The Rule of 70 at Trial as a Reference Point

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ABSTRACT

Trial testimony can become entangled in details that do not assist the trier of fact in understanding economic damages. Different growth rates between opposing experts can potentially become such an entanglement. The purpose of this note is to provide a pedagogical device whereby economic experts can provide the trier of fact with guidance and insight to better understand the economic consequences of different growth rates.

INTRODUCTION

Growth rates can differ between plaintiff and defense experts when used in estimating such things as lost income, lost household services and valuing a life care plan. For example, both experts may use the same income, fringe benefits and work-life expectancy, yet have different losses for income because their growth rates differ. Both experts may rely on the same life care plan and life expectancy, while their costs differ because they used different growth rates for each component in the life care plan. The growth rate in estimating the value of household services can differ when all other factors are the same.

Cross examination of plaintiff's economic expert on growth may become a "*what if growth is lower game."* Clearly, if growth is lower and all other things are constant, the loss would be smaller. Yet this game can be played ad nauseam under cross-examination with questions about how much lower the loss would be for different growth rates. Multiple scenarios of growth and corresponding losses may confuse the jury, consequently causing a distortion in understanding the differences in damage estimates. This cross examination strategy is an attempt to influence the jury to reduce the plaintiff's damage estimates. The opposite may occur when testifying for the defense.

Experts may attempt to clarify how exponential growth impacts losses by using examples of how compounding works. A simple example of compounding is by showing how interest rates impact saving accounts. However, extremely low rates on savings since the recession of 2008 can bias the jury. Jurors may not be able to identify with this compounding principle since they 1) may not have any savings and 2) if they do have savings, they recognize little, if any, accumulation of interest in their accounts. Furthermore, members of the jury may not have received a pay raise for several years or if they have received one it has been negligible, thus making a moderate growth rate seem unrealistic based on the juror's personal experience. Compounding examples are more convincing when the jury can identify with wage increases or accumulation of savings. When neither has changed much, compounding examples may not be a useful teaching tool. This is especially germane if cross examination questions raise the spectra of multiple losses based on different lower interest rates.

RULE OF 70

Fortunately, there is an alternative methodology that shows how seemingly small difference in annual growth rates can result in large differences in economic damages. This is particularly important when the time horizon is long. The Rule of 70 is a rule of thumb that puts growth rates into perspective. Intuitively, the jury may have an easier time understanding the impact on losses due to different growth rates by examining the number of years it takes economic damages to double rather than hearing multiple scenarios of losses.

Forensic economists would not be the first to use the Rule of 70. Economists use the Rule of 70 to estimate how long it takes a country to double their Gross Domestic Product or how long for inflation to double. Finance uses it to determine how long an investment will take to double. Demographers use the Rule of 70 to determine how long it will take to double a population. Environmental scientists use it to estimate how fast a particular animal species will take to double. Biologists use the Rule of 70 to estimate how long it will take to double the number of bacteria in a sample. In order to determine the number of years for any of these variables to double, you simply divide the number 70 by the growth rate.

The approximate number of years n for one of the variables growing at a constant growth rate of R percent to double is:

$$n = \frac{70}{R}$$

Most members of the jury can divide a number into 70 to see how long it takes to double. They can use their cell phone calculators if unable to do it in their head.

If Economist A states the growth rate of income is 1 percent per year and Economist B states it is 2 percent the jury may not fully understand the implications of such small differences, since it is only a 1 percent difference. The Rule of 70 informs the jury that when the growth rate is 1 percent it will take 70 years to double (70/1) and only 35 years to double if the growth rate is 2 percent (70/2). If the growth rate is 4 percent it takes 17.5 years to double compare to 14 years with a growth rate of 5 percent. The following table shows how long it will take to double between 1 and 5 percent with quarter of one percent increments.

Growth Rate	Years to Double
1.00%	70.00
1.25%	56.00
1.50%	46.67
1.75%	40.00
2.00%	35.00
2.25%	31.11
2.50%	28.00
2.75%	25.45
3.00%	23.33
3.25%	21.54
3.50%	20.00
3.75%	18.67
4.00%	17.50
4.25%	16.47
4.50%	15.56
4.75%	14.74
5.00%	14.00

If the growth rate is 2 percent, then income doubles in 35 years compared to 17.5 years with a growth rate of 4 percent. Another way of looking at this is that when the growth rate is 2 percent after 35 years, then losses will double one time. But with a growth rate of 4 percent the loss will double two times in the same 35 year time frame.

What appears to be small difference in growth to a jury, when compounded over time, can result in significant differences of economic damages. The following table shows how much a $45,000 a year income with a work-life expectancy of 25 years will be for various growth rates.

$45,000 growing for 25 years	
Growth Rate	Value after 25 years
1.00%	$1,225,944
1.25%	$1,266,095
1.50%	$1,307,836
1.75%	$1,351,236
2.00%	$1,396,363
2.25%	$1,443,293
2.50%	$1,492,099
2.75%	$1,542,863
3.00%	$1,595,667
3.25%	$1,650,597
3.50%	$1,707,744
3.75%	$1,767,201
4.00%	$1,829,066
4.25%	$1,893,442
4.50%	$1,960,434
4.75%	$2,030,155
5.00%	$2,102,719

Holding all other things constant, the losses will be different when opposing economists present losses based on different growth rates. In some jurisdictions (rural, less affluent) a multi-million dollar loss is something an average juror may not be able to identify with. This is especially relevant when the plaintiff's income is large relative to the average income of the jurisdiction where the trial is being held. Plaintiff's attorneys in such jurisdictions often remind the economist that these are low income areas where working people earn below the national average. They also stress that previous juries in that jurisdiction have been reluctant to award large damage awards. This is a subtle way of telling you to be extremely "moderate" if possible in estimating losses. Additionally, multiple scenarios brought to light under direct and cross examination can confuse the jury to just pick a number that seems reasonable to them. But reasonable to them may not do justice based on the actual losses.

The following table combines growth, doubling time, and income amounts.

$45,000 growing for 25 years		
Growth Rate	Years to Double	Value after 25 years
1.00%	70.00	$1,225,944
1.25%	56.00	$1,266,095
1.50%	46.67	$1,307,836
1.75%	40.00	$1,351,236
2.00%	35.00	$1,396,363
2.25%	31.11	$1,443,293
2.50%	28.00	$1,492,099
2.75%	25.45	$1,542,863
3.00%	23.33	$1,595,667
3.25%	21.54	$1,650,597
3.50%	20.00	$1,707,744
3.75%	18.67	$1,767,201
4.00%	17.50	$1,829,066
4.25%	16.47	$1,893,442
4.50%	15.56	$1,960,434
4.75%	14.74	$2,030,155
5.00%	14.00	$2,102,719

While debating whether a jury finds $2,102,719 to be "*all the money in the world*" or a very "*reasonable*" amount, the defense will try and make it seem like "*all the money in the world*" while the plaintiff attempts to make it seem "*reasonable."* Since the jury heard multiple scenarios of losses, deliberation can be aided by providing a reference point for guidance in making a decision of losses.

Given the simplicity of the Rule of 70, most jurors can make the calculation by dividing each economist's growth rate into 70, thus letting them know how long it will take for the plaintiff's income to double. In essence the Rule of 70 helps the decision-making process by illustrating how exponential growth works.

Imagine a juror who has received a 2.5 percent annual raise for 5 years in a row. With the new knowledge of the Rule of 70 he knows his hourly wage will double in 28 years. This may assist him in understanding the implication of a $1,492,099 loss in the above table. If the second economist used a 4.5 percent growth rate to determine a loss of $1,960,434, the jury may find doubling of income in 15.56

years to be unrealistic. This is particularly germane since wage growth has been minimal since the 2008 recession.

The Rule of 70 can be extremely helpful in valuing life care plans with long durations. Jurors will understand that medical costs will double either every 17.5 years (4 percent discount rate) or 23.3 years (3 percent discount rate). Thus, if life expectancy is 40 years, life care plan costs will double 2.29 times versus 1.72 times. A juror's experience with medical costs may find the Rule of 70 helpful in judging the appropriate cost.

The Rule of 70 is a useful pedagogical tool for the trier of fact's decision-making process when exponential growth is a key element in determining damages.