"An Agenda for Future Research in Forensic Economics: Setting Standards of Validity and Reliability in Measuring Progress"

By

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Introduction

Over the past thirty-three years the field of forensic economics has generated a considerable literature of published and unpublished research. Some of that literature can be characterized as original research, and given the applied nature of our discipline a large part of that literature consists of practicums of how to perform personal injury, death and employment damages calculations. That literature also includes surveys of practices of members and the interpretation of Federal and State statutes and case law governing the methodologies used in calculating economic damages in litigation.

This forensic economic literature consists of the papers published in the *Journal of Forensic Economics (JFE),* the *Litigation Economics Digest (LED)* and the *Litigation Economics Review (LER*) published from 1994 to 2003, the *Journal of Legal Economics* and *The Earnings Analyst.* Since 1987, these journals have produced over 1,300 peer reviewed papers[2]. In addition, papers presented at national and regional meetings of the National Association of Forensic Economics (NAFE) and the American Academy of Economic and Financial Experts (AAEFE) are often made available to meeting participants or to others through these organizations' web pages. Other forensic economic literature consists of numerous

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[2] The *JFE* has published 572 papers (excluding book reviews) and the LED and the LER published 157 papers. The JEL has published 24 Volumes totaling over 400 papers.

published books covering the foundations of the field and data sources such as the Expectancy Data, *Dollar Value of a Day* series. Finally, there has evolved a robust electronic literature on forensic economic issues through postings on list serves such as NAFE-L and AAEFE-L. The majority of papers published and list serve postings have focused on issues in personal injury and death damages with employment law damages second in coverage. The relative lack of papers and posting on issues in calculating commercial damages dates back to the beginning of NAFE.

Surveys of members of NAFE[3] since 1990 on their views on the quality and usefulness of the cumulative research of the field of forensic economics support the position that forensic economics has emerged as a unique disciple in Economics. It is an applied field of research (*JEL* Code K13), incorporating principles of microeconomics, labor economics, human resource economics, finance, actuarial science and statistics. The fields' framework in terms of objectives rests in principles of law and economics, such as the *Coase Theorem* and *Justice Hand's Rule* and the principles of efficiency, welfare economics and the Theory of Contracts.

So, where do we now stand as a discipline today? Has our past research yielded a body of knowledge, tools and principles that meet the standards of reasonable certainty required of us as practitioners of forensic economics? Can we assign a level of probability to our forecasts of damages in the forms of lost wages or lost profits? Is our research moving in the direction of greater convergence and consensus in our methodologies and projections of damages? In this age of Daubert[4] with judges being asked to assume the role of gatekeeper for the admission of expert testimony, has forensic economics adequately addressed the issues of validity and reliability required of a damages forecast. While the Kumho Tire[5] decision made it clear that none of the original Daubert tests may apply in a given situation, the general test of scientific reliability applies to all types of expert testimony.

[3] JFE membership surveys began in 1990 with Brookshire, Michael, Frank Slesnick, and Robert Lessne,(1990) "The Emerging Industry of Forensic Economics: A Survey of NAFE Members", *Journal of Forensic Economics,* 3(2) 15-29. Subsequent Surveys have been published in either the *JFE* or the *LER* in 1991, 1993, 1997, 1999, 2003, 2006. 2009, 2015, 2012, 2015 and 2017.

[4] Daubert v. Merrell Dow Pharmaceuticals Inc., 509 U.S. 579:113 S. Ct.2786; 125 L.ED. 469 (1993)

[5] Kumho Tire Co., Ltd v. Carmichael, 509 U.S. 579;119 S.Ct. 1167 (1999)

The objectives of this paper are to:

1. More clearly define the issues of reliability and validity as they apply to forensic economics. Any agenda for future research should incorporate such issues;
2. Provide a retrospective appraisal of our efforts to address past agendas for research in forensic economics: what have we achieved as a discipline, and;
3. Provide a new agenda for research that will address the shortfalls in past efforts and will move the discipline to a higher standard of reliability and validity of analysis.

Reliability and Validity

Economics is not a physical or biological science where precision of measurement and error rates of measurement are usually attainable. But, forensic economics does incorporate the principles of probability into most projections and with the passage of time and the dissemination of research economic projections should move toward greater consensus among those making such projections. Yet, Judge Richard Posner has voiced considerable skepticism about the ability of economists to meet the standards of neutrality and reliability the courts would want of expert witnesses[6]. Judge Posner believes that many if not most forensic economists are induced to be advocates by the attorney retaining them. In a ASSA, NAFE session in 2012, and in his JEP paper in 1999, he expressed the opinion that economic testimony in torts may not the standard of reliability because the tort system is based on advocacy and the economist is part of that system. To address this perception of advocacy by others, NAFE and AAEFE adopted ethics statements early in their existence and have updated those statements, which are conditions of membership[7]. In fact, NAFE and AAEFE were the first national economics associations to adopt ethics statements as noted by George DeMartino in his presentation at the same 2012 ASSA.NAFE session as Judge Posner. While NAFE members nearly unanimously support the SEP/PPP

[6] Posner, Richard, "The Law and Economics of the Economic Expert Witness" *The Journal of Economic Perspectives,* Spring, 1999 13 (2)

[7] From the NAFE Web Page it is stated that *Membership requires that you pledge to adhere to the Statement of Ethical Principles/Principles of Professional Practice (SEP/PPP)*, which is included with the membership form and is readily accessible on this web site.

based on the various Brookshire surveys, a survey of NAFE members[8] in 2013 revealed that respondents believed that only 50% of expert economist adhered to the SEP/PPP and in response to a question about whether the "market" would weed out violators of the SEP/PPP, only 35% believed that to be the case. The SEP/PPP statements address transparency of work, uniformity of methodologies used and avoidance of conflicts of interest along with the need to be neutral when making loss projections. It is this last point that Posner questions. Posner's criticism would also apply to work by economists in public utility rate hearings, congressional hearings on industry practices or any adversarial setting involving economic issues.

Despite the many papers published on the methodologies of calculating personal injury/ wrongful death damages, ranges of loss estimates by forensic economists on opposite sides in a case often are substantial given the same basic facts considered.

For example, assuming a total earnings loss for a non-Hispanic, white female, age 18 with a high school degree, using age earnings data from *Full-time Earnings in the United States, 2013-2017* as published by Expectancy Data for those characteristics, we provide three projections of discounted future earnings capacity using three common models.

Model one assumes: A projection of earnings to age 67, using real growth for all industrial workers adjusted by involuntary death, disability and unemployment to a ending age of 67; discounted with a current Treasury yield curve based on TIPS bonds and a Moody's Analytics forecast of earnings growth based on all workers. Probability of death and involuntary labor force withdrawal is considered in reducing loss. The details of the model are shown in Appendix 1 of this paper. These calculations are shown in Table 1 of the Appendix and the present value of projected earnings capacity is **$1,160,099**.

Model 2 assumes loss certain to age 67 with a total offset of interest rates and earnings growth and loss is **$1,597,915** as shown in Table 2 in the Appendix.

[8] Ward, John and Robert J. Thornton (2013), "Can Statements of Ethical Principles and Codes of Practice Make a Difference? The Results of a NAFE Survey" *Journal of Forensic Economics*, 24 (1), PP

Model 3 assumes a work life based on SCK (2019) run to age 100, starting as inactive, with a 2% wage net discount rate. Loss is **$573,288** as shown in Table 3.

When estimates of damages for a straightforward case vary by over 200 percent or more from a plaintiff's economist to a defendants' economist analysis, is it reasonable to attribute such divergence of opinion to advocacy?

Robert Thornton and I provided an example of ranges of estimates of lost earnings support that FE's might calculate using "plaintiff favoring" or" defense favoring" assumptions and methodologies that are commonly used by FE's[9]. All of these assumptions and methodologies are contained in our literature. The term "favoring" only means that using that assumption or methodology will result in higher or smaller losses than an alternative assumption or methodology that produces the opposite result. For example, the use of family income as a base for calculating self-consumption levels in a death case or the use of only the decedent's earnings in making a reduction in loss could be examples of defense or plaintiff favoring assumptions.

Large variations in projections of loss among economist in a specific case may be justified by the nature of the variables in methodologies. The choice of a self-consumption base in a death is subject to the way in which the damages are specified.. The choice of whether you apply that rate to family income or the decedents income may be a matter of law or precedent in a jurisdiction. While our research can make the rate of self-consumption more precise, the choice of using family income or decedent's income as the base in the calculation becomes a matter of choice or law, reasoned choice or, potentially, advocacy. The same logic applies to the selection of an earnings base to project, whether it be earnings capacity or probable earnings. The choices of earnings growth rates and discount rates should be subject to greater agreement than we see in practice, but advocates of either net wage discount rates, historical growth and discount rates of varying periods and relationships and wage growth projections and bond ladder discounting have persisted over the past thirty years and continue to be the focus of list serve debates.

[9] Thornton, Robert and John Ward (1999), "The Economist in Tort Litigation" *The Journal of Economic Perspectives,* Spring, 13 (2)101-112

In practice, variations in loss projections might be explained by the way in which such damages are defined by the law through statutes, case law or the way in which the economist defines the loss. For example, differences in an earnings projection may be the result of whether the loss is defined as a loss of earnings capacity based on an individual's skills and education or a loss of probable earnings based on an individual's past earnings performance. Similarly, a reduction for a decedent's self-consumption may be based on only the self-consumption of the decedent's earnings if loss is defined as the amount of earnings the decedent could have provided survivors from their own earnings. However, if the objective is to make the family whole in terms of income lost then one might reason that the decedents consumption of other family earnings should be subtracted from loss to the family.

The choice of a discount rate may rest on whether the economist's objective is just to reduce a future stream of annual losses to a certain present value as of a specific date or to use a net historical discount rate if the objective is to provide some average net return on the investment of a portfolio over time? Finally, the calculation of lost household services for an injured person or survivors of a decedent may differ from one projection to another based on the definition of what is a loss? So, if the loss of household services is defined as the replacement cost of what hours of services the individual did and is now not capable of doing, loss will likely be different than the actual expenditure on replacing such services since the loss began. Such definitional reasons for variations in calculations may result from only the opinions of the economist or because of direction from case law or statutes in a jurisdiction. List serve postings by Thomas Ireland on new case law and statutes along with the publication of damages precedents and statutes in the various states in the *JFE* have been great contributions to the discipline over the past decade in deciding such issues.

In depositions and trials, forensic economists are often asked, "do you offer your conclusions/opinions with reasonable certainty/probability?" and the answer is invariably "yes". Whether the question deals with reasonable probability, reasonable likelihood or reasonable certainty, do we really understand the question and does the jury really understand the answer? In any agenda for research in our field, enhancing the statistical validity of our projections should be an objective if for no other reason than to assure a jury that the expert's estimates are not speculation and have statistical validity.

We need to do a better job of explaining how our calculations are impacted by our definitions of the variables used in our models. How do we define self-consumption, earnings or earnings capacity, discounting and wage growth. Are we correcting the ability to work by all reasons or just involuntary reasons as in the case of earnings capacity? Our advances in research may only impact reliability of estimates if we are asking the right questions in defining the objectives of our calculations. So in the Model 1 and Model 3 calculations of lost earnings capacity above, the methodologies used to calculate such different present values of lost earnings may be explained in part by the questions asked by the economist. Two different questions are being asked.

A Retrospective Review of Agendas for Forensic Economic Research

In the first issue of the *JFE*[10], Ward and Olson provided an agenda for future research in Forensic Economics. Areas included were:

- the determination of work life expectancies and appropriate retirement ages for forecasting lifetime earnings;
- the development of econometric techniques to replace simple arithmetic projections of economic parameters to forecast damages;
- the appropriate measure of self-consumption to deduct from lifetime earnings in wrongful death litigation;
- the methods to forecast growth and the selection of discount rates in determining the present value of future lifetime earnings, and;
- the measurement of the value of home services as a damage in personal injury and wrongful death.

This agenda was offered based, in part, on the state of the art in forensic economics in projecting personal injury/death damages in 1987 which included:

- Work life expectancies were often based on Shirley J . Smith, "New Work Life Estimates Reflect Changing Profile of labor Force," Monthly Labor

[10] Ward, John and Gerald Olson. 1987. “Forensic Economics: A Perspective and an Agenda for Research.” *Journal of Forensic Economics*, 1(1): 1–10.

Review, March 1982, 15-20; Newest BLS Estimates. Many forensic economists projected lost earnings to fixed dates of retirement without considering labor force withdrawal;

- The great majority of forensic economists used simple wage growth rates and discount rates based on past historical trends in earnings loss calculations;
- Earl Cheit's simple (and probably erroneous), estimates of self consumption of earnings was the common standard used by forensic economists;
- Household Service loss projections were largely based on Walker, K. and W.H. Gauger (1973), "Time and its Dollar Value in Household Work", *Family Economics Review*, based a small and limited population sample.

In fact , the majority of papers published in the JFE and other forensic economic journals have focused on the agenda issues outlined in 1987.

Since that first "Agenda for Research" paper, a number of other such agenda papers have been published including;

- Brookshire, Michael, "An Agenda for Future Research in Forensic Economics" *Journal of Forensic Economics*, 4, Fall, 1991 287-290;
- Ward, John and Gerald Olson*," "* Forensic Economics: The Development and Outlook of the Field", in *Litigation Economics,* Eds. Patrick A Gaughan and Robert J. Thornton, JAI Press, Greenwich Conn. , 1993, pp 1-13, and;
- Ward, John , (2014) *"The Journal of Forensic Economics:* Revisiting Its Perspective and Agenda for Research" *Journal of Forensic Economics*, 25(1), pp 5-16.

In my 2014 "Agenda" paper in the *JFE* I did a survey of members asking questions about the impacts of our research accomplishments on the members practice. In the survey 96.7% of respondents rated the contributions of the *JFE* research to the development of the field as of critical or substantial importance and nearly 80% said that they always or often rely on papers published in the *JFE* as foundation for their own forensic economic opinions.

Nevertheless, a common observation among forensic economists is that the ranges of damages calculations among forensic economists in the same case (for plaintiff and defense) are often too large and do not reflect the advances we have made in

our discipline. In the Ward and Thornton 2013 survey of NAFE members on issues of ethics, one comment suggested that while the quality of analysis is generally superior today, there has been a hardening or rigidity of assumptions by some forensic economists. In the 2014 Ward *JFE* survey 70% of respondents believed research published in the JFE was free or largely free from advocacy of any position.

There is slow movement towards the use of current interest rates and bond ladders rather than historical interest rates, and for those using net wage discount rates, efforts to examine the stationarity of such rates has progressed but in other areas, methodologies appear fairly rigid with time. Some notable areas of advancement in analysis, in the areas of personal injury, include:

- Research by Skoog, Ciecka and Krueger, using Markov analysis has generated a number of comprehensive projections of work life expectancies as standards in forensic economics;
- Krueger's *Dollar Value of a Day*, and *Full-time Earnings in the United States* have substantially advanced the measure of lost replacement household services and statistical projections of lifetime earnings;
- Research based on BLS and Census Family Expenditure Survey data has added greater precision to earnings self consumption estimates, and;
- Papers on defining the differences between probable earnings and earnings capacity have brought greater focus to the selection of an earnings base in projections.

One area of research, "Hedonics' was prominent in the first decade of the existence of the *JFE*, but has virtually disappeared from our literature in the past two decades.

There have been shortcomings in the evolution of our research literature especially in the areas of research on commercial damages, employment law damages and economic issues in public law such as environmental and public utility rate litigation. But, subscribers appear to be satisfied with the general direction of research in the *JFE* and the quality of papers published.

A Future Research Agenda

Having served as Editor of both the *Journal of Forensic Economics* and the *Journal of Legal Economics* I recognize that such editors have unique perspectives about the directions and shortcomings of research in our field of forensic economics. In preparing this paper I asked James Ciecka and Steve Shapiro, Co-Editors of the *JFE* and David Schap, Editor of the *Journal of Legal Economics* , to offer comments on the current state of research and the needs for future research in the field of forensic economics.

Dave Schap, Editor of the *Journal of Legal Economics* offered the following suggestions for future research:

1. Tracking expenditure on household services by income level. It makes such intuitive sense that the higher the income, the more likely one is occupied with market production and less inclined to household production; and even when that aspect is not entirely true, higher income affords one the opportunity to purchase household services as opposed to producing them directly;

2. We have no measures, good or otherwise really, concerning self-consumption of household services. Some may argue that the amount is quite small, but that doesn't make zero the correct figure. And any other amount is pretty much just a guess;

3. There is opportunity for follow-up work related to two important recent studies and one entire area of research:
A. Macpherson and Stephenson, "Assessing Economic Damages in Wrongful Termination Cases," JLE 23 (1) 2016, appear to have found the Holy Grail for litigation involving wrongful termination from employment, where the key issue is the path to full mitigation. The authors present an empirical method for selecting the number of years to full mitigation based on subjective valuation of a set of key variables shown to matter concerning duration of unemployment in the labor economics studies of plant closures and company dissolution. It is doubtful that anyone will ever assemble a data set that directly addresses wrongful terminations, as opposed to worker displacement due to, say, plant closure, however welcome such an amassed data set would be. All the more reason to have an independent follow-up study capable of confirming the findings in the important Macpherson-Stephenson article.
B. Petersen and Allman, "The Effect of the Intent to Retire at Age 70 or Older on Worklife Expectancy," JLE 23 (2) 2017, explain that those who express themselves on wanting to retire late in their careers actually do retire later on average than those who have made no such declaration. This is an important finding for applied

work**.** It would be nice to see these authors or another team of researchers confirm the finding with updated data, as the issue of the timing of workforce separation for retirement is often a point of contention in PI casework.
C. Somewhat related to item 3B is the work by Kevin Cahill and his coauthors on bridge jobs, employment opportunities taken on by a sizable number of individuals who have left career employment but have yet to fully retire. Most applied work by FEs either merely mentions the possibility of bridge employment or ignores the issue altogether. An applied piece discussing in detail the findings in this area of labor economics directed toward user-friendly applications in FE casework would be a valuable addition to the FE toolkit. What may be needed is a way of apportioning WLE into career work versus bridge work coupled with some percentage coding of bridge pay rate relative to career employment pay rate. Differing fringe benefits between career employment and bridge employment puts lumps in the gravy. It seems to me that without some dumbed-down set of percentages that are linked to factors like sex, occupational type, maybe education level, this important area of research will not get its due in day-to-day FE applications, and that would be a shame. It is also a distortion in that some of what goes into WLE is bridge employment, so to ignore the fact is to weight career employment too heavily based on given WLE levels.

James Ciecka, Co-Editor of the *Journal of Forensic Economics* has suggested the following agenda for future research:

1. As you know, the last few papers Kurt, Gary, and I have done on worklife expectancies contain bootstrap estimates of WLE and standard errors for the sample mean of WLE. We used the bootstrap method because the mathematical statistics were just too hard to work out (at least for us) for the distribution of estimated WLE. I think the same difficulty occurs for many of the point estimates of various parameters (not necessarily WLE) that appear in forensic economists' reports. However, it still would be nice to have some estimate of margin of error or precision to put around point estimates. Maybe the bootstrap is a way to get estimates of precision; maybe there are other better methods**.** Anyway, I would like to see work that addresses precision issues that could be incorporated in day-to-day work of forensic economists;

2. Forensic economists often base lost future earnings calculations on a plaintiff's average earnings prior to a personal injury or wrongful death. There may be a

feeling of greater confidence in a final loss estimate when average lost earnings is based on (say) five or six years of data rather than on one or two years. However, how much better should a forensic economist feel with more data points? How much additional accuracy does more data provide? We know that accuracy improves not proportionally with *n* but with $\sqrt{n}$ and observations usually are not independent which also implies smaller improvements in accuracy as *n* increases. I would like to see research that addresses this issue;

3. Some time ago, Steve Shapiro and I decided not to publish new NAFE surveys in the *JFE*; and a natural place for the survey would be in the much upgraded *Forecast*. I do think that the surveys provide useful information and I hope that the *Forecast* will be their home if they are conducted in the future. However, I would like to see results of a probability based survey, or at least a serious analysis of nonresponses in the usual type of survey. If that were done, I think the *JFE* would be interested is such work, and;

4. I don't know how possible it may be, but I would like to see more Bayesian type work. We know that more classical type statistics seems to rely of a frequency foundation (e.g., 90% of many confidence interval constructed in a particular manner will cover the true value of some parameter). However, in forensic reports, there is one report with one or a few numbers as the bottom line; and it would be nice to attach some probability to that bottom line given the information used to generate it. That seems to be a Bayesian problem.

Steve Shapiro, Co-Editor of the *JFE* suggests:

1. Research on an appropriate measure of lost enjoyment of life other than current hedonics and past hedonics measures. In my humble opinion, such research should start from scratch by laying out a conceptual framework and then filling in the economic theory from that point;

2. Developing a conceptual framework that distinguishes lost earnings capacity from lost earnings. Frank Slesnick and Steph Horner have started this discussion with their recent work;

3. Integrating law and economics literature on punitive damages with what is done in practice. The law and economic literature that raises the issue of optimal compensation has made it clear that "proper" measurement is complicated.

4. I would like to see a forensic economist properly use financial and economic theory to come up with a conceptual framework for determination of the net wage discount rate**,** and;

5. Like James Ciecka, I would like to see more work on Bayesian lost wage calculations. There is little literature on this topic.

To the above agenda items I would add my own observations about a future research agenda

1. First, our research production has come from a relatively small base of membership. Moreover, our membership in NAFE appears to be getting older and fewer members come from academia. We need to promote original research proactively as an organization.
2. The use of net discount rates versus current and forecast wage growth and current interest rates continues to be the largest area of dispute among forensic economists. This appears to be the area of greatest rigidity among forensic economists. It would seem that this issue has become a definitional issue of what is the objective of discounting,
3. We now face the issue of adjusting or not adjusting our forecasts for gender and race differences of the plaintiff. We know that the wage gap between men and women is narrowing and that WLE and age earnings growth tables contain variance due to discrimination as well as family leave choices which are changing with time. What are the implications of dropping race and gender distinctions from our projections?
4. What is Race in an increasingly open society. Race is self-declared and increasingly hazy. Education is far more important in explaining future earnings of an individual.
5. What research will we need to address issues of race and gender in our projections? To what degree can we tailor such projections for population educational differences rather than race and gender distinctions?
6. What dynamic changes are taking place in industry specific employment unemployment and wage growth that are not captured by using historical wage growth and unemployment data

7. Do we have the models that will allow us to correctly adjust forecasts for such dynamic changes?
8. How do we incorporate Bayesian methodologies in our basic lost wage projections and how do we assign meaningful probabilities to outcomes?
9. Hedonic damages are real in a personal injury case, but we have largely dismissed their importance in our literature. Is there a way to redefine such damages through utility analysis to reexamine their relevance to damages?

Finally, neutrality in expert economic analysis is a work in progress and differences in opinion can't necessarily be construed to represent bias. Subjecting assumptions to examination and debate through our publications, peer review of papers and presentations, meeting sessions and internet list serves offers the best path to neutrality.

Appendix

Assumptions used in projecting Earnings loss in Table 1

To the worklife period, we applied risk probability adjustments to account for the involuntary reasons why the plaintiff would not be able to achieve her earning capacity. We based the risk of death on mortality data concerning non Hispanic, white females living in the United States. We assigned the annual risks of being unable to work due to disability and wanting to work but not being able to find work using data regarding the U.S. population of females with a high school level of education.

We reduce earning capacity by the risk probability of death calculated using the life table data in U.S. Life Tables, 2015. Those life tables are published by the National Center for Health Statistics. 10

We calculated the annual risk probabilities of (a) being unable to work due to disability, and (b) wanting to work but unable to find work. The data source used to calculate these probabilities is the Current Population Survey which is published by the U.S. Census Bureau and the Bureau of Labor Statistics. 11 The period used to calculate the disability probability was January 2009 12 to December 2018. The period used to calculate the unemployment probability was January 2005 13 to December 2018. The calculated data and methodology that we use to estimate the risk probabilities of disability and unemployment are detailed in a document published in the econometrics section of our Internet site and dated to the fourth quarter of 2018. 14 Because we hold education constant, persons not in the labor force because they are students are deleted from the population. For each probability calculation, we divide the U.S. population into two groups: inactive and active. The proportion of the persons active in the population measures the probability of being able to attain earning capacity. For the hazard of disability, active persons are all persons in the labor force plus all persons not-in-the-labor-force and not having a disability; inactive persons are all others. For the hazard of unemployment, inactive persons are those in the labor force but unemployed under the official BLS 4-week definition plus the persons who are not-in-the-labor force but want to work and feel that no job is available for them (BLS defined discouraged workers); active persons are all others. The risk probabilities of disability and unemployment are calculated using a Markov increment-decrement probability tracking movement between the inactive and active states. Our real inflation-free earning capacity related growth forecasts are calculated from Moody's Analytics forecasts 24 and Bureau of Labor Statistics' economic time series data. Future economic amounts are discounted to present value based on the spot rate values of the latest published Treasury Nominal and Real Coupon Issues Yield Curve (TNC and TRC) for U.S. Treasury securities as found at the U.S. Department of Treasury Internet site. 31

Table 2. Earning capacity of non-Hispanic white high school diploma women; certain to age 67; total offset

Plaintiff name: Jill Plaintiff

Year	End of year age	Earning capacity	Growth	Portion of year	Anticipated earning capacity	Survival probability	Probability labor force attachment	Unemployed probability	Expected earning capacity	Discount factor: total offset	Present value of expected earning capacity	
2019	18	$17,351	1.0431	0.49863	$9,025	1.00000	1.00000	1.00000	$9,025	1.00000	$9,025	$9,025
2020	19	$18,373	1.0431	1.00000	$19,165	1.00000	1.00000	1.00000	$19,165	1.00000	$19,165	$28,190
2021	20	$19,365	1.0431	1.00000	$20,200	1.00000	1.00000	1.00000	$20,200	1.00000	$20,200	$48,390
2022	21	$20,330	1.0431	1.00000	$21,206	1.00000	1.00000	1.00000	$21,206	1.00000	$21,206	$69,596
2023	22	$21,265	1.0431	1.00000	$22,182	1.00000	1.00000	1.00000	$22,182	1.00000	$22,182	$91,779
2024	23	$22,172	1.0431	1.00000	$23,128	1.00000	1.00000	1.00000	$23,128	1.00000	$23,128	$114,907
2025	24	$23,050	1.0431	1.00000	$24,044	1.00000	1.00000	1.00000	$24,044	1.00000	$24,044	$138,951
2026	25	$23,900	1.0431	1.00000	$24,931	1.00000	1.00000	1.00000	$24,931	1.00000	$24,931	$163,882
2027	26	$24,721	1.0431	1.00000	$25,787	1.00000	1.00000	1.00000	$25,787	1.00000	$25,787	$189,669
2028	27	$25,513	1.0431	1.00000	$26,614	1.00000	1.00000	1.00000	$26,614	1.00000	$26,614	$216,282
2029	28	$26,277	1.0431	1.00000	$27,410	1.00000	1.00000	1.00000	$27,410	1.00000	$27,410	$243,692
2030	29	$27,012	1.0431	1.00000	$28,177	1.00000	1.00000	1.00000	$28,177	1.00000	$28,177	$271,869
2031	30	$27,719	1.0431	1.00000	$28,914	1.00000	1.00000	1.00000	$28,914	1.00000	$28,914	$300,783
2032	31	$28,396	1.0431	1.00000	$29,621	1.00000	1.00000	1.00000	$29,621	1.00000	$29,621	$330,404
2033	32	$29,045	1.0431	1.00000	$30,298	1.00000	1.00000	1.00000	$30,298	1.00000	$30,298	$360,702
2034	33	$29,666	1.0431	1.00000	$30,945	1.00000	1.00000	1.00000	$30,945	1.00000	$30,945	$391,647
2035	34	$30,258	1.0431	1.00000	$31,562	1.00000	1.00000	1.00000	$31,562	1.00000	$31,562	$423,209
2036	35	$30,821	1.0431	1.00000	$32,150	1.00000	1.00000	1.00000	$32,150	1.00000	$32,150	$455,359
2037	36	$31,355	1.0431	1.00000	$32,708	1.00000	1.00000	1.00000	$32,708	1.00000	$32,708	$488,067
2038	37	$31,861	1.0431	1.00000	$33,235	1.00000	1.00000	1.00000	$33,235	1.00000	$33,235	$521,302
2039	38	$32,339	1.0431	1.00000	$33,733	1.00000	1.00000	1.00000	$33,733	1.00000	$33,733	$555,035
2040	39	$32,787	1.0431	1.00000	$34,201	1.00000	1.00000	1.00000	$34,201	1.00000	$34,201	$589,236
2041	40	$33,207	1.0431	1.00000	$34,639	1.00000	1.00000	1.00000	$34,639	1.00000	$34,639	$623,876
2042	41	$33,599	1.0431	1.00000	$35,047	1.00000	1.00000	1.00000	$35,047	1.00000	$35,047	$658,923
2043	42	$33,961	1.0431	1.00000	$35,426	1.00000	1.00000	1.00000	$35,426	1.00000	$35,426	$694,349
2044	43	$34,295	1.0431	1.00000	$35,774	1.00000	1.00000	1.00000	$35,774	1.00000	$35,774	$730,123
2045	44	$34,601	1.0431	1.00000	$36,093	1.00000	1.00000	1.00000	$36,093	1.00000	$36,093	$766,216
2046	45	$34,877	1.0431	1.00000	$36,381	1.00000	1.00000	1.00000	$36,381	1.00000	$36,381	$802,597
2047	46	$35,126	1.0431	1.00000	$36,640	1.00000	1.00000	1.00000	$36,640	1.00000	$36,640	$839,237
2048	47	$35,345	1.0431	1.00000	$36,869	1.00000	1.00000	1.00000	$36,869	1.00000	$36,869	$876,106
2049	48	$35,536	1.0431	1.00000	$37,068	1.00000	1.00000	1.00000	$37,068	1.00000	$37,068	$913,174
2050	49	$35,698	1.0431	1.00000	$37,237	1.00000	1.00000	1.00000	$37,237	1.00000	$37,237	$950,412
2051	50	$35,832	1.0431	1.00000	$37,377	1.00000	1.00000	1.00000	$37,377	1.00000	$37,377	$987,788
2052	51	$35,936	1.0431	1.00000	$37,486	1.00000	1.00000	1.00000	$37,486	1.00000	$37,486	$1,025,274
2053	52	$36,013	1.0431	1.00000	$37,566	1.00000	1.00000	1.00000	$37,566	1.00000	$37,566	$1,062,840
2054	53	$36,060	1.0431	1.00000	$37,615	1.00000	1.00000	1.00000	$37,615	1.00000	$37,615	$1,100,455
2055	54	$36,079	1.0431	1.00000	$37,635	1.00000	1.00000	1.00000	$37,635	1.00000	$37,635	$1,138,090
2056	55	$36,070	1.0431	1.00000	$37,625	1.00000	1.00000	1.00000	$37,625	1.00000	$37,625	$1,175,715
2057	56	$36,031	1.0431	1.00000	$37,585	1.00000	1.00000	1.00000	$37,585	1.00000	$37,585	$1,213,300
2058	57	$35,964	1.0431	1.00000	$37,515	1.00000	1.00000	1.00000	$37,515	1.00000	$37,515	$1,250,815
2059	58	$35,869	1.0431	1.00000	$37,415	1.00000	1.00000	1.00000	$37,415	1.00000	$37,415	$1,288,230
2060	59	$35,744	1.0431	1.00000	$37,286	1.00000	1.00000	1.00000	$37,286	1.00000	$37,286	$1,325,516
2061	60	$35,591	1.0431	1.00000	$37,126	1.00000	1.00000	1.00000	$37,126	1.00000	$37,126	$1,362,642
2062	61	$35,410	1.0431	1.00000	$36,937	1.00000	1.00000	1.00000	$36,937	1.00000	$36,937	$1,399,579
2063	62	$35,200	1.0431	1.00000	$36,718	1.00000	1.00000	1.00000	$36,718	1.00000	$36,718	$1,436,297
2064	63	$34,961	1.0431	1.00000	$36,468	1.00000	1.00000	1.00000	$36,468	1.00000	$36,468	$1,472,765
2065	64	$34,693	1.0431	1.00000	$36,189	1.00000	1.00000	1.00000	$36,189	1.00000	$36,189	$1,508,954
2066	65	$34,397	1.0431	1.00000	$35,880	1.00000	1.00000	1.00000	$35,880	1.00000	$35,880	$1,544,835
2067	66	$34,072	1.0431	1.00000	$35,542	1.00000	1.00000	1.00000	$35,542	1.00000	$35,542	$1,580,377
2068	67	$33,719	1.0431	0.49863	$17,538	1.00000	1.00000	1.00000	$17,538	1.00000	$17,538	$1,597,915
Future: Jul 2, 2019 to Age 67.00				49.00 years	$1,597,915	49.00 years	49.00 years	49.00 years	$1,597,915		**$1,597,915**	
John Ward Economics		**Sum of past and future**		49.00 years Age 67.00	$1,597,915	49.00 years Age 67.00	49.00 years Age 67.00	49.00 years Age 67.00	$1,597,915		**$1,597,915**	

Table 3. Earning capacity of non-Hispanic white high school diploma women; SCK(2019) WLE to age 100 starting inactive; 2% NDR

Plaintiff name: [illegible]

Year	End of year age	Earning capacity	Growth	Portion of year	Anticipated earning capacity	Survival probability	Probability labor force attachment	Unemployed probability	Expected earning capacity	Discount factor: net 2%	Present value of expected earning capacity	
2019	18	$17,851	1.0481	0.49863	$9,025	0.99992	0.10470	0.95200	$899	0.98039	$882	$882
2020	19	$18,473	1.0481	1.00000	$19,165	0.99965	0.47533	0.95200	$6,845	0.96117	$6,580	$7,462
2021	20	$19,465	1.0481	1.00000	$20,200	0.99928	0.55261	0.95200	$10,616	0.94232	$10,004	$17,465
2022	21	$20,430	1.0481	1.00000	$21,206	0.99887	0.63375	0.95200	$12,780	0.92385	$11,807	$29,271
2023	22	$21,265	1.0481	1.00000	$22,182	0.99842	0.67108	0.95200	$14,149	0.90573	$12,815	$42,087
2024	23	$22,173	1.0481	1.00000	$23,128	0.99796	0.68738	0.95200	$15,104	0.88797	$13,412	$55,498
2025	24	$23,050	1.0481	1.00000	$24,044	0.99748	0.69414	0.95200	$15,825	0.87056	$13,777	$69,275
2026	25	$23,900	1.0481	1.00000	$24,931	0.99698	0.69932	0.95200	$16,404	0.85349	$14,001	$83,275
2027	26	$24,721	1.0481	1.00000	$25,787	0.99629	0.69065	0.95200	$16,892	0.83676	$14,135	$97,410
2028	27	$25,514	1.0481	1.00000	$26,614	0.99567	0.68879	0.95200	$17,425	0.82035	$14,214	$111,624
2029	28	$26,277	1.0481	1.00000	$27,410	0.99500	0.68262	0.95200	$17,723	0.80426	$14,254	$125,877
2030	29	$27,012	1.0481	1.00000	$28,177	0.99429	0.67854	0.95200	$18,097	0.78849	$14,270	$140,147
2031	30	$27,719	1.0481	1.00000	$28,914	0.99354	0.67486	0.95200	$18,456	0.77303	$14,267	$154,414
2032	31	$28,396	1.0481	1.00000	$29,621	0.99276	0.67200	0.95200	$18,812	0.75788	$14,257	$168,671
2033	32	$29,045	1.0481	1.00000	$30,298	0.99188	0.67018	0.95200	$19,176	0.74301	$14,246	$182,917
2034	33	$29,666	1.0481	1.00000	$30,945	0.99097	0.66964	0.95200	$19,543	0.72845	$14,236	$197,154
2035	34	$30,258	1.0481	1.00000	$31,562	0.99003	0.66970	0.95200	$19,922	0.71416	$14,228	$211,381
2036	35	$30,821	1.0481	1.00000	$32,150	0.98904	0.67089	0.95200	$20,309	0.70016	$14,219	$225,601
2037	36	$31,355	1.0481	1.00000	$32,708	0.98799	0.67303	0.95200	$20,705	0.68643	$14,213	$239,814
2038	37	$31,861	1.0481	1.00000	$33,235	0.98689	0.67624	0.95200	$21,116	0.67297	$14,210	$254,024
2039	38	$32,339	1.0481	1.00000	$33,733	0.98572	0.68050	0.95200	$21,542	0.65978	$14,213	$268,236
2040	39	$32,787	1.0481	1.00000	$34,201	0.98448	0.68547	0.95200	$21,969	0.64684	$14,210	$282,446
2041	40	$33,207	1.0481	1.00000	$34,639	0.98315	0.69018	0.95200	$22,376	0.63416	$14,190	$296,636
2042	41	$33,599	1.0481	1.00000	$35,047	0.98172	0.69439	0.95200	$22,745	0.62172	$14,141	$310,777
2043	42	$33,961	1.0481	1.00000	$35,426	0.98018	0.69773	0.95200	$23,065	0.60953	$14,059	$324,836
2044	43	$34,295	1.0481	1.00000	$35,774	0.97854	0.70004	0.95200	$23,330	0.59758	$13,941	$338,777
2045	44	$34,601	1.0481	1.00000	$36,094	0.97675	0.70121	0.95200	$23,534	0.58586	$13,787	$352,565
2046	45	$34,877	1.0481	1.00000	$36,381	0.97486	0.70112	0.95200	$23,672	0.57437	$13,597	$366,161
2047	46	$35,126	1.0481	1.00000	$36,640	0.97279	0.70004	0.95200	$23,754	0.56311	$13,376	$379,538
2048	47	$35,345	1.0481	1.00000	$36,869	0.97059	0.69853	0.95200	$23,797	0.55207	$13,138	$392,675
2049	48	$35,536	1.0481	1.00000	$37,068	0.96819	0.69669	0.95200	$23,803	0.54125	$12,883	$405,559
2050	49	$35,698	1.0481	1.00000	$37,237	0.96556	0.69406	0.95200	$23,757	0.53064	$12,606	$418,165
2051	50	$35,832	1.0481	1.00000	$37,377	0.96264	0.69003	0.95200	$23,646	0.52023	$12,296	$430,461
2052	51	$35,936	1.0481	1.00000	$37,486	0.95947	0.68398	0.95200	$23,420	0.51003	$11,945	$442,405
2053	52	$36,013	1.0481	1.00000	$37,566	0.95602	0.67527	0.95200	$23,087	0.50003	$11,544	$453,950
2054	53	$36,060	1.0481	1.00000	$37,615	0.95232	0.66394	0.95200	$22,642	0.49022	$11,100	$465,049
2055	54	$36,079	1.0481	1.00000	$37,635	0.94836	0.65082	0.95200	$22,113	0.48061	$10,628	$475,677
2056	55	$36,070	1.0481	1.00000	$37,625	0.94408	0.63706	0.95200	$21,543	0.47119	$10,151	$485,828
2057	56	$36,031	1.0481	1.00000	$37,585	0.93948	0.62413	0.95200	$20,947	0.46195	$9,676	$495,504
2058	57	$35,964	1.0481	1.00000	$37,515	0.93457	0.60852	0.95200	$20,311	0.45289	$9,199	$504,703
2059	58	$35,869	1.0481	1.00000	$37,415	0.92935	0.59169	0.95200	$19,587	0.44401	$8,697	$513,399
2060	59	$35,744	1.0481	1.00000	$37,286	0.92386	0.57038	0.95200	$18,704	0.43530	$8,142	$521,542
2061	60	$35,591	1.0481	1.00000	$37,126	0.91806	0.54386	0.95200	$17,601	0.42677	$7,512	$529,053
2062	61	$35,410	1.0481	1.00000	$36,937	0.91192	0.50765	0.95200	$16,279	0.41840	$6,811	$535,864
2063	62	$35,200	1.0481	1.00000	$36,718	0.90545	0.46692	0.95200	$14,778	0.41020	$6,062	$541,926
2064	63	$34,961	1.0481	1.00000	$36,468	0.89857	0.42254	0.95200	$13,182	0.40215	$5,301	$547,227
2065	64	$34,693	1.0481	1.00000	$36,189	0.89116	0.37720	0.95200	$11,581	0.39427	$4,566	$551,793
2066	65	$34,397	1.0481	1.00000	$35,880	0.88316	0.33094	0.95200	$10,074	0.38654	$3,894	$555,687
2067	66	$34,072	1.0481	1.00000	$35,542	0.87458	0.29379	0.95200	$8,694	0.37896	$3,295	$558,982
2068	67	$33,719	1.0481	1.00000	$35,173	0.86538	0.25693	0.95200	$7,445	0.37153	$2,766	$561,748
2069	68	$33,337	1.0481	1.00000	$34,775	0.85541	0.22251	0.95200	$6,301	0.36424	$2,295	$564,043
2070	69	$32,926	1.0481	1.00000	$34,346	0.84489	0.19032	0.95200	$5,257	0.35710	$1,877	$565,920
2071	70	$32,487	1.0481	1.00000	$33,888	0.83406	0.16052	0.95200	$4,314	0.35010	$1,510	$567,430
2072	71	$32,019	1.0481	1.00000	$33,400	0.82033	0.13421	0.95200	$3,501	0.34323	$1,202	$568,632
2073	72	$31,522	1.0481	1.00000	$32,882	0.80642	0.11224	0.95200	$2,833	0.33650	$953	$569,585
2074	73	$30,997	1.0481	1.00000	$32,334	0.79132	0.09568	0.95200	$2,324	0.32991	$767	$570,352
2075	74	$30,443	1.0481	1.00000	$31,756	0.77472	0.08327	0.95200	$1,950	0.32344	$631	$570,983
2076	75	$29,861	1.0481	1.00000	$31,148	0.75716	0.07284	0.95200	$1,658	0.31710	$526	$571,509
2077	76	$29,249	1.0481	1.00000	$30,511	0.73809	0.06483	0.95200	$1,390	0.31088	$432	$571,941
2078	77	$28,609	1.0481	1.00000	$29,843	0.71766	0.05541	0.95200	$1,130	0.30478	$344	$572,285
2079	78	$27,941	1.0481	1.00000	$29,146	0.69559	0.04609	0.95200	$890	0.29881	$266	$572,551
2080	79	$27,264	1.0481	1.00000	$28,419	0.67175	0.03759	0.95200	$683	0.29295	$200	$572,751
2081	80	$26,518	1.0481	1.00000	$27,662	0.64586	0.03020	0.95200	$514	0.28720	$148	$572,898
2082	81	$25,764	1.0481	1.00000	$26,875	0.61816	0.02424	0.95200	$383	0.28157	$108	$573,006
2083	82	$24,980	1.0481	1.00000	$26,058	0.58809	0.01965	0.95200	$287	0.27605	$79	$573,086
2084	83	$24,169	1.0481	1.00000	$25,211	0.55743	0.01609	0.95200	$215	0.27064	$58	$573,144
2085	84	$23,328	1.0481	1.00000	$24,334	0.52409	0.01320	0.95200	$160	0.26533	$43	$573,186
2086	85	$22,459	1.0481	1.00000	$23,428	0.48879	0.01082	0.95200	$118	0.26013	$31	$573,217
2087	86	$21,562	1.0481	1.00000	$22,492	0.45266	0.00888	0.95200	$86	0.25503	$22	$573,239
2088	87	$20,635	1.0481	1.00000	$21,525	0.41645	0.00702	0.95200	$62	0.25003	$16	$573,255
2089	88	$19,681	1.0481	1.00000	$20,529	0.37514	0.00608	0.95200	$45	0.24513	$11	$573,266
2090	89	$18,697	1.0481	1.00000	$19,504	0.33522	0.00508	0.95200	$32	0.24032	$8	$573,273
2091	90	$17,685	1.0481	1.00000	$18,447	0.29528	0.00428	0.95200	$22	0.23561	$5	$573,278
2092	91	$16,644	1.0481	1.00000	$17,362	0.25598	0.00362	0.95200	$15	0.23099	$4	$573,282
2093	92	$15,574	1.0481	1.00000	$16,246	0.21788	0.00306	0.95200	$10	0.22646	$2	$573,284
2094	93	$14,476	1.0481	1.00000	$15,100	0.18188	0.00259	0.95200	$7	0.22202	$2	$573,286
2095	94	$13,349	1.0481	1.00000	$13,925	0.14864	0.00220	0.95200	$4	0.21766	$1	$573,287
2096	95	$12,194	1.0481	1.00000	$12,720	0.11876	0.00187	0.95200	$3	0.21340	$1	$573,287
2097	96	$11,010	1.0481	1.00000	$11,485	0.09249	0.00159	0.95200	$2	0.20921	$0	$573,288
2098	97	$9,797	1.0481	1.00000	$10,220	0.07001	0.00145	0.95200	$1	0.20511	$0	$573,288
2099	98	$8,556	1.0481	1.00000	$8,925	0.05154	0.00115	0.95200	$1	0.20109	$0	$573,288
2100	99	$7,286	1.0481	1.00000	$7,600	0.03680	0.00098	0.95200	$0	0.19715	$0	$573,288
2101	100	$5,987	1.0481	0.49863	$3,114	0.02814	0.00084	0.95200	$0	0.19328	$0	$573,288
Values: Jul 3, 2019 to Age 100.00				82.00 years	$2,670,754	64.50 years	30.58 years	29.11 years	$947,859		$573,288	
John Ward Economics		Sum of past and future		82.00 years	$2,670,754	64.50 years	30.58 years	29.11 years	$947,859		$573,288	
				Age 100.00		Age 81.50	Age 48.58	Age 47.11				

able 1. Earning capacity of non-Hispanic white high school diploma women adjusted by involutary death, disability and unemployment to ge 67; discounted with current Treasury yield curve and professional forecast of earnings growth.

Plaintiff name: Jill Plaintiff

Year	End of year age	Earning capacity	Growth	Portion of year	Anticipated earning capacity	Survival probability	Disability probability	Unemployed probability	Expected earning capacity	Discount factor: TIPS	Present value of expected earning capacity	
2019	18	$17,351	1.0431	0.49863	$9,025	0.99992	0.99513	0.97692	$8,773	0.99946	$8,768	$8,768
2020	19	$18,373	1.0505	1.00000	$19,301	0.99965	0.98154	0.92338	$17,487	0.99634	$17,423	$26,191
2021	20	$19,365	1.0444	1.00000	$20,226	0.99928	0.96797	0.91373	$17,876	0.99248	$17,742	$43,933
2022	21	$20,330	1.0361	1.00000	$21,063	0.99887	0.95790	0.91996	$18,541	0.98875	$18,332	$62,265
2023	22	$21,265	1.0327	1.00000	$21,961	0.99842	0.95042	0.92858	$19,351	0.98465	$19,054	$81,318
2024	23	$22,172	1.0317	1.00000	$22,874	0.99794	0.94504	0.93464	$20,162	0.97988	$19,757	$101,075
2025	24	$23,050	1.0343	1.00000	$23,841	0.99743	0.94163	0.93821	$21,008	0.97452	$20,473	$121,548
2026	25	$23,900	1.0403	1.00000	$24,863	0.99688	0.94002	0.94115	$21,928	0.96809	$21,228	$142,777
2027	26	$24,721	1.0491	1.00000	$25,934	0.99629	0.93954	0.94358	$22,906	0.96038	$21,998	$164,775
2028	27	$25,513	1.0599	1.00000	$27,041	0.99567	0.93917	0.94490	$23,893	0.95281	$22,765	$187,540
2029	28	$26,277	1.0712	1.00000	$28,149	0.99500	0.93810	0.94564	$24,846	0.94465	$23,471	$211,011
2030	29	$27,012	1.0823	1.00000	$29,236	0.99429	0.93601	0.94702	$25,767	0.93505	$24,094	$235,105
2031	30	$27,719	1.0925	1.00000	$30,284	0.99354	0.93295	0.94949	$26,653	0.92590	$24,678	$259,782
2032	31	$28,396	1.1018	1.00000	$31,288	0.99274	0.92941	0.95200	$27,482	0.91511	$25,149	$284,932
2033	32	$29,045	1.1105	1.00000	$32,256	0.99188	0.92612	0.95344	$28,251	0.90366	$25,529	$310,461
2034	33	$29,666	1.1194	1.00000	$33,207	0.99097	0.92376	0.95420	$29,006	0.89297	$25,902	$336,362
2035	34	$30,258	1.1275	1.00000	$34,114	0.99003	0.92228	0.95496	$29,746	0.88186	$26,232	$362,594
2036	35	$30,821	1.1347	1.00000	$34,974	0.98904	0.92125	0.95514	$30,437	0.87039	$26,492	$389,086
2037	36	$31,355	1.1418	1.00000	$35,802	0.98799	0.91998	0.95450	$31,062	0.86000	$26,713	$415,799
2038	37	$31,861	1.1483	1.00000	$36,588	0.98689	0.91782	0.95399	$31,616	0.84782	$26,805	$442,603
2039	38	$32,339	1.1543	1.00000	$37,330	0.98572	0.91443	0.95445	$32,115	0.83861	$26,932	$469,536
2040	39	$32,787	1.1602	1.00000	$38,041	0.98448	0.91006	0.95569	$32,572	0.82740	$26,950	$496,486
2041	40	$33,207	1.1662	1.00000	$38,728	0.98315	0.90532	0.95745	$33,003	0.81772	$26,987	$523,473
2042	41	$33,599	1.1725	1.00000	$39,393	0.98172	0.90087	0.95930	$33,421	0.80797	$27,004	$550,477
2043	42	$33,961	1.1792	1.00000	$40,049	0.98018	0.89731	0.96073	$33,841	0.79814	$27,010	$577,487
2044	43	$34,295	1.1864	1.00000	$40,689	0.97853	0.89469	0.96159	$34,254	0.78827	$27,001	$604,488
2045	44	$34,601	1.1938	1.00000	$41,305	0.97675	0.89254	0.96245	$34,657	0.77826	$26,973	$631,461
2046	45	$34,877	1.2010	1.00000	$41,887	0.97484	0.89015	0.96365	$35,026	0.77030	$26,981	$658,441
2047	46	$35,126	1.2085	1.00000	$42,449	0.97279	0.88675	0.96466	$35,324	0.76023	$26,854	$685,295
2048	47	$35,345	1.2164	1.00000	$42,994	0.97059	0.88186	0.96501	$35,513	0.75232	$26,717	$712,012
2049	48	$35,536	1.2237	1.00000	$43,485	0.96819	0.87501	0.96469	$35,539	0.74219	$26,376	$738,389
2050	49	$35,698	1.2303	1.00000	$43,919	0.96554	0.86649	0.96445	$35,438	0.73261	$25,962	$764,351
2051	50	$35,832	1.2369	1.00000	$44,321	0.96263	0.85744	0.96499	$35,302	0.72299	$25,523	$789,874
2052	51	$35,936	1.2436	1.00000	$44,691	0.95947	0.84952	0.96607	$35,191	0.71572	$25,187	$815,061
2053	52	$36,013	1.2503	1.00000	$45,028	0.95602	0.84389	0.96688	$35,124	0.70612	$24,802	$839,863
2054	53	$36,060	1.2571	1.00000	$45,331	0.95232	0.84050	0.96727	$35,097	0.69649	$24,444	$864,307
2055	54	$36,079	1.2639	1.00000	$45,600	0.94834	0.83823	0.96806	$35,091	0.68933	$24,189	$888,496
2056	55	$36,070	1.2707	1.00000	$45,833	0.94408	0.83603	0.96950	$35,072	0.67978	$23,841	$912,337
2057	56	$36,031	1.2776	1.00000	$46,032	0.93948	0.83345	0.97097	$34,997	0.67270	$23,542	$935,880
2058	57	$35,964	1.2845	1.00000	$46,195	0.93457	0.83057	0.97197	$34,852	0.66317	$23,113	$958,993
2059	58	$35,869	1.2914	1.00000	$46,321	0.92935	0.82749	0.97299	$34,660	0.65622	$22,745	$981,737
2060	59	$35,744	1.2984	1.00000	$46,409	0.92386	0.82459	0.97478	$34,463	0.64673	$22,288	$1,004,025
2061	60	$35,591	1.3054	1.00000	$46,460	0.91804	0.82239	0.97741	$34,285	0.63988	$21,938	$1,025,963
2062	61	$35,410	1.3124	1.00000	$46,473	0.91192	0.82164	0.98035	$34,137	0.63041	$21,520	$1,047,483
2063	62	$35,200	1.3195	1.00000	$46,447	0.90545	0.82314	0.98288	$34,025	0.62369	$21,221	$1,068,704
2064	63	$34,961	1.3266	1.00000	$46,380	0.89857	0.82694	0.98482	$33,940	0.61706	$20,943	$1,089,647
2065	64	$34,693	1.3338	1.00000	$46,274	0.89114	0.83245	0.98638	$33,860	0.60767	$20,576	$1,110,223
2066	65	$34,397	1.3410	1.00000	$46,127	0.88316	0.83810	0.98782	$33,726	0.60114	$20,274	$1,130,497
2067	66	$34,072	1.3483	1.00000	$45,938	0.87458	0.84188	0.98938	$33,465	0.59467	$19,900	$1,150,398
2068	67	$33,719	1.3537	0.49863	$22,760	0.86776	0.84266	0.99055	$16,486	0.58846	$9,701	$1,160,099
iture: Jul 2, 2019 to Age 67.00				49.00 years	$1,834,912	47.28 years	42.19 years	40.42 years	$1,491,264		**$1,160,099**	
John Ward Economics		Sum of past and future		49.00 years Age 67.00	$1,834,912	47.28 years Age 65.28	42.19 years Age 60.20	40.42 years Age 58.43	$1,491,264		**$1,160,099**	