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A Comment on “Employee Tenure and Economic Losses in Wrongful Termination Cases”

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Abstract

In the April 2013 issue of the *Journal of Forensic Economics*, Charles L. Baum II develops a model to estimate the annual probability of a worker remaining with a particular employer and applies his results to estimates of economic losses resulting from wrongful termination. Baum’s adjustment for job survival is based only on forecast experience in the job held at the time of the termination. This method seems inconsistent with Baum’s own findings that early years in any job are associated with much higher hazard rates. In this comment we apply Baum’s survival coefficients in a model that incorporates the probability of termination and survival in both the original job and the replacement job.

In a recent *Journal of Forensic Economics* (April 2013) Charles L. Baum calculates the annual probability of employment termination (the “hazard rate”) for workers with various personal characteristics of age, gender, education, etc. Under given economic conditions (as measured by the unemployment rate) Baum finds that hazard rates are higher for younger workers and for those of lower education and earnings. Baum also finds that the hazard rate declines rapidly as job tenure increases. Baum’s figures (shown in his Table 4) suggest, for example, that for a 25-year-old female¹ the probability of job separation might fall from 49.1% during the first year of employment to 33.4% in the second year and 27.8% in the third. After 15 years the probability of separation during a single year is only 5.8%.

Baum’s hazard rate can be used to estimate the “survival” probability of a worker within a job. In Baum’s notation, with a hazard rate of λ_t during year t of tenure,² the probability of remaining in a given job from year 1 out to time T is $\prod_{t=1}^T (1 - \lambda_t)$. This is analogous to the survival rate in a life table given death rates at various ages.

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¹With 12 years of education earning \$20 per hour in an office and administrative support job in a market with an unemployment rate of 8.3%.

²Baum’s definition of tenure is not entirely clear. Based on his discussion of hazard rates we have assumed that under Baum’s definition an individual with x years of tenure has completed $x-1$ years of work in the job and is within his or her x^{th} year of tenure.

Baum's Table 4 also shows survival rates for a typical employee. The probability of job survival declines rapidly during early years with an employer, but then flattens out.

Baum's paper raises some interesting issues about the valuation of economic loss from wrongful terminations. The hazard rates calculated by Baum take into account any job separation, including both firings and quits, and thus do not imply that either the worker or the employer is "at fault." His model does not explore the reasons for separation; presumably the probability of separation is high during early years of a job both because the employer is gaining information about the worker and because the worker is gaining information about the job and the employer. A termination that results from some exogenous factor such as malice, incompetence, or bad planning results in a loss of this information and thus produces an economic loss.

A termination might also result from a tort such as an automobile accident that forces the victim to give up a long-held job, either because he/she is rendered temporarily incapable of fulfilling job duties and must be replaced, or because the victim is rendered physically incapable of doing a particular job, though not barred from similar employment perhaps paying as much. The loss from the termination itself, i.e. from the loss of the particular job, must be added to the loss of capacity to work in a particular occupation. Both of these losses are additional to any temporary loss of work time during recovery.

In principle, the economic loss suffered by a wrongfully terminated worker can be viewed as the difference between the present value of the stream of income benefits from employment the worker will now experience and the present value of the stream of income the worker would have enjoyed absent the wrongful termination. In practice, the loss can be approximated in several ways. In his recent paper Baum suggests that the usual method has been as follows (the short title is mine):

Traditional Method: Compare the present values of the streams of future annual earnings of the individual in the original and replacement jobs as if both jobs will be held with certainty (except for mortality) over some time horizon.

Baum suggests it is unrealistic to ignore the possibility of termination from the original job, and suggests the following alternative:

Baum's Method: Compare the present values of the streams of future annual earnings of the individual in the original and replacement jobs during the period the individual is expected to survive in employment in the original job. The probability of a worker staying in the original job to any point in time is estimated using the hazard rates.

In Tables 5 and 6 Baum has provided comparative estimates of the loss to a wrongfully terminated employee under the two methods. He has assumed a white female earning \$40,000 per year (\$20.00 per hour) born on January 1, 1960 with 5 years of tenure³ in her office and administration job before being

³We have assumed the individual completes her 5th year of tenure on December 31, 2009 and begins her 6th year of tenure on January 1, 2010.

terminated by her employer on January 1, 2010. Baum further assumes the individual found another job 1 year after her termination earning \$35,000 per year (\$17.50 per hour). Earnings are assumed to increase at a rate of 5% per year in both the initial and the alternative employment. Baum uses a discount rate of 3% and a valuation date of January 1, 2013. Baum indicates that the estimated loss incorporates the probability of surviving to age 67 (the individual's Social Security normal retirement), but the loss estimates he presents actually incorporate the probability of survival up to the day before the individual's 68th birthday.

In his Table 5 Baum has estimated the loss to the wrongfully terminated employee described above under the *Traditional Method* to be \$182,186. We could not reproduce Baum's mortality estimate (which shows a 50-year-old female has a 97.7% chance of surviving to age 68). Allowing for the possible mortality during the period based on average mortality data for white females in the United States⁴ we estimate that the female actually has only a 90.1% chance of surviving to age 68. Using this estimate for the survival rate we estimate the individual's loss under the *Traditional Method* (using Baum's assumptions) to be approximately \$177,621 (see Table 1). This is less than the estimate presented by Baum because of our correction to the mortality rate.

Using his method, Baum's Table 6 estimates the loss to a wrongfully terminated employee with 5 years of tenure to be \$101,352. When we attempted to replicate the employment survival rates presented in Column 6 of Baum's Table 6 using the regression coefficients from Baum's Table 3 we produced lower estimates than those presented by Baum. Our estimates⁵ of the employment survival rate show only a 25.0% chance of remaining in the original employment through 2027 whereas Baum estimates a 31.3% chance of remaining in that employment. Using the correct job survival figures based on Baum's regression coefficients, and also incorporating our estimates for the life survival rate, our estimate of this loss is approximately \$87,429 (see Table 2).

Baum's comparison of the loss under the two methods is done under simplified assumptions:

1. The wrongfully terminated employee's earnings level will never return to its original path⁶ but will remain at exactly 83% (in the example he

⁴United States Department of Health and Human Services in "National Vital Statistics Reports, United States Life Tables, 2006".

⁵It is unclear whether the individual described by Baum on pages 54 and 55 is in her 5th year of tenure or her 6th year of tenure during the period between January 1, 2010 and December 31, 2010. We have assumed that in 2010 the individual is in her 6th year of tenure. This seems consistent with Baum's assumption that the individual had 5 years of tenure before being terminated, that is the individual had completed 5 years with the employer and was about to enter her 6th year. We have also performed calculations of the employment survival rate using both alternatives and the employment survival rates we produced assuming an individual beginning her 6th year of tenure on January 1, 2010 are closer to the employment survival rates presented in Baum's Table 6 than are our estimates assuming an individual in her 5th year of tenure.

⁶The relative impacts of experience in an occupation, tenure in a specific job, and age on employment earnings is the subject of a large literature that attempts to distinguish these factors from the impact of selection and job search. Our review of the literature in this area suggests it is

uses) of her original earnings level for the remainder of her career;⁷ and

2. The terminated employee will suffer from a full year of unemployment initially but in the future (at least for the purposes of the loss estimate) her probability of becoming unemployed will be the same in the original and replacement jobs.

The effect of these two assumptions is that under the *Traditional Method* the estimated loss from termination will be equal to the difference in the discounted earning streams (for the individual's career or over some shorter time horizon) that results from the terminated employee's lesser seniority in the new job (which in this case is 17% of the original earning stream) plus the total loss of earnings during the initial period of job search (which in this case is one year of earnings). Under *Baum's Method* the loss is equal to this same amount, except that each year's loss is multiplied by the probability of survival in the original job during that year.

While Baum's analysis of the loss takes survival in the *original* job into account, arguing that it should not be assumed that the worker would have remained in the employment from which she was wrongfully terminated, it does not take into account the individual's survival in the *replacement* job. This method seems inconsistent with Baum's own finding that early years in any job carry much higher hazard rates, so that the chance of maintaining the new job through any given period of years is much lower than that of retaining the original job with (in Baum's example) 5 years of seniority. This means that the individual's employment experience in future years is likely to be less favourable as a result of termination.

This suggests the following option.

Job-Specific Survival Method: Compare the earnings of the individual in the original job, taking into account the probability of survival in that job, against earnings in the replacement job, taking into account the probability of survival in the replacement job. That is, instead of weighting each earnings stream by the probability of remaining in the original job (as in *Baum's Method*), weight each earnings stream by the probability of retaining the job associated with that earnings stream.

unrealistic to assume earnings never recover from a termination. For example, Altonji and Shakotko (1987) suggest that the impact of tenure on wage earnings is much less than the impact of general labor market experience, and that much of the observed correlation between earnings and job tenure result from the different characteristics of workers—that is, higher tenures are likely to be associated with higher earnings, but it is the worker characteristics that are associated with longer tenures that are the cause of those higher earnings. They suggest that that job tenure accounts for wage growth of about 6.6% over the first 10 years of tenure, with much of that increase occurring in the first year. In a more recent paper Altonji and Williams (1998) estimate the effect of tenure on wage growth at between 7 and 14% over the first 10 years of employment. Naturally, other studies have produced different estimates.

⁷The sample calculations presented in Baum's paper assume that individual will not work past age 68. We have maintained this assumption in our sample calculations.

The relationship among these methods can be represented if we define the hazard rate in the original employment as $\lambda_{o,n}$ and the earnings in the original employment $y_{o,n}$ for the individual as functions based on the individual's characteristics in that job (e.g., wage rate, age at the reference date, etc) in year n of job tenure. In the same way, we define $\lambda_{a,n}$, the hazard rate in the alternative employment, and $y_{a,n}$, the earnings in the alternative employment. In this case, the loss t years in the future to an individual who is terminated today in year c of job tenure but who found a new job immediately and has remained in it is $y_{o,c+t} - y_{a,t}$. The traditional model evaluates the loss as the discounted sum of these annual amounts out to some terminal date.⁸

Baum's model adjusts the loss by the probability of survival in the original job. In this case the hazard rate for an individual in the original employment t years in the future, if she is in year c of tenure today, is $\lambda_{o,t+c}$; and the corresponding annual loss t years in the future if the individual is terminated today is $(y_{o,c+t} - y_{a,t}) \prod_{i=1}^t (1 - \lambda_{o,i+c})$.

The annual loss under the *Job-Specific Survival Method* in year t can be expressed as $y_{o,c+t} \prod_{i=1}^t (1 - \lambda_{o,i+c}) - y_{a,t} \prod_{i=1}^t (1 - \lambda_{a,i})$.

The total loss from termination to any given year in the future can be calculated as the present value, discounted for time and mortality, of the stream of annual losses.

We estimate the loss under the *Job-Specific Survival Method* based on Baum's assumptions regarding the individual, the economy, and the discount rate to be \$265,063 (see Table 3). This is larger than the loss under either *Baum's Method* or the *Traditional Method*, because the survival rate in the replacement job will be less than that in the original job. That is, where *Baum's Method* and the *Traditional Method* value lost earnings assuming the individual's future probability of employment is not affected by the termination, the *Job-Specific Survival Method* values lost earnings assuming that the individual is less likely be employed in any given future period as a result of the termination.

⁸In this simple formulation the time taken to find a new job is reflected in the earnings in year 1. Under Baum's assumptions as outlined above $y_{a1} = 0$.

Table 1
Economic Losses from Wrongful Employment Termination Without Adjustments for the
Probability of Continued Employment (*Traditional Method*)

1	2	3	4	5	6	7
Year	Age	Original Compensation	Alternative Compensation	Survival Rate	Adjusted Loss	Present Value of Loss
Pre-Trial						
2010	50	40,000.00	0.00	N/A	40,000.00	40,000.00
2011	51	42,000.00	35,000.00	N/A	7,000.00	7,000.00
2012	52	44,100.00	36,750.00	N/A	7,350.00	7,350.00
Post-Trial						
2013	53	46,305.00	38,587.50	0.998	7,702.99	7,478.64
2014	54	48,620.25	40,516.88	0.994	8,056.53	7,594.05
2015	55	51,051.26	42,542.72	0.990	8,423.61	7,708.80
2016	56	53,603.83	44,669.85	0.986	8,804.48	7,822.67
2017	57	56,284.02	46,903.35	0.981	9,199.17	7,935.29
2018	58	59,098.22	49,248.51	0.975	9,607.38	8,046.03
2019	59	62,053.13	51,710.94	0.970	10,028.46	8,154.05
2020	60	65,155.79	54,296.49	0.963	10,461.33	8,258.27
2021	61	68,413.57	57,011.31	0.956	10,904.86	8,357.66
2022	62	71,834.25	59,861.88	0.949	11,358.07	8,451.47
2023	63	75,425.97	62,854.97	0.940	11,820.81	8,539.61
2024	64	79,197.26	65,997.72	0.931	12,293.37	8,622.32
2025	65	83,157.13	69,297.61	0.922	12,775.31	8,699.37
2026	66	87,314.98	72,762.49	0.912	13,265.45	8,770.02
2027	67	91,680.73	76,400.61	0.901	13,761.88	8,833.22

Total losses are \$177,621.49. Calculations are for a 50-year-old female. The individual is assumed to have been earning \$20.00 per hour in 2010 in the absence of the termination and earning \$17.50 per hour in 2011 as a result of the termination.

Table 2
Economic Losses from Wrongful Employment Termination With Adjustments for the
Probability of Continued Employment (*Baum's Method*)

1	2	3	4	5	6	7	8
Year	Age	Original Compensation	Alternative Compensation	Life Survival Rate	Employment Survival Rate	Survival Adjusted Loss	Present Value of Loss
Pre-Trial							
2010	50	40,000.00	0.00	N/A	0.834	33,353.10	33,353.10
2011	51	42,000.00	35,000.00	N/A	0.722	5,051.24	5,051.24
2012	52	44,100.00	36,750.00	N/A	0.638	4,692.89	4,692.89
Post-Trial							
2013	53	46,305.00	38,587.50	0.998	0.582	4,480.02	4,349.53
2014	54	48,620.25	40,516.88	0.994	0.523	4,210.73	3,969.01
2015	55	51,051.26	42,542.72	0.990	0.474	3,989.56	3,651.01
2016	56	53,603.83	44,669.85	0.986	0.431	3,797.03	3,373.61
2017	57	56,284.02	46,903.35	0.981	0.400	3,683.99	3,177.85
2018	58	59,098.22	49,248.51	0.975	0.375	3,606.16	3,020.10
2019	59	62,053.13	51,710.94	0.970	0.356	3,567.79	2,900.94
2020	60	65,155.79	54,296.49	0.963	0.339	3,545.93	2,799.19
2021	61	68,413.57	57,011.31	0.956	0.327	3,567.11	2,733.89
2022	62	71,834.25	59,861.88	0.949	0.309	3,511.93	2,613.21
2023	63	75,425.97	62,854.97	0.940	0.292	3,453.47	2,494.86
2024	64	79,197.26	65,997.72	0.931	0.280	3,447.74	2,418.18
2025	65	83,157.13	69,297.61	0.922	0.270	3,444.03	2,345.22
2026	66	87,314.98	72,762.49	0.912	0.259	3,442.19	2,275.69
2027	67	91,680.73	76,400.61	0.901	0.250	3,441.91	2,209.23

Total losses are \$87,428.75. Calculations are for a 50-year-old female working in the office and administration support occupation with 12 years of education with an 8.3% unemployment rate. The individual is assumed to have been entering their 6th year of tenure earning \$20.00 per hour in 2010 in the absence of the termination and entering their first year of tenure earning \$17.50 per hour in 2011 as a result of the termination. Regression results from Baum's Table 3 with NLSY data.

Table 3
 Economic Losses from Wrongful Employment Termination With Adjustments for the Probability of Continued Employment in both the Original and Alternative Employment (*Job-Specific Survival Method*)

1	2	3	4	5	6	7	8	9
Year	Age	Original Compensation	Original Employment Survival Rate	Alternative Compensation	Alternative Employment Survival Rate	Life Survival Rate	Survival Adjusted Loss	Present Value of Loss
Pre-Trial								
2010	50	40,000.00	0.834	0.00	0.000	N/A	33,353.10	33,353.10
2011	51	42,000.00	0.722	35,000.00	0.506	N/A	12,601.82	12,601.82
2012	52	44,100.00	0.638	36,750.00	0.337	N/A	15,762.46	15,762.46
Post-Trial								
2013	53	46,305.00	0.582	38,587.50	0.245	0.998	17,455.55	16,947.14
2014	54	48,620.25	0.523	40,516.88	0.193	0.994	17,509.37	16,504.26
2015	55	51,051.26	0.474	42,542.72	0.157	0.990	17,315.93	15,846.53
2016	56	53,603.83	0.431	44,669.85	0.132	0.986	16,973.88	15,081.07
2017	57	56,284.02	0.400	46,903.35	0.115	0.981	16,823.02	14,511.69
2018	58	59,098.22	0.375	49,248.51	0.102	0.975	16,732.78	14,013.44
2019	59	62,053.13	0.356	51,710.94	0.093	0.970	16,725.05	13,599.00
2020	60	65,155.79	0.339	54,296.49	0.084	0.963	16,865.72	13,313.95
2021	61	68,413.57	0.327	57,011.31	0.077	0.956	17,217.70	13,195.94
2022	62	71,834.25	0.309	59,861.88	0.070	0.949	17,084.04	12,712.13
2023	63	75,425.97	0.292	62,854.97	0.065	0.940	16,852.08	12,174.30
2024	64	79,197.26	0.280	65,997.72	0.062	0.931	16,901.90	11,854.65
2025	65	83,157.13	0.270	69,297.61	0.059	0.922	16,924.85	11,525.00
2026	66	87,314.98	0.259	72,762.49	0.056	0.912	16,942.80	11,201.19
2027	67	91,680.73	0.250	76,400.61	0.054	0.901	16,928.27	10,865.61

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