INFLATION, TAXATION AND DAMAGE ASSESSMENT

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I. *Introduction.*

In three recent tort cases and a fatal accident case the Supreme Court of Canada attempted to establish some general principles for making damage assessments.[1] To an economist the most troublesome aspect of these cases is the court's discussion of inflation and taxation. Since the court analysed inflation and taxation without the benefit of any serious economic evidence, it is not surprising that the opinions contain some errors. The Canadian courts are not alone in their inadequate treatment of these two issues. In the United States the treatment of inflation and taxes is generally unsettled,[2] and in Great Britain a Royal Commission has recently recommended some major changes in the British method of assessing damages.[3]

Inflation and taxation have often been linked as two factors which can be neglected in personal injury awards because it has been

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[1] *Andrews* v. *Grand & Toy (Alberta) Ltd.*, [1978] 2 S.C.R. 229, 83 D.L.R. (3d) 452; *Thornton* v. *Board of School Trustees of School District No. 57 (Prince George)*, [1978] 2 S.C.R. 267, 83 D.L.R. (3d) 480; *Arnold* v. *Teno*, [1978] 2 S.C.R. 287, 83 D.L.R. (3d) 609; *Keizer* v. *Hanna*, [1978] 2 S.C.R. 342, 82 D.L.R. (3d) 444. The cases are discussed in W.H. Charles, A New Handbook on the Assessment of Damages in Personal Injury Cases From the Supreme Court of Canada, (1978), 3 C.C.L.T. 344; A. Bissett-Johnson, Damages for Personal Injuries—The Supreme Court Speaks (1978), 24 McGill L.J. 317; C.J. Bruce, The Calculation of Foregone Lifetime Earnings: Three Decisions of the Supreme Court of Canada (1979), 5 Can. Pub. Pol. 155; M. Braniff and A. 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; V. Krishna, Tax Factors in Personal Injury Cases: A Plea for Reform (1978), 16 Osgoode Hall L.J. 723.

[2] J.P. Henderson, Some Recent Decisions on Damages; with Special Reference to Questions of Inflation and Income Taxes (1973), 40 Ins. Counsel J. 432; Case Note, *Feldman* v. *Allegheny Airlines Inc.* (1976), 37 Ohio State L. J. 138 and (1976), 62 Cornell L. Rev. 803; Future Inflation, Prospective Damages and the Circuit Courts (1977), 63 Va. L. Rev. 105.

[3] Great Britain, Royal Commission on Civil Liability and Compensation for Personal Injury, Report (London, 1978) hereinafter referred to as the Pearson Report.

claimed that they offset each other.[4] It is shown in this article that the two issues are linked in a more important way because the rate of inflation affects the rate of taxation. The first part of the article deals with the treatment of inflation in personal injury and fatal accident awards and indicates the correct approach in the absence of taxation. In the second section taxation is introduced and the connection between inflation and taxation is illustrated. Several alternative approaches to taxation are compared with numerical examples. Although the discussion is in terms of a personal injury that leads to total disability and total loss of earnings, the conclusions are equally applicable to fatal accidents and partial disability. The results indicate that the Supreme Court made a substantial error in its treatment of inflation in *Andrews* v. *Grand & Toy (Alberta) Ltd.*[5] The rule that taxes should be ignored in personal injury cases was approximately correct in *Andrews,* but it can lead to a substantially biased result, depending on the facts of the case.

II. *Inflation.*

The principle of *restitutio in integrum* requires that damages be calculated so as to return the victim to the position he enjoyed prior to the accident. In the absence of taxes this implies that the award must provide an amount in each future year which equals the lost earnings (other heads of damage are not considered in this article). Since the prediction of future earnings is based on current price levels, it is reasonable to assume that the future earnings will increase in each year along with the cost of living.[6] The Supreme Court has acknowledged that inflation must be built into the damage calculation,[7] but it did not understand that the forecast rate of inflation must be consistent with the rate of interest used to discount future losses. After the relationship between the interest rate and inflation is explained, it will be shown that courts need not explicitly forecast the rate of inflation unless the effect of inflation on taxes is considered.

Interest rates can be thought of as a mechanism for enticing consumers to forego consumption today in exchange for consump-

[4] *McWeeney* v. *New York, New Haven and Hartford R.R.* (1960), 282 F. 2d 34 (2nd Cir.), cert. den. (1960), 364 U.S. 870. Lawyers' fees were mentioned as another factor which would offset taxes. In a later case Judge Friendly noted that with higher rates of inflation the approach may have to be changed, *Yodice* v. *Koninklijke Nedenlansche Stoonboot Maatschappij* (1971), 443 F.2d 76, at p. 79 (2nd Cir.).

[5] *Supra,* footnote 1.

[6] Earnings should also increase due to promotions and rising real wages in the economy as a whole. This later effect was considered in *Cobean* v. *Northern and Central Gas Corp. Ltd.*, unreported judgment of the Supreme Court of Ontario, July 3rd, 1979, at p. 22.

[7] *Supra,* footnote 1, at pp. 258 (S.C.R.), 474 (D.L.R.).

tion in the future. Consider the simple case of someone who is loaning $100.00 for one year at three per cent interest. In the absence of inflation the three per cent interest is the reward for delaying consumption for one year. If prices rise seven per cent by next year, the $100.00 loan plus $3.00 in interest will be worth seven per cent less in terms of this year's purchasing power. The consumer is put in a position of giving up $100.00 in consumption goods to have the equivalent of $103.00/1.07 = $96.26 in consumption goods next year. He may be induced to consume this year rather than lending on these terms. The borrower of funds on these terms may be induced to borrow more because he can repay the loan with dollars that are worth seven per cent less. Since lenders are less willing to lend and borrowers are more willing to borrow, the interest rate must rise above three per cent to equate the supply and demand for loans. If the consumer was willing to lend at three per cent interest in the absence of inflation, he will be willing to lend at (roughly) a ten per cent rate of interest if inflation equals seven per cent. At the end of the year the $100.00 plus $10.00 interest has a purchasing power equal to $110.00/1.07 = $102.08 in today's prices, roughly three per cent more than at the beginning of the year. The borrower is willing to pay ten per cent because he can repay the loan with dollars that are worth seven per cent less than when the loan was made. Economists differentiate between the *nominal* interest rate and the *real* interest rate. The latter is corrected for inflation. In this example the nominal interest rate is ten per cent and the real interest rate is three per cent.

A similar process is at work in the economy as owners of wealth decide on what assets to hold. Alternative assets offer varying degrees of protection against inflation. For example, if one owns property which provides a rent that is revised frequently, the annual rent will increase more or less in line with the cost of living. In other words, the *real* return on the investment is relatively constant. On the other hand if one buys a bond, the interest earned will be fixed in *nominal* terms. As prices rise fewer goods and services can be purchased with the fixed interest on a bond. Furthermore, when the bond is retired, the purchasing power provided by the principal will be lower because of inflation. Rational investors will choose between the alternative types of assets based on the real rate of return which can be expected. In order to know the real rate of return from assets such as bonds, they must forecast the rate of inflation. The higher the expected rate of inflation, the higher must be the nominal interest rate on the bond in order to entice investors to hold bonds. The market-determined interest rate on bonds will be roughly the sum of a long-term real rate of return and the expected rate of inflation. Since the expected rate of inflation cannot be measured directly, a reasonable estimate of the expected real rate of return is the amount by which interest rates have exceeded inflation in the

past. For example, the rate of return on long-term Government of Canada bonds averaged two point two percentage points above the rate of inflation between 1955 and 1977.

Once one understands the relationship between interest rates and inflation it is easy to see that the estimate of future inflation is not needed by the court. As an example consider an individual whose loss one year from now is estimated to equal $10,000.00 in today's prices. If inflation is forecast to equal seven per cent, the plaintiff will need $10,700.00 next year to be restored to his former position. If the market interest rate is ten per cent, the present value of $10,700.00 is $10,700/1.1 = $9,727.00. If instead we simply calculate the present value of $10,000.00 using a real rate of return of three per cent, we get substantially the same result without considering the rate of inflation: $10,000.00/1.03 = $9,709.00. The slight difference between these two figures is eliminated if we recognize that the interest payment (as well as the principal) will have lower purchasing power after a year of inflation.[8] If r is the real rate of return and p is the rate of inflation, the interest rate must equal $r + p + (r \times p/100)$ to guarantee a real rate of return equal to r. For example, if the rate of inflation is expected to be seven per cent and the real rate of return is three per cent, the interest rate must equal $7 + 3 + (7 \times 3)/100 = 10.21$ per cent.

Table 1 illustrates that the amount of consumption that can be maintained with an initial capital fund equal to $148,775.00 is the same regardless of inflation. In the absence of inflation this fund can sustain $10,000.00 per year in consumption for twenty years with a three per cent rate of interest. Alternatively, the same fund can sustain the same consumption under seven per cent inflation if the interest rate equals 10.21 per cent. The last three columns in Table 1 represent the pattern of assets, income, and consumption if nominal consumption rises with the price level but real annual consumption remains constant. The example in Table 1 also illustrates that when inflation is expected (and realized) assets must be accumulated in the earlier years in order to provide for high cost future consumption.

We can conclude that exactly the same capital sum will be calculated if either of two methods are used: 1) $10,000.00 is capitalized at a real rate of three per cent, or 2) $10,000.00 is increased by seven per cent per year to account for inflation and the resulting series is discounted at a rate of 10.21 per cent. However, it is crucial that the forecast rate of inflation used to inflate the $10,000.00 annual sum be the same rate of inflation which is

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[8] The explanation for this difference in Case Note on *Feldman* v. *Allegheny Airlines, op. cit.*, footnote 2, at p. 145 is not correct.

TABLE 1

CONSUMPTION SUPPORTED BY LUMP SUM PAYMENT

	No Inflation			7% Inflation		
Year	End of Year Assets	Interest 3%	Consumption	End of Year Assets	Interest 10.21%	Consumption Constant Purchasing Power (10,000 year 0 prices)
0	148775			148775		
1	143238	4463	10000	153265	15190	10700
2	137535	4297	10000	157464	15648	11449
3	131661	3950	10000	161291	16077	12250
4	125611	3768	10000	164651	16468	13108
5	119379	3581	10000	167436	16811	14026
6	112961	3389	10000	169523	17095	15008
7	106350	3191	10000	170773	17308	16058
8	99540	2986	10000	171027	17436	17182
9	92526	2776	10000	170104	17462	18385
10	85302	2559	10000	167800	17368	19672
11	77861	2336	10000	163883	17132	21049
12	70197	2106	10000	158093	16732	22522
13	62303	1869	10000	150135	16141	24099
14	54172	1625	10000	139678	15329	25786
15	45797	1374	10000	126347	14261	27592
16	37171	1115	10000	109725	12900	29522
17	28286	849	10000	89340	11203	31588
18	19135	574	10000	64662	9122	33800
19	9709	291	10000	35098	6602	36166
20	0	0	10000	−15	3584	38697

Note: The calculations assume that the interest is paid on the assets held at the end of the previous year and prices rise at the beginning of each year. End of year assets equal the previous year's assets plus interest minus consumption.

implicit in the interest rate. This is where the Supreme Court made a crucial error in *Andrews*. Mr. Justice Dickson noted that current rates were approximately ten and one half per cent and subtracted a forecast rate of inflation of three and one half per cent, producing a seven per cent real rate of discount. The use of this excessively high real discount rate substantially reduced the awards. For instance, in *Andrews* the pecuniary loss would be $1,109, 373.00 with a three per cent capitalization rate, compared to $641,713.00 with a seven per cent capitalization rate. The inflation forecast was based on evidence of a home economist in the *Thornton* trial.[9] She testified that the Economic Council of Canada had forecast a three and one half per cent rate of inflation for the next forty years. There was no source given for this forecast. In the other cases the Supreme Court attributed the forecast to Dr. Deutsch, former head of the Economic

[9] *Supra*, footnote 1, at pp. 279 (S.C.R.), 487 (D.L.R.).

Council, but is not clear that he ever made such a forecast.[10] In any case, such a forecast, made at least five years previously, is totally inconsistent with the rate of inflation which participants in the market were predicting in 1978 when interest rates were above ten per cent. Similarly, if the future earnings are to be explicity inflated, the (nominal) discount rate must reflect the same forecast of inflation that is used to inflate future losses.[11]

The confusion over expected rates of inflation can be ignored altogether if the courts use a real rate of discount which reflects historical experience. A two to three per cent figure would be appropriate. Lord Diplock was nearly correct when he suggested that the interest rates that prevail during "stable" periods should be used.[12] His suggestion must be modified somewhat because the correct discount rate is an interest rate which occurs when inflation is *expected* to be zero. The historical real rate of return is an estimate of such a rate. If the modified Diplock approach is used, the assessment process would be greatly simplified by a Supreme Court ruling that a particular real rate is reasonable for all cases.[13] It is extremely inefficient for economic evidence to be heard on the historical real rate of return in every injury or fatal accident case.

It must be emphasized that the use of a real rate of discount does not guarantee that the plaintiff will not be adversely affected by inflation or that he might not benefit from inflation. If inflation increases unexpectedly, the plaintiff, along with other owners of fixed income assets, will suffer a capital loss as interest rates rise. If inflation unexpectedly falls, he will receive a capital gain as interest rates fall. This risk can be alleviated somewhat by holding short-term assets. In the past the gains and losses from unexpected inflation have tended to cancel out when measured over long periods, with the result that the *ex-post* real return has been relatively constant. Economists see no reason for the future real return to deviate from past levels.

The suggestion that inflation be considered implicitly (by using a real rate of discount) rather than explicitly is only correct if taxes

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[10] Dr. Deutsch *assumed* a 3 1/2 per cent rate of inflation in a letter to the Minister of Labour, December 27th, 1973. In another case this letter was stated to be the reference to Dr. Deutsch, *Julian* v. *Northern and Central Gas Corporation Ltd.* (1978), 5 C.C.L.T. 148, at p. 159 (Ont. S.C.).

[11] The plaintiffs in all four cases (*supra*, footnote 1) could have used better economic advice: in *Keizer* the plaintiff consented to a 9-10 per cent real interest rate, at pp. 366 (S.C.R.), 464 (D.L.R.).

[12] *Mallett* v. *McMonagle*, [1970] A.C. 166, at p. 176.

[13] In *Andrews*, *supra*, footnote 1, at pp. 259 (S.C.R.), 474 (D.L.R.), the court held (with respect to the discount rate) that "[t]he result in the future cases will depend upon the evidence adduced in those cases".

are not considered. In the next section it is shown that the impact of taxation depends on the rate of inflation. Therefore, a forecast of the rate of inflation may have to be made, but it is crucial that it be consistent with the inflation forecast implied by the level of the market interest rate.

III. *Taxation.*

Taxes introduce an interesting conceptual problem and a conflict between the economic and legal views of negligence law. Economists and lawyers who view law from an economic perspective have concluded that the primary justification for negligence law is that it encourages efficient accident prevention.[14] The Learned Hand rule[15] defines negligence to have occurred whenever the cost of preventing an accident was less than the expected cost of the accident. The Learned Hand rule not only defines negligence, it also implies that to promote economic efficiency the damage award should reflect the *social* cost of the accident, not just the cost to the victim. This economic criterion requires that the award should reflect total lost earnings, gross of taxes.[16] It is immaterial whether the government taxes the earnings or the award, as long as the tortfeasor is assessed the total cost of the accident. If substantial injustice occurs to accident victims, the legislature can revise the tax laws. This possibility was mentioned in *Andrews*.[17]

In contrast to the economic view, the courts and most of the legal profession perceive the purpose of damages in tort cases to be compensation for the victim.[18] Since damages are supposed to restore the injured victim to the position that he would have enjoyed had he not been injured, the court should replace lost after-tax income. In this article alternative approaches to taxation are evaluated from this perspective.

If the lost earnings occurred in only one year, the court could simply award the amount of the lost after-tax income for that year. There would be no tax consequences since the award itself is not

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[14] R.A. Posner, A Theory of Negligence (1972), 1 J. Legal Studies 29.

[15] *United States* v. *Carroll Towing Co.* (1947), 159 F.2d 169 (2nd Cir.).

[16] The social cost may deviate from the cost to the victim for reasons other than taxes.

[17] *Supra*, footnote 1, at pp. 260 (S.C.R.), 475 (D.L.R.). E. Yorio suggests that awards for lost earnings be taxed, The Taxation of Damages: Tax and Non-Tax Policy Considerations (1977), 62 Cornell L. Rev. 701, at p. 736.

[18] The following quotation is typical: "The cardinal principle of damages in Anglo-American law is that of *compensation* for the injury caused to plaintiff by defendant's breach of duty" [italics in original]. F.V. Harper and F. James, Jr., The Law of Torts (1956), p. 1299.

taxable. When the loss extends into the future, it becomes much more difficult to calculate a capital sum that will replace the lost after-tax earnings. The court faces a difficult calculation because the recipient will have to invest the capital sum so as to spread his consumption throughout his life. Since the future investment income is taxable, the resulting life-time tax liability differs from the taxes that would have been paid on the lost earnings. The three most important causes of this difference are: 1) income from capital and earnings are taxed at different rates. The $1,000.00 dividend and interest exclusion, the dividend tax credit and the favorable treatment of capital gains are examples of provisions that reduce taxes on this income compared to taxes on an equivalent amount of earnings. 2) Since there is no explicit tax on capital (excluding capital gains), the recipient of a lump sum award will not pay taxes on that portion of his consumption that is financed out of encroachments on capital. 3) The tax system makes no distinction between nominal and real returns to capital. If inflation increases the interest rate, the increased nominal interest income is taxed as if it were real income. Nominal capital gains resulting from inflation are also taxed. Therefore, the tax rate, expressed as a percentage of real investment income, will increase as the rate of inflation increases. Consider the following example (given a three per cent real rate of interest). If there is no inflation and the tax rate is twenty per cent, the after-tax rate of return is $3 - .2 \times 3 = 2.4$ per cent. If inflation is correctly anticipated to be seven per cent, the interest rate will rise to 10.21 per cent. The nominal after-tax rate of return will be $10.21 - .2 \times 10.21 = 8.17$ per cent. The real rate of return if roughly $8.17 - 7 = 1.17$ per cent, or more precisely 1.09 per cent.[19] The inflation reduces the after-tax real return from 2.4 per cent to 1.09 per cent and increases the tax as a percentage of real investment income from twenty per cent to sixty-four per cent. Indexing the tax brackets does not eliminate this additional tax on capital. The tax rate on real earnings is unaffected by inflation as long as the tax brackets are indexed.[20]

A. Alternative Approaches.

Courts have long recognized the complexity of taking taxes into account in the computation of damages, and over the last thirty years a number of different approaches to the problem have been proposed.

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[19] Note that $7 + 1.09 + (7 \times 1.09/100) = 8.17$.

[20] Some of the features of the tax system are not indexed for inflation, such as the employment expense deduction, the standard deduction, and the interest dividend and capital gains deduction. The absence of indexation of these deductions has relatively little effect (see *infra* Table 4).

After a description of these alternatives, their accuracy will be compared under the Canadian income tax rules applicable in 1978.

1. *Armentrout* v. *Virginia Ry.*[21]

In *Armentrout* a United States District Court judge presented eight pages of detailed calculations in which taxes on the interest income from the lump-sum award were calculated for each future year.[22] The calculations were intended to show that the lower court award would replace the lost after-tax income during the working life of the plaintiff. The judge's task was formidable without the aid of modern computers, and it is not surprising that other courts have not duplicated his effort and until recently have ignored taxes on investment income. This method requires that trial and error be used to find a lump-sum which will allow the plaintiff to consume an amount in each year that equals the lost after-tax earnings. Taxes on the fund's investment income must be calculated for each future year in order to determine if a particular lump-sum is sufficient. The development of computers since *Armentrout* has made this method a feasible alternative to other judicial approaches. In fact, expert testimony based on this method was accepted in a recent fatal accident case.[23] Since the trial and error technique is the *only* way of determining the award that will exactly replace future after-tax earnings, it is used below to evaluate other methods. A more detailed explanation of the method is provided below.

2. *Queen* v. *Jennings.*[24]

Given the complexity of the tax calculation, the Supreme Court of Canada decided in *Jennings* to ignore taxes altogether in personal injury cases. This decision was affirmed in *Andrews*. The court's explanations for ignoring taxes[25] are not convincing to an economist. If we accept the *restitutio in integrum* principle, the appropriate criterion for evaluating this approach is whether it leads to awards which differ significantly from the proper awards (calculated by the trial and error method). If the tax on earnings roughly cancels out the tax on the investment income, the added cost of the trial and error tax calculation may not be justified.

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[21] (1947), 72 F. Supp. 997, at pp. 1004-1012 (S.D. W. Va.), rev'd. on other grounds (1948), 166 F.2d 400 (4th Cir.).

[22] Inflation was not taken into account.

[23] *Cobean* v. *Northern and Central Gas Corp. Ltd.*, *supra*, footnote 6, at pp. 23-24.

[24] [1966] S.C.R. 532.

[25] See Charles, *op. cit.*, footnote 1, pp. 358-361 and Krishna, *op. cit.*, footnote 1.

3. *British Transport Commission* v. *Gourley*.[26]

In this earlier decision the House of Lords deducted income tax that would have been paid on the lost earnings but did not take account of the tax on the investment income.

4. *McWeeney* v. *New York, New Haven and Hartford Railroad Co*.[27]

In this important American case, followed in United States cases under federal jurisdiction, Judge Friendly suggested that taxes (on earnings) should not be considered except for those at the high end of the income spectrum.[28] It was argued that the effects of taxes and inflation would cancel out for those with lower levels of earnings. In *McWeeney* the calculations made in *Armentrout* were said to be impractical, and the tax on investment income was subsequently ignored.

5. *Taylor* v. *O'Connor*.[29]

In this decision subsequent to *Gourley* the House of Lords acknowledged that the investment income would be taxed and made a rough guess that the annual amount of income in that case would have to be increased ("grossed up") by seventeen per cent.[30] In *Keizer* v. *Hanna* (also a fatal accident case) the Supreme Court of Canada apparently made a substantial upward adjustment for taxes on the investment income.[31] *Taylor* and *Keizer* both deduct the taxes on the lost earnings. Their approach is that no explicit or detailed calculations are made of the future tax liability.

6. *Pearson (Royal Commission on Civil Liability and Compensation for Personal Injury)*.

The Pearson Commission suggested that the lost disposable income be capitalized with a discount rate that takes account of taxes.[32] As discussed above, the applicable discount rate in the absence of taxes is roughly i-p where i is the nominal rate of interest and p is the expected rate of inflation. If taxes are levied on nominal interest at a rate of t (expressed as a fraction), the real after-tax discount rate becomes roughly i(1–t)–p. This formula implicitly

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[26] [1956] A.C. 185. For a discussion see G. Bale, British Transport Commission v. Gourley, Reconsidered (1966), 44 Can. Bar Rev. 66.

[27] *Supra*, footnote 4.

[28] *Ibid.*, at p. 38 (F. 2d).

[29] [1971] A.C. 115.

[30] *Ibid.*, at p. 129.

[31] *Supra*, footnote 1, at pp. 353 (S.C.R.), 463 (D.L.R.).

[32] *Op. cit.*, footnote 3, Vol. I, pp. 141-153.

assumes that the tax rate on investment income is constant, regardless of the amount of investment income, and that there is no encroachment on capital. The Commission recommends that this formula be used with the tax rate applicable for the lost earned income at the time of the trial.[33] For example, if the average tax rate is .2 and interest rates are ten per cent, the after-tax real rate of return is $10(1-.2)-7 = 1$ per cent.

B. *Comparison of Alternative Approaches.*

A computer programme was written in order to calculate the annual consumption that could be financed out of a given lump sum award, taking into account the taxes that will be paid on investment income and inflation. In order to make these calculations a number of arbitrary assumptions had to be made, such as the nature of the future tax rates and the type of investments made with the lump-sum award. The arbitrariness of these assumptions has bothered the Supreme Court,[34] but these assumptions are no more arbitrary than a number of others which are currently made, particularly the deductions for contingencies. At any rate, it is even more arbitrary to make no estimate of the tax implications.

In the examples presented below it is assumed that court is attempting to replace the 1978 after-tax earnings of a plaintiff who is totally disabled. All future tax calculations will use 1978 tax rules for Canada and Ontario, with the tax brackets and exemptions indexed for inflation. It is assumed that the plaintiff will attempt to equalize his consumption in each of the remaining years, as shown in Table 1. Because of inflation it will cost more each year to enjoy the same level of real consumption.

One of the important assumptions which must be made is how the funds are invested. In *Cobean* v. *Northern and Central Gas,*[35] a case in which the trial and error method was used, the judge held that it must be assumed that the funds are invested in bonds because equities are too risky. The decision does not acknowledge that bonds are risky if there is unanticipated inflation. A more basic question concerns the risk that must be borne by the plaintiff. Given the principle of *restitutio in integrum,* it seems reasonable to require the plaintiff to assume the same risk that was assumed before the accident. The stream of earnings that is no longer available was also subject to risk because of uncertainties such as labor market

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[33] *Ibid.*, p. 142.

[34] *Andrews, supra,* footnote 1, at pp. 260 (S.C.R.), 475 (D.L.R.); *Teno, supra,* footnote 1, at pp. 325 (S.C.R.), 633 (D.L.R.).

[35] *Supra,* footnote 6, at p. 19.

conditions and the health of the individual. Consistency requires that the judgment not be based on the assumption of a totally riskless portfolio. Furthermore, there are significant tax advantages in Canada that accrue from holding equities. In the calculations it is assumed that half of the funds are invested in fixed income securities eligible for the interest deduction and half are invested in shares of taxable Canadian corporations (eligible for the dividend tax credit). The real rate of return on each is assumed to equal three per cent, with no investment expenses. If p is the annual rate of inflation, the nominal rate of return will equal $3 + p + 3 \times p/100$. For example, if p equals 7, the nominal rate of return is 10.21 per cent. It is assumed that the future rate of inflation is constant and that half of the yearly return on equities comes in the form of realized capital gains.[36] Except in the case where medical expenses are explicitly taken into account, it is assumed that the plaintiff receives only the standard deduction and the $1,000.00 interest deduction. The plaintiff is assumed to be without dependents and is over age twenty-one (and therefore cannot take advantage of section 81(1)(g.1) of the Income Tax Act,[37] which exempts the income from any property acquired pursuant to an action for personal injury as long as the taxpayer is under age twenty-one).

In Table 2 a sample calculation is illustrated. The plaintiff is awarded $426,514.00 which is the capitalized value of $50,000.00 in annual lost earnings for ten years, discounted at three per cent. With a 10.21 per cent rate of interest and seven per cent inflation he could have consumed $50,000.00 per year in 1978 prices in the absence of taxes on the investment income. The taxes on the investment income reduce his consumption to $46,531.00 per year in 1978 prices, a decline in consumption of seven per cent. This consumption level was determined by trial and error. Notice that the average tax rate on investment income (including capital gains) for a year falls from twenty per cent to zero as the size of the fund decreases.

In the example shown in Table 2 the plaintiff is over-compensated by forty-eight per cent because the tax on $50,000.00 in earnings in 1978 would be $18,581.00,[38] leaving him with only

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[36] Since equities have more favourable tax treatment, it is not rational to invest in fixed income securities when the rate of inflation, the future interest rates, and real rates of return are known with certainty. The gross real return on fixed income securities would have to be higher to attract investors. A more complicated model would take account of different risk on alternative assets and allow for different expected rates of return.

[37] R.S.C., 1970-71-72, c. 63, as am.

[38] The tax on $50,000.00 in earnings includes Unemployment Insurance and Canada Pension deductions. The contributions themselves are not subtracted from gross earnings because they are assumed to be offset by benefit entitlement.

TABLE 2

ILLUSTRATION OF EFFECT OF TAXES ON CONSUMPTION FROM LUMP SUM AWARDS
10.21% Interest, 7% Inflation, 10 Year Working Life

Year	End-Year Assets	Investment Income and Capital Gains	Taxes (1978 rates indexed)	Consumption	Consumption 1978 Prices
1978	426514				
1979	411573	43547	8699	49788	46531
1980	392481	42022	7841	53273	46531
1981	368645	40072	6906	57002	46531
1982	339469	37639	5823	60992	46531
1983	304317	34660	4549	65262	46531
1984	262265	31071	3293	69830	46531
1985	212259	26777	2065	74718	46531
1986	153039	21672	943	79948	46531
1987	83058	15625	61	85545	46531
1988	5	8480	0	91533	46531

$31,419.00 in disposable income in 1978. For this example the *Jennings* (and *Andrews*) approach substantially overcompensates the plaintiff because he is able to consume $46,531.00 per year with the award, compared to $31,419.00 per year had the accident not taken place.

1. *Jennings*.

Before concluding that the courts are over-compensating by a substantial percentage by omitting taxes from their calculations, it is necessary to consider some other examples. In each case the consumption that can be enjoyed with the award (calculated by trial and error) is compared with the 1978 after-tax earnings. The extent of over-compensation under the *Jennings* approach depends crucially on the amount of earnings lost, the length of the working life, and the rate of inflation. Table 3 indicates the percentage of over-compensation for a number of examples. For short working lives, the extent of over-compensation rises substantially with earnings levels. For a five year life, the over-compensation is only ten per cent for $7,500.00 in lost earnings. This rises to fifty-six per cent for $50,000.00 in lost earnings. The tax on the earnings at the $50,000.00 level is substantial, but there is relatively little tax on the investment income because most of the compensation comes from encroachment on capital for a five year working life. The picture changes drastically when the length of the working life increases because the investment income supports a greater percentage of consumption. At the $7,500.00 earnings level there is two per cent over-compensation for a forty year working life, but at the $50,000.00 earnings level there is a two per cent under-

compensation over forty years. The *Jennings* rule is nearly correct in this case, but at higher levels of lost earnings there is under-compensation.

TABLE 3

COMPARISON OF CONSUMPTION UNDER *JENNINGS* APPROACH WITH AFTER-TAX EARNINGS
7% Inflation, 10.21% Interest

1978 Earnings Before Tax	1978 Earnings After Tax	Working Life	Capitalized Gross Earnings (3% discount rate)	Annual Consumption 1978 Prices	Percent Overcompensation (+) or Undercompensation (–)	After Tax Real Yield
		5	34348	7500	+10	3.00
7500	6805	10	63977	7500	+10	3.00
		30	147003	7269	+ 7	2.76
		40	173361	6950	+ 2	2.53
		5	68696	15000	+24	3.00
15000	12138	10	127954	14947	+23	2.93
		30	294006	13113	+ 8	1.99
		40	346722	12144	0	1.76
		5	137392	29899	+41	2.88
30000	21232	10	255908	28899	+36	2.27
		30	588012	23222	+ 9	1.13
		40	693444	20738	- 2	.90
		5	228986	49139	+56	2.39
50000	31419	10	426514	46531	+48	1.61
		30	980020	35315	+12	.51
		40	1155740	30789	- 2	.31

At the beginning of the article it was shown that a real rate of return could be used for discounting, eliminating any need for forecasting inflation. This is no longer true if taxes are considered. Since the tax system does not distinguish between real investment income and income that merely offsets rising prices, the higher the rate of inflation the greater the real tax on investment income.[39] In Table 4 the higher rates of inflation are shown to reduce the consumption that can be sustained by lump-sum awards. Without any inflation there is very little taxation over the thirty year period, even at the $50,000.00 level. The high rates of inflation raise the rate of taxation on real investment income as interest rates increase. At a ten per cent rate of inflation there is under-compensation for those earning over $7,500.00. It must be emphasized that these calcula-

[39] Changes in the rate of inflation may alter the percentage of the total return on equities that takes the form of capital gains. This readjustment is not considered in the simulations. One would expect that the non-neutrality of the tax system would cause nominal interest rates to rise by enough to offset the higher taxes, but empirically this has not been the case.

tions assume that the government does not react to the rising real tax revenue by lowering tax rates. These results are not caused by the lack of full indexation of the tax system. If the $100.00 standard deduction and the $1,000.00 interest dividend and capital gains deduction were indexed, the consumption rises only slightly (compare the last two columns of Table 4).

Table 5 offers a comparison between the alternative methods of accounting for taxes assuming seven per cent inflation. The correct award provides an amount which just replaces the lost consumption in each year. The *Jennings* rule provides more compensation in all of the cases shown, but higher rates of inflation would reverse this result.

TABLE 4

EFFECT OF INFLATION ON VALUE OF LUMP SUM, 30 YEAR WORKING LIFE

			Annual Consumption Sustained by Lump Sum 1978 Prices			
			Inflation Rate (%)			
1978 Earnings	1978 Earnings After Tax	Capitalized Gross Earnings (3%)	0	7	10	10 Full Indexation[a]
7500	6805	147003	7500	7269	6884	7091
15000	12138	294006	14997	13113	12020	12335
30000	21232	588012	29571	23222	20531	21034
50000	31419	980020	48011	35315	30488	31091

[a] The standard deduction, and interest, dividend and capital gains deduction are indexed, as well as personal exemptions and tax brackets.

2. *Gourley.*

Under the *Gourley* method the taxes on the earnings are deducted, but no allowance is made for the taxes on the investment. The award is nearly correct for short periods because most of the consumption is financed from encroachment on capital. For higher income levels, longer periods, and higher rates of inflation, the *Gourley* approach substantially under-compensates the plaintiff (Table 5). For example at the $50,000.00 level, the consumption is reduced by twenty-three per cent below the pre-accident level over a thirty year period.

3. *McWeeney.*

The *McWeeney* rule would use the *Gourley* method for high income plaintiffs and the *Jennings* method for low income plaintiffs. For short period damage calculations the errors in *Jennings* increase with income. Therefore, the *Gourley* method for higher income cases offers more accurate results. For longer periods (such as thirty years)

TABLE 5

COMPARISON OF ALTERNATIVE APPROACHES, 7% INFLATION

			Correct[a]		Jennings		Gourley			Pearson[b]			Modified Pearson[c]	
Working Life	1978 Gross Earnings	1978 After Tax Earnings	Award	Annual Consumption	Award	Annual Consumption	Award	Annual Consumption	Discount Rate (%)	Award	Annual Consumption	Discount Rate (%)	Award	Annual Consumption
10 years	7500	6805	58048	6805	63977	7500	58048	6805	2.26	60303	7070	3.00	58048	6805
	15000	12138	103623	12138	127954	14947	103540	12129	1.26	113376	13270	2.55	105959	12409
	30000	21232	184548	21232	255908	28899	181113	20858	.23	209659	23958	1.50	195805	22461
	50000	31419	279899	31419	426514	46527	268010	30169	−.58	324450	36051	.78	301121	33626
30 years	7500	6805	136345	6805	147003	7269	133381	6674	2.26	147097	7273	3.00	136345	6805
	15000	12138	267790	12138	294006	13113	237910	10991	1.26	301667	13398	2.55	252366	11549
	30000	21232	526699	21232	588012	23222	416157	17516	.23	614799	24083	1.50	509904	20677
	50000	31419	850472	31419	980020	35315	615826	24119	−.58	103281	36878	.78	837515	31026

[a] Calculated by trial and error.

[b] The discount rate equals 10.21 × (1 − tax rate on earnings) − 7.

[c] The discount rate equals 10.21 × (1 − tax rate on investment income) − 7.

the *McWeeney* method will substantially under-compensate high income plaintiffs. The *Jennings* rule is closest to the correct result for longer periods and higher rates of inflation.

4. *Taylor.*

The *Taylor* and *Keizer* decisions suggest that judges can approximate the correct result by capitalizing net earnings and adding an adjustment for taxes on the investment income. A comparison between the consumption provided by *Gourley* and the after-tax earnings indicates that there is no simple adjustment factor ("gross up") that will give satisfactory results. The upward adjustment must be greater for higher incomes, longer periods, and higher rates of inflation. If courts are going to consider these factors, they might as well hear evidence on the predicted tax burden based on the trial and error method.

5. *Pearson.*

The *Pearson* approach makes adjustments to the discount rate because of taxes. In the example presented in Table 5 this method suggests that the discount rate should be $10.21(1-t) \times 7$ where 10.21 is the rate of interest, 7 is the rate of inflation and t is the average tax rate on the lost earnings. The resulting awards exceed the correct awards in every case. This is in part due to the lower taxes on investment income compared to earned income. The last column in Table 5 modifies the *Pearson* formula to use the average tax on the gross income lost, treating it as investment income.[40] This brings the results more into line, but there is some under-compensation for longer periods. The under-compensation increases with the rate of inflation.

C. *Medical Expenses.*

In *Andrews* the Supreme Court of Canada felt that the tax-deductibility of medical expenses in excess of three per cent of net income mitigated the need to allow for future taxation.[41] Table 6 compares the non-medical consumption of plaintiffs with and without $10,000.00 per year (1978 prices) in medical expenses. The award for the plaintiff with medical expenses is the capitalized value of medical expenses plus gross earnings. Use of a three per cent discount rate implicitly assumes that medical costs and earnings will increase along with the cost of living. The table indicates that the

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[40] It was assumed that half of the income was interest, one-quarter dividends and one-quarter capital gains.

[41] *Supra,* footnote 1, at pp. 259-260 (S.C.R.), 475 (D.L.R.).

plaintiff with $10,000.00 in medical expenses may be better off or worse off in terms of funds left over for other consumption, depending on the level of income and the rate of inflation. There are several reasons why the medical expense deduction does not exactly offset medical cost: 1) the dividend tax credit is a credit for dividend income that is not taxable if it is used for medical expenses. This raises the consumption of the recipient of an award for medical expenses. 2) Only expenses in excess of three per cent of net income are deductible. 3) When there is inflation, some portion of the award for medical expenses must be reinvested in the early years to cover future rising medical costs. The taxes on the subsequent investment income are not tax deductible.

TABLE 6

INCREASE (+) OR DECREASE (–) IN ANNUAL CONSUMPTION OF THOSE WITH MEDICAL EXPENSES OF $10,000 PER YEAR (1978 PRICES) JENNINGS METHOD, 30 YEAR WORKING LIFE

	Rate of Inflation		
Gross Earnings	0	7	10
7500	0	–136	– 782
15000	+3	–284	–1148
30000	+429	–474	–1476
50000	+1405	–700	–1843

The net result of these biases is that at a zero rate of inflation the higher income individual can enjoy a greater *increase* in non-medical consumption than the lower income individual. At high rates of inflation, the higher income individual suffers a greater loss of other consumption. In the $50,000.00, ten per cent inflation case, eighteen per cent of medical expenses ($1,843.00 dividend by $10,000.00) are not compensated because of the additional tax burden.

IV. *Conclusions.*

An analysis of the impact of inflation on interest rates suggests that a modified Diplock approach should be used. The real rate of interest that has prevailed over long periods in the past offers the best guide to future long-term real rates of return. This approach eliminates the need for testimony on the future rate of inflation, but such testimony may be required if taxes are taken into account using the *Taylor, Pearson*, or trial and error methods.

The simulations of the tax consequences for the recipient of a lump-sum award suggest that the method chosen by the Supreme Court of Canada in *Andrews* for personal injury cases is only accurate for long working lives and current rates of inflation (ten per cent). For shorter working lives there is substantial over-compensation. The *Taylor* and *Keizer* method of arbitrary adjust-

ment is unlikely to yield a correct result. The *Pearson* method is adequate if the tax rate is based on investment income.

It is likely that the Supreme Court (in *Andrews*) decided to ignore income taxes for personal injury cases for two reasons. First, it believed that the taxes on the earnings would cancel out the taxes on the investment income. Second, it believed that it is impractical to make the calculations. Now that it has been demonstrated that the results may be biased if taxes are ignored and that it is practical to make the calculations, it is suggested, with respect, that the court should reconsider its position. Following *Keizer*, plaintiffs in fatal accident cases must now introduce testimony on the future tax liability. Such testimony based on the trial and error method, has been utilized in *Cobean*.[42] Since no meaningful distinction can be made between fatal and non-fatal cases, the *Jennings* rule is clearly inappropriate.

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[42] *Supra*, footnote 6, at p. 23.