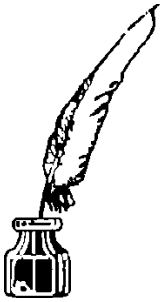


The Expert Witness

Spring 2016 Vol. 20, No. 1

The Expert Witness
is published by:

Economica Ltd.
Consulting Economists
1660 McFarlane Tower
700 – 4th Avenue SW
Calgary, AB T2P 3J4

Phone: (403) 297-0012
1-866-997-0012
Fax: (403) 262-5458
www.economica.ca
experts@economica.ca

Christopher J. Bruce
PhD Cambridge

Derek W. Aldridge
MA Victoria

Kelly A. Rathje
MA Calgary

Laura J. Weir
MA Calgary

Contents

In This Issue

This issue contains two articles written by Dr. Christopher Bruce. The first reviews the debate over the use of cross versus sole dependency approaches in the determination of loss of dependency on income; while the second article concerns the reliability of income data drawn from the 2011 census.

In the first article, Dr. Bruce notes that a fundamental assumption in economics is that individuals are rational. Therefore, when an individual is observed to make a voluntary choice, it can be concluded that the individual must have expected that choice to make him/her better off (or at least, no worse off). With respect to fatal accident actions, this implies that if spouses are rational, they must have expected that the decisions they made about spending on one another would make them better off. He then shows that if this proposition is accepted, the sole dependency approach is preferred to cross dependency.

In the second article, Dr. Bruce examines the reliability of the 2011 Census income data. In the past, completion of the long form census was mandatory. In 2011, however, completion of this form was voluntary and the response rate decreased. While this created statistical problems concerning the reliability of the data, Statistics Canada had anticipated these problems and took steps to mitigate them. In his article, Dr. Bruce discusses these problems, and the solutions implemented by Statistics Canada, concluding that the 2011 census remains a reliable, high quality data source. It will remain our primary source of earnings information until data from the 2016 census are released sometime in 2018.

With respect to the 2016 census, we would note that it will be mandatory. Further, Statistics Canada will be sending the long-form section to a greater number of households than in past censuses (one in four households instead of one in five households), and will use income data directly from the Canada Revenue Agency, providing data for 100 percent of households. It is anticipated that because of these changes, the income data from the 2016 census will be the most accurate of any census to date.

Cross versus Sole Dependency in Fatal Accident Actions

Christopher J. Bruce

When a spouse has been killed through the negligence of a third party, the surviving spouse is entitled to damages that would allow him/her to maintain the standard of living that he/she had previously enjoyed.

The determination of this value requires that three steps be taken. First, the *potential earning capacity* of each spouse must be estimated. Second, a calculation must be made of each spouse's *dependency rate* – that is, the percentage of family income that benefitted that spouse. Third, it must be determined whether any monies that had been spent on the deceased by the survivor (and which now do not have to be spent due to the death of the former) should be deducted from the survivor's loss of dependency. In what is known as the *sole dependency approach*, that "saving" is not deducted. In the *cross dependency approach*, the saving is deducted.

In this article, I will use a concept that is fundamental to economic analysis – the *rational person assumption* – to suggest that basic economic principles favour the use of sole dependency.

I begin by making some simple assumptions about a couples' earning capacity and dependency rates and use those assumptions to define sole and cross dependency. I then introduce the rational person assumption and provide examples of the use of that assumption in non-fatal accident cases. Finally, I extend the analysis to fatal accident cases and argue the rational person assumption provides support for use of the sole dependency approach.

Assumptions concerning earning capacity and dependency

Statistical analyses suggest that, in a household consisting of a husband and wife, approximately 30 percent of the family's after-tax income is spent on items such as food, clothing, and transportation that benefit the husband alone; approximately 30 percent is spent on items that benefit the wife alone; and 40 percent is spent on items, such as housing, furniture, and insurance, that benefit both spouses collectively. Each spouse benefits, in total, from 70 percent of family income – 30 percent that benefits that spouse personally – usually referred to as "personal expenses" – and 40 percent that benefits both spouses equally – "common expenses." The 70 percent figure in this example is known as the individual spouse's "dependency rate." [Note that, as both spouses have the same dependency rate, 70 percent, there is a net benefit from marriage.]

Assume that in a childless couple, the husband earns $100,000 per year after taxes and the wife earns $40,000. Based on my assumptions concerning dependency rates, out of the husband's income, 30 percent, or $30,000, is devoted to his personal expenses, 30 percent, or $30,000, is devoted to his wife's personal expenses, and 40 percent, or $40,000, to common expenses. From the wife's income, the comparable figures are 30 percent ($12,000), 30 percent ($12,000), and 40 percent ($16,000), respectively.

Cross and sole dependency defined

Now, assume that the wife has been killed. The *sole dependency* approach asks: how much of the wife's future income would have been devoted to expenses that benefitted the husband? The answer in this case is that it is the 30 percent of

her income that she spent on items specific to her husband (food, clothing, etc.) plus the 40 percent of her income that she spent on common expenses (housing, furniture, etc.), or $28,000 – which equals the husband's dependency rate, 70 percent, multiplied by the wife's (after-tax) income, $40,000. The tortfeasor would be required to pay $28,000 per year until the projected date of the wife's retirement, discounted to the present.

Proponents of the *cross dependency* would also calculate the husband's dependency on the wife's income, here $28,000. But they would then argue that there is an offset against that loss: the "savings" obtained by the husband because he no longer devotes 30 percent of his income to his wife's personal expenses. In the example here, as the husband was spending 30 percent of his income on his wife, it is argued that he now benefits from a $30,000 saving as a result of her death. The difference between this $30,000 saving and the $28,000 he has lost, $2,000 per year in total, represents a net benefit to him. He has no claim (for dependency loss) against the tortfeasor.

The "Rational Person" assumption

Which of these approaches is more consistent with the legal principal that plaintiffs are to be returned to the position they would have been in had the negligent action not occurred, *restitutio in integrum*?

When answering this question, economists rely on an assumption that is fundamental to economic analysis: that individuals act rationally to improve their own welfare. This *rational person* assumption implies that informed individuals will voluntarily undertake actions only if those actions make them better off (or, at least, no worse off). [Note the similarity to the "reasonable person" doctrine of tort law and to the rationale, in contract law, for maintaining the sanctity of contracts.]

As a simple example of the rational person assumption, assume that individual B is observed to be saving towards the purchase of a lap-top computer. One day, B sees an ad for the computer he likes, at a price of $1,000 (inclusive of all taxes). He checks his bank balance and discovers that he has $1,500. Assume we also observe him use his debit card to buy the desired computer; and, when he gets home, to check his bank balance again, to find that he now has $500.

Can we, as an external observer (with no ability to read B's mind) conclude that B is "better off?" Economists, employing the "rational person" assumption, argue that B must be better off than if the purchase had not been made: a rational individual will only pay $1,000 for an item if he or she values that item at more than (or equal to) $1,000.

Although it might be argued that B is "worse off" in the sense that he now has $1,000 less than he would have had, that reduction in his finances is at least offset by the fact that he now has a computer that he valued at $1,000 or more.

To put it another way, if an individual was observed to go shopping with the intention of paying $1,000 for a computer, but was prevented from doing so because the store had run out of stock, no professional economist would argue that that individual was now "better off" -– because he now has $1,000 that he would otherwise not have had. He is not better off. His preference was observed to be to trade the $1,000 for a computer – *that* would have made him better off. [Indeed, the rational person assumption suggests that when he is prevented from spending his money the way that he prefers, he is made worse off.]

The Rational Person argument applied to personal injury cases

Before examining how this view of rational behaviour applies to fatal accident cases involving spouses, I first turn to two other classes of tort actions.

In the first of these actions, assume that an individual has been seriously injured in a motor vehicle accident. As a result of this accident, her earning capacity has been impaired to the extent that she will lose $100,000 between now and the time she would have retired. The defendant accepts responsibility for this loss, but counters that offset against this loss is a "gain" that the plaintiff has obtained because of the accident. Imagine that before the plaintiff was injured, she was an active golfer, spending $5,000 a year on green fees, lessons, and equipment. The injuries suffered in the accident, however, are such that she can no longer play golf, thereby "saving" $5,000 per year. Assume also that evidence has been led to suggest that she would have played golf for another 25 years, had she not been injured. Hence, because of her injuries, she will save approximately $125,000 over her lifetime that would otherwise have been spent on golf. The defendant argues that when this saving is deducted from the plaintiff's lost earnings, the plaintiff is actually $25,000 better off as a result of the accident. The defendant owes nothing to the plaintiff.

Using the assumption of the rational individual, however, it is easily seen why the defendant's argument in this case is fallacious. Although it is true that the plaintiff will now have $125,000 available to her that she would not have had in the absence of the accident, she now has been denied $125,000 worth of pleasure that golf would have given her. Ignoring the effect of the accident on her earnings, in order for the plaintiff to be left in the same position she would have been in the absence of the accident, she will have to spend sufficient money to replace the value she would have obtained from golf. But this must be *at least* $125,000: because she would have chosen to spend $5,000 per year on golf in preference to spending it on anything else, $5,000 spent on "anything else" must be of lesser value than that expenditure on golf. That the plaintiff now has $125,000 that she would not have had if she had been allowed to spend it on golf does not make her $125,000 better off. At best, it leaves her in approximately the same position as she would have been in had she been allowed to spend that money. Hence, it is incorrect to suggest that the $125,000 that has been "saved" should be set off against the plaintiff's loss of earnings.

In the second example of a tort action, assume again that the injuries suffered by the plaintiff in an automobile accident have reduced his lifetime earnings by $100,000. Again, the defendant has accepted responsibility for the accident; but in this case, she argues that as the plaintiff's daughter was killed in that accident, the plaintiff has been "saved" the costs of raising that child. If those costs have been calculated to be $150,000 over the life expectancy of the child, the defendant argues that the net effect of the accident has been to leave the plaintiff no worse off than he had been in the absence of the accident. There is no loss.

Again, the fallacy of this argument arises because the defendant has implicitly argued that the plaintiff would not have received any benefit from the $150,000 he would have spent on his daughter. But, according to the "rational consumer" assumption, if the plaintiff had chosen to have the daughter and to spend $150,000 on her, in preference to spending that money in any other way, the plaintiff is worse off having $150,000 than he would have been spending that money on his daughter.

The Rational Person argument applied to fatal accident cases

With these cases in mind, consider again the case discussed at the beginning of this article, concerning the death of a wife. It is now seen that when the defendant argues that the cross dependency approach should be applied, what he is actually arguing is that the $30,000 the plaintiff had been spending on his wife had provided him with no benefit at all. Now that those expenditures have been "freed up", he can spend the money on himself, at a net gain of $30,000. Therefore, the defendant argues that that gain can be set against other losses from the accident - as was argued by the defendants in the cases of the plaintiffs who were asked to set their savings of expenditures on golf or on their child against their losses of income.

But, as in those cases, the rational person assumption suggests that surviving spouses are *not* better off when they do not "have to" make expenditures on their deceased partners. If they were making those expenditures voluntarily (i.e. rationally), they must have obtained some benefit from that expenditure – indeed, a benefit that exceeded the value from any other purchases that could have been made with the same amount of money. Now that the husband in the example does not "have to" spend $30,000 per year on his wife, he can spend it on himself – clothes, travel, cars, etc. But does that expenditure give him as much pleasure as spending it on his wife? The better argument, I suggest, is that preventing plaintiffs from spending money in the way that they would have chosen cannot make them better off. Hence, it would be inappropriate to deduct any such purported "gains" from plaintiffs 'other losses.

It is the sole dependency approach that is more consistent with both *restitutio in integrum* and with the rational person assumption.

Summary

A fundamental assumption in economics is that individuals are rational; and, therefore, that when an individual is observed to make a voluntary choice, it can be concluded that the individual must have expected that choice to make him/her better off (or, at least, no worse off). With respect to fatal accident actions, this implies that if spouses are rational, they must have expected that the decisions they made about spending on one another would make them better off. In this article, I have argued that if this proposition is accepted, the sole dependency approach is preferred to cross dependency.

Christopher Bruce is the President of Economica

Are Data from the 2011 Census Reliable?

Christopher J. Bruce

When estimating future earnings in personal injury and fatal accident cases, financial experts often rely on information provided by the Canadian Census. Of particular importance are data concerning incomes by age, sex, occupation, and education. For example, if a 24 year-old male plaintiff would have been a journeyman carpenter, his potential earnings might be based on average incomes for Canadians with that certification, in the age groups 25-29, 30-34, 35-44, etc.

In the past, these data would have been drawn from a section of the Census known as the "long form." This portion of the Census survey, which contained much more detailed information than on was on the rest of the Census, was given to only one household out of five. (The remainder of the Census survey asks only basic questions about such demographic factors as age, sex, language, and area of residence.)

For the 2011 Census, however, the government decided to replace the long-form questions with a "National Household Survey (NHS)." Although the 2011 NHS asked the same questions as had the 2006 Census long form, whereas the long form had been mandatory, the NHS was voluntary. The result, as had been expected, was that the percentage of households answering this portion of the survey fell significantly, from 93.8% in 2006 to 77.2% in 2011.

This created three statistical problems concerning the reliability of the data (variability in small community data, sample error, and non-response bias). As Statistics Canada had anticipated these problems, however, it took steps to mitigate them, steps that have maintained the reliability of the data that are of value to the courts. Briefly, I consider the three problems, and how Statistics Canada dealt with them here[1].

Variability in small community data

As the sample size of any survey becomes smaller, the data become less and less reliable, due to an increase in variance. In response, Statistics Canada routinely withholds data concerning the smallest communities. In 2011, they withheld the results from 1,100 such communities, up from 160 in the 2006 Census. That is, all of the data reported in 2011 meet the normal statistical requirements for reliability.

Sample error

As the overall size of a sample decreases, there is an increase in what is known as the "sampling error;" that is, from the problem that the average characteristics of the sample differ from the average of the total population. Because Statistics Canada expected a smaller percentage of households to answer the voluntary NHS than had answered the mandatory long form, they anticipated that the total size of the "sample" (the households answering the survey) would be lower in 2011 than in 2006.

To deal with this problem, Statistics Canada increased the number of households who were asked to answer the long portion of the 2011 Census. Whereas one household in five were asked to answer the 2006 long form, one household in three were asked to answer the NHS. The result was that, even though a smaller *percentage* of households responded to the

1. The information in this article is drawn from a blog written by Wayne R. Smith, Chief Statistician of Canada, entitled "The 2011 National Household Survey – the complete statistical story," June 4, 2015. This blog can be found at: http://www.statcan.gc.ca/eng/blog-blogue/cs-sc/2011NHSstory.

NHS than had responded to the 2006 long form, the *number* of households answering the NHS was higher than in 2006, (2,657,461 versus 2,443,507, representing 6,719,688 versus 2006's 6,136,517).

Although this approach does not correct for all errors, those errors become less and less important as the data are aggregated. Thus, for example, the data for the average income of all carpenters in Alberta are more reliable than for the average income of carpenters in Calgary.

Non-response bias

The most worrisome problem that arises when a survey is made voluntary is that the households who choose to respond to that survey may differ significantly from those who refuse to do so. For example, if those carpenters with relatively high incomes are more likely to respond to the NHS than are those with low incomes, the average incomes reported by the NHS will be biased upwards.

Statistics Canada could not control, ex ante, for the *possibility* that this would happen. However, they were able, ex post, to investigate whether the respondents to the NHS were representative of the overall groups from which they were drawn – that is, they were able to determine whether the respondents "looked" different from the average.

To make this determination, Statistics Canada was assisted by the fact that they had a considerable amount of information about the respondents to the NHS before those individuals answered the NHS survey. Most importantly, they also had their responses to the short questions on the Census that are mandatory for all Canadians. In addition, they were also able to link the NHS respondents to those individuals' tax files, immigrant landing data, and the Indian Register.

Using sophisticated statistical techniques they were able to determine that the average respondent to the NHS had very similar characteristics to the average Canadian with respect to age, sex, language, area of residence, income tax, immigration status, and aboriginal status. This finding leads Statistics Canada to conclude that the NHS respondents were, in most cases, representative of the larger population from which they were drawn. And when Statistics Canada was *unable* to conclude that the individuals who replied to a specific subclass of questions were representative of the population, the resulting data were not released, or they were released with an accompanying cautionary note.

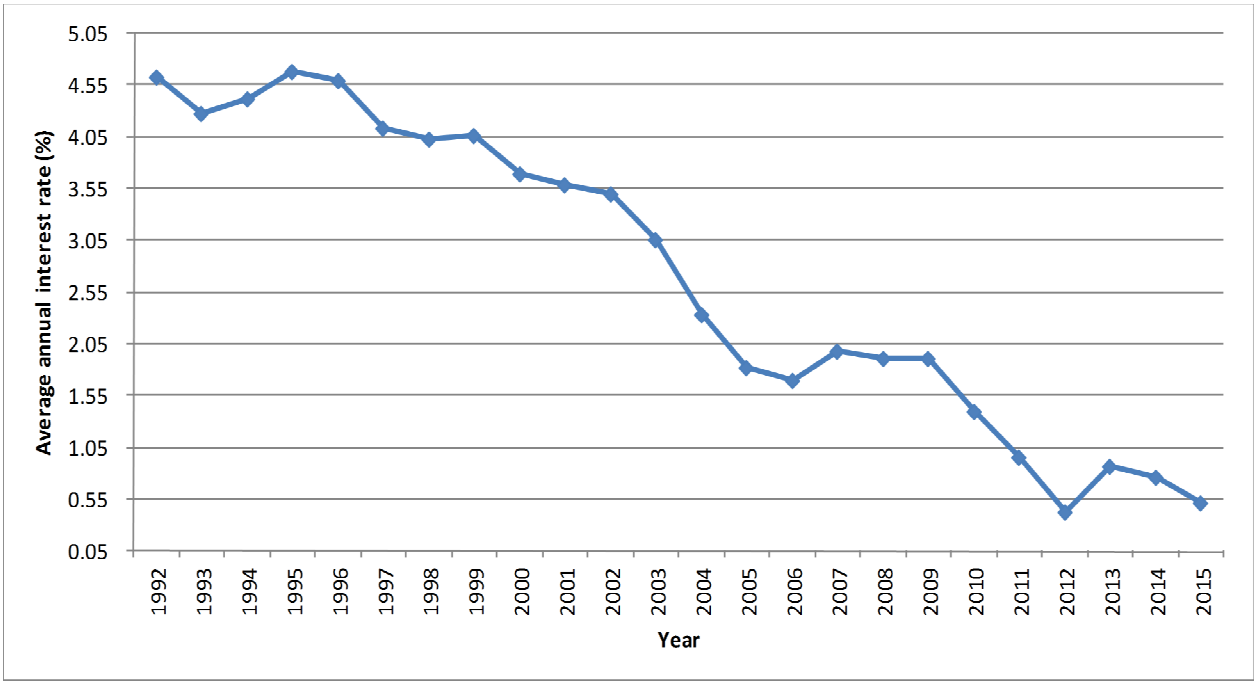
Summary

To summarise: Although the long-form portion of the 2011 Census was made voluntary, there is sound reason to believe that the data that are of greatest relevance to the calculation of lost earnings can be relied upon.

Christopher Bruce is the President of Economica

Interest rates on Canadian real return bonds

In the graph below, we present the average annual interest rates for Canadian long-term real return bonds, over the period from 1992 through 2015. As can be seen below, interest rates have been steadily decreasing since the Bank of Canada began its policy of targeting the inflation rate. Interest rates have been below two percent for over 10 years.



The Expert Witness
is published two to three times per year by:

Economica Ltd.
1660, 700 – 4th Avenue SW
Calgary, AB T2P 3J4
Phone: (403) 297-0012
www.economica.ca

Economica is a Calgary-based economic consulting firm that specialises in the provision of litigation support in personal injury and fatal accident actions. Our areas of expertise include: the calculation of pre- and post-trial losses of earning capacity, business income, and household services; the computation of the present value of future costs of care; and the estimation of the "tax gross-up" on future damages in fatal and cost of care actions.