. *Todd*, Mr Justice Dickson accepted productivity as a relevant factor in assessing a damage award and noted that this factor had not been raised in the trilogy.[45] He found that there was evidence to support a 2%

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[42] *Supreme Court of Ontario Rules of Practice*, R.R.O. 1981, Reg. 540, r. 267a; and Nova Scotia *Civil Procedure Rules*, r. 31.10(2).

[43] It is unfortunate that a separate sub-rule was not established to determine the present value of an average flow of future wages. This would have eliminated the confusion which appears to be developing in Nova Scotia. In *Whitehead* v. *Misner* (1981) 48 N.S.R. (2d) 416, (1981) 92 A.P.R. 416 (S.C., T.D.), counsel for the plaintiff argued that the discount rate should be adjusted to reflect real wage growth and had adduced evidence that pay increases averaged more than 1% higher than the increase in the Consumer Price Index. Madam Justice Glube refused to vary the 2.5% net discount rate and, at 445, stated that "to tamper with this rate based on individual circumstances would present great difficulties". On appeal, the damage award was reduced. See (1982) 51 N.S.R. (2d) 111, (1982) 102 A.P.R. 111 (S.C., App. Div.). MacKeigan C.J.N.S. used the 2.5% net discount rate prescribed by the Rules, but did not discuss whether evidence of real wage growth might justify a lower discount rate. No adjustment for real wage growth was permitted in *Shaw's Estate* v. *Roemer* (1981) 46 N.S.R. (2d) 629, 686, (1981) 89 A.P.R. 629 (S.C., T.D.). A preferable approach has been adopted by Mr Justice Hallett in *Comeau* v. *Marsman* (1981) 47 N.S.R. (2d) 550, 560, (1981) 90 A.P.R. 550 (S.C., T.D.), who states that "the judges did not intend that the only discount rate that could be appropriate in any particular case would be 2½%. The fixing of the discount rate at 2½% is intended to reflect only the difference between interest rates and the rate of inflation. In any given case, there could be factors that would indicate that this discount rate would be inappropriate."

[44] *Supra*, note 9, 5-6.

[45] [1980] 2 S.C.R. 694, 712, (1980) 115 D.L.R. (3d) 257.

productivity growth rate figure. In Ontario and Nova Scotia, this factor would result in a net discount rate of 0.5%.[46]

Unrealistically high net discount rates are still being used by some courts to determine the lump sum damage award for loss of future income of average wage and salary earners.[47] We are only paying lip service to the principle that a tort victim is entitled to full indemnity for all pecuniary losses.[48] Reality denies the mythology of full compensation. Applying any discount rate, and certainly a net discount rate which is greater than 0.5% or 1.0%, to lost future earnings, implies clearly that the court is denying the right of a victim to share in the future growth of wages stemming from the productivity gains of the economy. Discount rates, particularly unrealistically high net discount rates, are adding insult to injury. Such discount rates proclaim that the injured person was a substantially below-average worker who would not have shared in the productivity gains of the economy if he had not been injured.

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[46] If the courts are reluctant to modify the net discount rate prescribed by the Rules, the simplest solution would be to build the rate of growth of real wages into the lost future income stream before any discounting occurs. One can then continue to use the 2.5% discount rate and yet still recognize the growth of real wages. This would be analogous to the serial calculation which Landsea advocates. Such a serial calculation is possible because the growth of real wages and the real rate of interest can be forecast independently.

[47] The use of discount rates is certainly appropriate in the determination of the present value of a discrete amount of future loss or of a loss of a flow of future values which increases solely in response to inflation. A discount rate will have to be applied to determine the present value of such a lost value stream. However, the *net* discount approach will produce a methodological error as described by Landsea which is always adverse to the plaintiff, but the quantum of which defies prediction. This error is something which judges should bear in mind when assessing damage awards, particularly for very long term economic losses. Although there is no precise way of compensating for this methodological error, a judge should perhaps be less inclined to apply contingency deductions against such plaintiffs unless the deductions are clearly justified.

[48] The principle has been set forth by the Supreme Court in *Andrews, supra*, note 1, 240-2.

APPENDIX
CANADIAN INTEREST, PRICE AND WAGE RATES 1930-1982[1]

Year	Interest Rate[2] (%)	Annual Increase in Prices[3] (%)	Annual Increase in Wages and Salaries[4] (%)	Real Interest Rate (%)	Real Wage Growth (%)
1930	4.56	−0.61	0.62	5.17	1.23
1931	5.42	−9.81	−3.28	15.23	6.53
1932	4.83	−9.19	−7.20	14.02	1.99
1933	4.62	−4.69	−5.02	9.31	−0.33
1934	3.46	1.39	0.96	2.07	−0.43
1935	3.67	0.72	2.86	2.95	2.14
1936	3.11	1.80	1.85	1.31	0.05
1937	3.21	3.20	7.50	0.01	4.30
1938	3.03	1.07	2.96	1.96	1.89
1939	3.50	−0.77	0.41	4.27	1.18
1940	3.11	4.07	3.89	−0.96	−0.18
1941	3.06	5.83	8.86	−2.77	3.03
1942	3.06	4.85	8.32	−1.79	3.47
1943	3.00	1.75	9.01	1.25	7.26
1944	2.99	0.48	3.22	2.51	2.74
1945	2.83	0.52	2.82	2.31	2.30
1946	2.60	3.39	9.52	−0.79	6.13
1947	2.56	9.46	11.86	−6.90	2.40
1948	2.93	14.18	12.72	−11.25	−1.46
1949	2.75	3.16	4.49	−0.41	1.33
1950	2.99	2.93	5.50	0.06	2.57
1951	3.50	10.52	12.89	−7.02	2.37
1952	3.62	2.40	7.22	1.22	4.82
1953	3.68	−0.85	4.62	4.53	5.47
1954	3.14	0.65	3.22	2.49	2.57
1955	3.07	0.15	2.76	2.92	2.61

[1]1930-79 data from *Report to the Committee of the Supreme Court of Ontario on Fixing Capitalization Rates in Damage Actions* (14 February 1980) Appendix. The Table was updated to 1982 by David Arrowsmith of the Industrial Relations Centre, Queen's University. The 1979 values were also revised.

[2]Measured by average yield to maturity on long term Government of Canada bonds.

[3]Measured by the Statistics Canada Consumer Price Index.

[4]Taken from industrial composite wage and salary index shown in Canadian Insitute of Actuaries, Sub-Committee on Economic Statistics, *Report on Canadian Economic Statistics 1924-1978*.

Year	Interest Rate[2] (%)	Annual Increase in Prices[3] (%)	Annual Increase in Wages and Salaries[4] (%)	Real Interest Rate (%)	Real Wage Growth (%)
1956	3.60	1.48	4.94	2.12	3.46
1957	4.19	3.15	5.25	1.04	2.10
1958	4.28	2.63	3.90	1.65	1.27
1959	5.23	1.09	4.24	4.14	3.15
1960	5.11	1.31	−0.35	3.80	−1.66
1961	5.06	0.87	3.91	4.19	3.04
1962	5.10	1.20	2.94	3.90	1.74
1963	5.09	1.75	3.39	3.34	1.64
1964	5.18	1.79	3.87	3.39	2.08
1965	5.20	2.46	5.21	2.74	2.75
1966	5.68	3.74	5.81	1.94	2.07
1967	5.90	3.57	6.74	2.33	3.17
1968	6.73	4.09	6.93	2.64	2.84
1969	7.56	4.51	7.20	3.05	2.69
1970	7.97	3.37	7.60	4.60	4.23
1971	6.95	2.84	8.57	4.11	5.73
1972	7.23	4.77	8.41	2.46	3.64
1973	7.55	7.61	7.53	−0.06	−0.08
1974	8.87	10.86	10.99	−1.99	0.13
1975	9.00	10.81	14.18	−1.81	3.37
1976	9.22	7.51	12.15	1.71	4.64
1977	8.69	7.99	9.61	0.70	1.62
1978	9.24	8.96	6.17	0.28	−2.79
1979	10.20	9.13	8.62	1.07	−0.51
1980	12.48	10.15	10.11	2.33	−0.04
1981	15.27	12.49	12.09	2.78	−0.40
1982	10.81	11.69	9.65	−0.88	−2.04

[1]1930-79 data from *Report to the Committee of the Supreme Court of Ontario on Fixing Capitalization Rates in Damage Actions* (14 February 1980) Appendix. The Table was updated to 1982 by David Arrowsmith of the Industrial Relations Centre, Queen's University. The 1979 values were also revised.

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