Demonstrating Failure To Discharge Plaintiff's Duty To Mitigate In A Wrongful Termination Case: An Empirical Approach

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ABSTRACT

In a wrongful termination case, the defendant has the burden of proving that the plaintiff did not adequately discharge his or her duty to mitigate damages. The defendant may satisfy its burden by proving that the claimant failed to exercise "reasonable care and diligence" in seeking a job; and it must do so by a preponderance of the evidence. On the other hand, the amount of any award turns on the difference between the plaintiff's pre- and post-termination earnings. Thus, there is a conflict between the potential increased damages award made possible by remaining jobless and the legal duty to mitigate. It is reasonable to assume that a plaintiff may perceive an incentive to stay out of the workforce to enhance the damage award.

In this paper we empirically establish the expected joblessness duration period for a plaintiff's population cohort in a wrongful termination lawsuit; we also calculated the estimated duration period's associated standard error. To illustrate the procedure we discuss a hypothetical case study and use uncensored data on joblessness duration from the Bureau of Labor Statistics' Displaced Workers Survey.

This process enables us structure a hypothesis test examining whether the plaintiff's period of joblessness is statistically significantly different from the predicted test statistic in a manner consistent with case law. Succinctly, we are able to empirically assess the soundness of the duration of a plaintiff's job search and thereby enhance the robustness of present-day approaches.

INTRODUCTION

*I*n wrongful termination cases, the law obliges a plaintiff to find a comparable job and mitigate losses as much as possible.[1] It is a defendant's burden to demonstrate that plaintiff has not adequately discharged his or her duty to mitigate.[2] Defendant may satisfy its burden by showing that claimant failed to exercise "reasonable care and diligence," and it must do so by a preponderance of the evidence.[3]

Because the amount of any award turns on the difference between plaintiff's pre- and post-termination earnings there is a conflict between the potential increased damages award made possible by remaining unemployed and the legal duty to mitigate. Thus, all else being equal, it is reasonable to assume that a plaintiff may perceive an incentive to stay out of the workforce to enhance the damage award. Put differently, but for the litigation, there is no

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[1] Gonzalez, Richard J., "Satisfying the Duty to Mitigate in Employment Cases: A Survey and Guide," *Mississippi Law Journal*, Volume 69 (Winter 1999) 749, provides and excellent overview of the law regarding mitigation of damages.
[2] Sheehan v. Donlen Corp.,173 F 3d 1039, 1048 (7th Circuit); NRLB v. Thalbo Corp., 171 F. 3d 102, 112 (2d Cir. 1999).
[3] See, Rodriguez v. Taylor, 569 F. 2d 1231, 1243 (3rd Cir. 1977).

reason to expect plaintiff would behave any differently from a comparable cohort group. Therefore, there is no reason to suspect that plaintiff's observed period of joblessness would differ significantly from those of his cohort group.

Of course, discrimination may impart particular psychological and emotional difficulties on individuals that are not found among a comparable group of workers displaced as a result of reasons other than discrimination. These are limitations of the model that cannot be circumvented in a legal proceeding without additional evidence.

Our objective in this paper is necessarily narrow. Specifically, we calculate empirically the expected range of joblessness duration for a carefully constructed plaintiff cohort group using a publicly available dataset. This range allows an empirical assessment of the soundness of the duration of plaintiff's search. Specifically, it allows one to determine if the difference between the observed length of plaintiff's joblessness and the length derived from a model of plaintiff's cohorts is statistically significant; thereby providing a more robust basis to address the rebuttable presumption.

To obtain the test statistic – the model-derived length of observed joblessness – we use a multivariate regression approach on uncensored unemployment duration data from the Current Population Survey[4]. We provide a hypothetical case study to illustrate the methods.

The paper is organized as follows. The following section discusses the problem we confront and provides background on the economics literature. We are not aware of any direct attempts at empirically rebutting the duty to mitigate. However, there is considerable literature on related empirical approaches to employment discrimination topics. In the third section we provide the theoretical background justifying why we expect that a litigation process alters plaintiff's structure of incentives, encouraging a lengthier period of joblessness. The fourth section contains our empirical work and results. Section five discusses relevant case law, demonstrating that the proposed test here is consistent with past decisions relying on statistical testing. The last section concludes and discusses the limitations of the analysis.

DEMONSTRATING PLAINTIFF'S DUTY TO MITIGATE

If defendant prevails, the law allows deductions from any backpay awards of any monies plaintiff should have earned but for the wrongful termination.[5] If plaintiff is believed to have been remiss in securing comparable post-termination employment, the law allows for a salary imputation; the level and length of the imputed salary becomes the relevant question.[6]   Enhanced robustness of the methodology used to appraise employment discrimination awards is an ongoing concern of Forensic Economists. Recent work by White, Tranfa-Abboud, & Holt,[7] and Trout[8] address the need and relevance of attrition rates for economics loss calculations in employment discrimination models. Macpherson and Piette provide empirical evidence on the extent to which involuntarily terminated employees are able to close the earnings gap between pre and post termination salary levels.[9] However, to our knowledge the process underscoring plaintiff's duty to mitigate has not been empirically examined.

When embarking on demonstrating that plaintiff has not discharged his duty to mitigate, defendant's counsel typically offers to the court the testimony of a professional "head-hunter," vocational expert or an industrial

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[4] The general web site is www.bls.census.gov/cps. See, Kurt V. Krueger, "Calculate Labor Force Participation Tables Using CPS Microdata," *Litigation Economics Review*, Volume 5, Number 2 (2002), for an excellent introduction to the current population survey data.

[5] 42 U.S.C. § 2000e-5(g)(1)(1994)

[6] The same consideration may extend to determination of front-pay awards as well.

[7] White, Paul F., Josefina V. Tranfa-Abboud, and Frederick M. Holt., "The Use of Attrition Rates for Economic Loss Calculations in Employment Discrimination Cases: A Hypothetical Case Study," *Journal of Forensic Economics*, Volume 16, Number 2 (2003) 209-223.

[8] Trout, Robert R., "Duration of Employment: Updated Analysis," Journal of Forensic Economics, *Journal of Forensic Economics*, Volume 16, Number 2 (2003) 201-207. [updating work set out in Robert R. Trout, "Duration of Employment in Wrongful Termination Cases," *Journal of Forensic Economics*, Volume 8, Number 2 (1995) 167-177.] See, also Melvin Hughes., "Duration of Employment in Employment Discrimination Cases," *Journal of Forensic Economics*, Volume 10, Number 1 (1997) 73-75; Tyler J. Bowles, "Wrongful discharge: The time horizon of future damages and the economic basis for damages," *Journal of Legal Economics*, Volume 4, Number 1 (1994) pp. 75–82.

[9] Macpherson, David A. and Michael J. Piette, "Do Terminated Employees Catch Up? Evidence from the Displaced Workers Survey," *Journal of Forensic Economics*, Volume 16, Number 2 (2003) pp. 189-199.

psychologist. These experts opine on the job search process or on conditions of the relevant job market(s). Although the job search process is not rigidly defined there is a general framework that job placement specialists increasingly follow. To some commentators that framework may constitute a baseline or standard that may facilitate the assessment of whether a plaintiff has conducted a "reasonable and effective" job search.[10]

Testimony on job market conditions implicitly, albeit indirectly, alludes to plaintiff's employment prospects. Although such testimony offers the trier-of-fact a subjective assessment of unemployment duration, unassisted by unemployment duration statistics a job placement expert's opinion is sufficiently general that it often renders the expert's contribution highly susceptible to effective cross-examination.

A placement expert's opinions derive from their close understanding of the operational dynamics of labor markets. Many employment search experts point to unemployment duration estimates published by the U.S. Department of Labor and state agencies as basis for their testimony.[11] The Displaced Worker Survey, for example, contains data on time elapsed between jobs from national population surveys, typically parsed by any number of geographic, demographic and socio-economic variables. The Displaced Worker Survey provides information for people who found jobs as presented for select variables below.

Table 1: Univariate Results for Unemployment Duration

Variable	Age Category	Obs	Median Unemp Duration	[95% Conf. Interval]	Mean Unemp Duration	[95% Conf. Interval]
Age	[15,30]	122	6	(5,8)	11.7	(8.3,15.0)
	[30,43]	61	8	(6,12)	11	(11.0,22.4)
	[43,57]	53	13	(9,16)	15.8	(15.8,31.2)
	[57,90]	12	12	(6,26)	6.7	(6.7,25.6)
Region	Northeast	77	12	(8,15)	20.7	(14.9,26.4)
	Other	171	7	(6,8)	13.4	(10.4,16.4)
Class of Job	Private Sector	43	12	(8,16)	19.1	(12.9,25.4)
	Other	3	12	(8, .)	18.6	(-17.0,54.4)
Married	Yes	77	8	(6,10)	14	(14.0,18.2)
	No	171	8	(6,9)	16.4	(12.8, 19.9)
Race	White	188	8	(6,8)	14.2	(13.5,27.3)
	Other	60	9	(8,13)	20.4	(11.2,17.1)
Sex	Male	131	8	(6,9)	15.5	(11.7,19.3)
	Other	101	8	(6,11)	15.8	(11.7,20.0)

Thus, an expert would testify to the duration of joblessness for a particular characteristic of plaintiff from the variables arrayed above; these can be combined often for two variables in categorical style data tables. These independently gathered statistics may impart an increased degree of robustness to an expert's testimony. For example, if plaintiff is a white male in one of the northeastern states, an employment expert may obtain and present to the court data published by the Bureau of Labor Statistics showing the median or average duration of joblessness for white males in the Northeast and contrast that statistic to the duration of plaintiff's search.

But univariate or bivariate statistics alone will match the precise facts of the terminated employee only by coincidence. No attempt is made to determine whether the observed difference between the proffered duration statistic and plaintiff's duration is statistically significantly.

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[10] Diamond, Charles and Damon Montal, "Wrongful Termination, Damage Period Length and Mitigation," *NYSBA L&E Newsletter*, Volume 30, Number 1 (Spring/Summer 2005), 15-18 […explaining a job process methodology and recommending it serve as a standard against which to evaluate plaintiff's job search process and presumably, elicit an assessment of reasonableness.]

[11] See, for example, Robert Male & David C. Toppino, "Economic Foundations for Employment Case Analysis," *Journal of Legal Economics*, Volume 11, Number 3 (Winter 2001-02) ["It is possible to make this type of comparison using data sets that provide mean, or percentile, earnings rates years of experience or skill level."] at 10.

As a result, plaintiff's counsel can easily challenge the applicability of defense's statistic alleging that the case under litigation contains sufficient particularities and idiosyncracies. For example, opposing counsel may reveal that plaintiff is married, which may be a variable whose influence is not explicit accounted for in the duration-of-joblessness statistic selected by the expert, and thereby render plaintiff sufficiently distinct from the norm represented by the expert's statistic. By design, employment data describe the average experiences of job seekers whereas plaintiffs typically are claiming unusual circumstances.

Multivariate models incorporating relevant covariates are capable of incorporating many of the important elements that allow the expert to "particularize" to some degree the proffered statistic and thereby mitigate the argument that the univariate or bivariate unemployment duration is too broad. Multivariate regression models are well established in employment case law.[12] The courts may have indirectly facilitated the use of multivariate regression by requiring that the fact finder evaluate the reasonableness of plaintiff's search "in light of the individual characteristics of the claimant and the job market."[13]

To the extent that the differential between plaintiff's joblessness duration and those of his cohort group extends beyond two standard deviations we argue that this is consistent with the law's understanding of significance as applied originally in Castaneda v. Partida.[14] Because the objective is to document that plaintiff's search is unreasonable, statistical evidence supporting such a showing may impeach the witness, which may have the effect of shifting the burden of proof – leading ultimately to the imputation of back wages and an adjustment of backpay awards.

The argument has limitations, needless to say. On the one hand, a model cannot be perfect, only better than an alternative model. In this case, the alternative model is the heuristic one favored by headhunters and other job search professionals. Available data will reproduce the particulars of a plaintiff imperfectly. On the other hand, the legal argument turns on the weight allowed statistical reasoning in court proceedings.

ON MODELING DURATION OF JOBLESSNESS

What are the expected effects of litigation windfall on a plaintiff's decision to return to work? The point of departure is Mortensen's basic job search model with endogenous search effort.[15] Given a particular search intensity s, the individual will receive job offers according to some rate lambda λ, where the arrivals are directly and positively increasing with search intensity; that is lambda is increasing in s, $\lambda = \varphi(s)$. The individual is able to choose the intensity of the job search, s. Offers are random drawings from a wage offer distribution $F(w)$. Every time an offer arrives the decision has to be made whether to accept it or reject it and search further. Once a job is accepted, it will be held forever at the same wage. During unemployment, a flow of benefits b is received, and a flow of search costs has to be paid; search costs also increase with increases in search intensity; $c(s)$.

The individual maximizes the expected present value of income over an infinite horizon, with discount rate r. It is well known that in this model the optimal strategy of unemployed individuals can be characterized by a reservation wage f and an optimal search intensity s.

Consider an unemployed individual, party to a wrongful termination lawsuit, who allegedly searches for a job while litigation proceeds; the prospect of prevailing in a discrimination lawsuit or favorably settling the matter increases unemployed plaintiff's reservation wage. Specifically, a large anticipated award or a significantly high probability of prevailing in court, directly impacts an individuals reservation wage. As an individual's reservation wage increases, the range of acceptable wage offers shrinks to the upper part of the offered wage distribution. As a

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[12] See, Julie Lee and Caitlin Liu, "Measuring Discrimination in the Workplace: Strategies for Lawyers and Policymakers," *The University of Chicago Law School Roundtable*, Volume 6 (1999) 195.

[13] Rasimas v. Michigan Department of Mental Health, 714 F.2d 614, 624 (6th Cir.1983); Sellers v. Delgado College,902 F. 2nd 1189, 1193 (5th Cir. 1990); James L. Hughes et al., Backpay in Employment Discrimination Cases, 35 Vand. L. Rev. 893, 1018 (1982).

[14] 430 U.S. 482 (1977).

[15] Mortensen, Dale T., "Job search and labor market analysis," in *Handbook of Labor Economics,* Vol. 2, Orley Ashenfelter and Richard Layard, Eds. (Amsterdam: North-Holland, 1986); see, also, T.J. Devine and N.M. Kiefer., *Empirical Labor Economics: The Search Approach* (New York: Oxford University Press, 1991).

consequence, the duration of unemployment is likely to increase. On the other hand, the lengthier the joblessness spell, the higher the costs to the individual including the disutility of being party to an unpleasant adversarial process. Increased cost reduces the incentives of a plaintiff to remain out of the workforce and increases the probability of exit. Thus, the net effect of the competing incentives on the optimal level of search is unknown ex ante but depend heavily on the likelihood of prevailing in court and the magnitude of the prospective award.

Throughout the 1960's, 1970's and 1980's, in what has come to be known as wrongful discharge laws, Federal law imposed limitations upon employers' hiring and firing practices;[16] states followed. The results carved out exemptions to the historical common law doctrine of employment-at-will that allowed termination of the employment relationship at any time, by either party. Wrongful discharge laws created a cause of action enabling terminated employees the right to sue employers for wrongful discharge under certain circumstances, even though the employment was otherwise at-will.

Various commentators have examined the relationship between wrongful termination laws and the labor force. Dertouzos and Karoly[17] examined aggregate state-level data from 1980 to 1987 and found the adoption of wrongful discharge laws resulted in reduction in employment levels; Morris found similar results.[18] Autor, Donohue and Schwab[19] confirm the disemployment effects of wrongful discharge laws.[20]

Results of empirical examinations of the effects suggest that the laws increased the duration of unemployment spells. Accordingly, all else being equal, it is reasonable to assume that the optimal level of search for a litigating plaintiff is greater than the optimal search of an individual lacking the prospects of litigation award that would provide compensation during a period of unemployment.

Thus, the empirical determination of length-of-joblessness for an individual that shares similar demographic and socio-economic characteristics of the plaintiff serves as a lower limit on the expected duration of a plaintiff's reasonable search as required by the legal duty to mitigate.

To facilitate the exposition of the three approaches proposed here we rely on the following hypothetical example.

Case Study: *A 43 year-old white male was allegedly wrongfully terminated and has sued for redress. The job was a white collar, job in the Northeastern part of the United States. Plaintiff is married and has no children. Plaintiff has been out of work for 97 weeks and claims that he has searched extensively but to no avail. In addition, he has been unable to obtain temporary work. As proof of the reasonableness of the search he has kept a log of interviews and applications.*

Thus, the objective is to obtain a measure of joblessness duration for a group that resembles plaintiff and test to see whether plaintiff's period of joblessness is statistically significantly different from the calculated statistic. Consistent with case law, the difference will be considered statistically significant if it differs by at least two standard deviations.

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[16] The most well known are the National Labor Relations Act (1935), the Civil Rights Act (1964), the Age Discrimination in Employment Act (1967) and the American with Disabilities Act (1990).

[17] Dertouzos, James N. and Lynn A. Karoly, *Labor Market Responses to Employer Liability* (Santa Monica, CA: Rand, Institute for Civil Justice, 1992).

[18] But see Thomas J. Miles, "Common Law Exceptions to Employment at Will and U.S. Labor Markets," *Journal of Law, Economics, and Organizations*, Volume 16, Number 1 (April 2000) pp. 74-101 [finding that wrongful discharge laws had no significant effects on total unemployment and unemployment rates.]

[19] Autor, David, John J. Donohue III, and Stewart J. Schwab., "The Employment Consequences of Wrongful-Discharge Law: Large, Small, or None at All?" *American Economic Review, Papers and Proceedings*, Volume 94, No.2 (May 2004) 440-446.

[20] They conclude that Dertouzos and Karoly, *supra*, note 17, significantly overestimate the disemployment effects of wrongful discharge laws while the Miles, *supra*, note 18, study underestimates the effects.

A MULTIVARIATE MODEL OF UNEMPLOYMENT DURATION

The availability of data that reflects the amount of time a group of formerly unemployed individuals spent looking for a job before obtaining one suggests that one can build a multivariate model that contains covariates designed to reduce the observed variance in the data.

The Displaced Worker Survey contains a data set that represents such a survey. We use data from the 2000 Displace Worker Survey. The DWS is a government sponsored survey that asks questions about job tenure, joblessness duration and reemployment. Displaced Workers are defined as persons age 20 or older who lost or left jobs because their plant of company closed or moved, there was insufficient work for them to do or their position or shift was abolished in the prior three years. Employees that were terminated for cause are not considered displaced workers and art not part of the DWS.

RESOLUTION OF CASE STUDY

When plaintiff's information on race, age, marital status and geographic location are inserted into the estimated duration model the estimated value of duration is ## weeks, with a standard deviation of ## weeks. Plaintiff has been out of work for 97 weeks; this difference is over 2 standard deviations. A two-standard deviation standard would conclude that search is unreasonable.

We begin with a base regression incorporating as covariates as many applicable variables available in the DWS data set. We limit the analysis to five variables to illustrate the model. The variable selection results in a data set containing 248 records. It is possible to incorporate many more variables to tailor the analysis more based on plaintiff's particulars. A multivariate regression takes the following form:

$Y = \beta X + \varepsilon$

Where Y represents the explained variable – the natural logarithm of the duration of joblessness; X is the vector of five covariates (we added a variable that consists of the square of age, a transformed variable necessary for statistical tractability), β is the vector of associated covariate coefficients and ε represent regression error. A variable is considered applicable if it conveys information into any of the many socioeconomic and demographic characteristics of plaintiff. Thus, the multivariate regression is the following

Natural logarithm of unemployment duration =

β_0 $+ \beta_1*$Age
        $+ \beta_2*$Age Squared
        $+ \beta_3 *$Married
        $+ \beta_4*$Race
        $+ \beta_5*$Region
        $+ \beta_6*$Sex

The output of the linear regression model is estimated values of the coefficients (β_0- β_6) and several regression diagnostics; these are found in the Table below.

Table 2: Multivariate Regression Results

Source	SS	df	MS		Number of obs	248
					F(6, 241)	9.05
Model	57.1131946	6	9.51886577		Prob > F	0
Residual	253.375486	241	1.05135056		R-squared	0.1839
					Adj R-squared	0.1636
Total	310.48868	247	1.25703919		Root MSE	1.0254

Ln(Duration)	Coefficient	Std. Error	t	P>t	[95% Conf. Interval]	
Age	0.0596565	0.0224458	2.66	0.008	0.0154415	0.103872
Age Squared	-0.0003952	0.0002867	-1.38	0.169	-0.0009599	0.00017
Married	-0.4003548	0.1601879	-2.5	0.013	-0.7159018	-0.08481
Race	-0.3400359	0.1533799	-2.22	0.028	-0.6421722	-0.0379
Region	0.5511477	0.1410425	3.91	0	0.2733143	0.828981
Sex	0.0218976	0.1317246	0.17	0.868	-0.237581	0.281376
constant	0.8514958	0.417598	2.04	0.043	0.0288879	1.674104

To obtain an estimate of the predicted unemployment period it is possible to use the coefficients estimated in the model above and substitute plaintiff's particular values of each covariate.

$$Y_{plaintiff} = \beta_{estimated} * X_{plaintiff}$$

The first six columns in Table 3 below contain the covariate values representing plaintiff. The predicted value of the (logarithm) duration of joblessness is provided in column seven.

Table 3: Predicted Unemployment Duration *(in natural logarithms)*

Age	Age Squared	Married	Race	Region	Sex	Predicted ln(Duration)
45	2025	1	1	1	1	2.568444

However, this approach does not provide a measure of the standard error of the estimate for the expected logarithm of joblessness duration at the given values of the covariates. A confidence interval is necessary to establish whether plaintiff's actual unemployment duration is distinctly different from the average unemployment duration. To obtain the standard error of the predicted value we run an ancillary regression.

The estimator of $Y_{plaintiff}$ is

$\beta_0 + \beta_1 Age + \beta_2 Age\ Squared + \beta_3 Married + \beta_4 Race + \beta_5 Region + \beta_6 Sex$

We subtract the value of each covariate from each observation and then run the regression on the adjusted covariates. Thus, we define a new set of covariates as follows: Age0 = Age – 45; Age Squared0 = Age Squared – 2025; Married0 = Married – 1; Race0 = Race – 1; Region0 = Region-1 and Sex0= Sec -1.

When we regress the logarithm of Joblessness Duration on these new covariates we get the regression results are found in the table below.

Table 4: Multivariate Regression on Adjusted Covariates

Source	SS	df	MS			
					Number of obs = 248	
					F(6, 241) = 9.05	
Model	57.1132	6	9.518866		Prob > F = 0.0000	
Residual	253.375	241	1.051351		R-squared = 0.1839	
					Adj R-squared = 0.1636	
Total	310.489	247	1.257039		Root MSE = 1.0254	

Ln(Duration)	Coefficient	Std. Error	t	P>t	[95% Conf. Interval]	
age0	0.05966	0.0224458	2.66	0.008	0.015442	0.1038715
agesq0	-0.0004	0.0002867	-1.38	0.169	-0.00096	0.0001695
married0	-0.4004	0.1601879	-2.5	0.013	-0.7159	-0.0848077
race0	-0.34	0.1533799	-2.22	0.028	-0.64217	-0.0378995
region0	0.55115	0.1410425	3.91	0	0.273314	0.8289812
sex0	0.0219	0.1317246	0.17	0.868	-0.23758	0.2813761
_cons	2.56844	0.1737671	14.78	0	2.226148	2.91074

The only difference between the results of the regressions on the adjusted versus the unadjusted covariates is the intercept, which is the prediction we want along with its standard error.[21] Specifically, the predicted value is 2.56844 and the associated standard error is 0.1738. We still have to account for the unobserved factors in the error term. To obtain the standard error of the prediction we rely on

$$Se(ln\ duration\ of\ joblessness) = \{[se(yo)]^2 + \sigma^2\}^{1/2}$$

Thus, $[(0.1738)^2 + (1.024)^2]^{1/2} = 1.03869$. Note that the prediction error accounts for a relatively minor portion of the standard error.

Even though the dependent variable is the natural logarithm of unemployment duration, it is not possible to simply exponentiate the predicted value ln(duration of joblessness) = 2.568 to obtain an estimate of the joblessness duration for plaintiff's cohort. An adjustment is necessary to account for the nonlinear nature of the effect of the variance:

$$E(y|x) = exp(\sigma^2/2)*exp(\beta X) = \alpha exp(ln\ of\ joblessness\ duration)$$

Where σ^2 is the variance of ε when $\varepsilon \sim Normal(0, \sigma^2)$
A consistent estimator of the adjustment factor, α, can be obtained as follows:[22]

(i) obtaining the fitted values of the dependent variable $Y_{plaintiff}$
(ii) Create a new variable $m = exp(Y_{plaintiff})$
(iii) Regress the jobless duration variable on the new variable m without an intercept; the resulting coefficient is the estimate of α, the adjustment factor.

The output of this ancillary regression is provided in the appendix to this paper; the summary output is presented in the table below, along with the (adjusted) predicted joblessness duration for plaintiff's cohort: column 3 is obtained from the other two according to the adjustment equation above. The obtained estimate of average unemployment is 21.67 weeks.

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[21] It is not a coincidence that the slope coefficients, their standard errors and the diagnostics are similar. This allows a check on the soundness of the covariate transformation.
[22] See, generally, Jeffrey M. Wooldridge, *Introductory Econometrics* (2000) at 202-203.

Table 5: Average Joblessness Duration

Predicted ln(Joblessnes Duration)	Adjustment Factor	Mean Joblessness Duration
(1)	(2)	(2)*exp(1)
2.568444	1.660754	21.66538263

Because the standard deviation and the mean share similar properties the adjustment factor similarly applies the estimated measure of prediction error. Thus, the table below reproduces the obtained average joblessness duration and the estimated confidence interval.

Average Joblessness Duration	Lower Confidence Interval	Upper Confidence Interval
(weeks)	**(95%)**	
21.7	12.5	30.9

It is easily seen that plaintiff's joblessness duration of 97 weeks easily falls outside the estimated 2 standard deviation range and therefore is considered statistically significantly different – at the 95% level of significance -- from the 21.7 weeks that is the expected joblessness duration.

What is the probability that we would observe plaintiff's joblessness duration if the null hypothesis is true (i.e. that average joblessness duration is 21.7 weeks)? The standardized statistic for testing H_0: $\mu = 21.7$ weeks is $Z = (21.7 – 97)/4.7 = -16.01$. The value of -16.01 is so far out in the left tail of the standard normal distribution that we reject H_0 at any reasonable significance level. Formally,

$$p\text{-}value = P(Z > 16.03|H_0) = 1 – \Phi(16.03) = 0.00000$$

The result above indicates that if the null hypothesis is actually true, it is unlikely that we would ever observe a value as large as 16.03. In other words, the observed significance level indicates that the likelihood of a random result occurring is essentially zero. This strongly suggests that plaintiff's search may not meet the reasonableness standard.

The table below reflects the likelihood of observing a random result as the joblessness period varies. For example, the second column indicates the observed joblessness duration and the column labeled "p-value" indicates the likelihood. Thus, for example, the table indicates that there is a 3.8 percent likelihood that we observe plaintiff being joblessness for 30 weeks.

Average Joblessness Duration	Plaintiff's Joblessness Duration	Difference	Normalized Statistic	p-value
(weeks)	*(weeks)*			
21.7	97.0	-75.3	-16.03	0.0000
21.7	85	-63.3	-13.48	0.0000
21.7	60	-38.3	-8.16	0.0000
21.7	50	-28.3	-6.03	0.0000
21.7	40	-18.3	-3.90	0.0000
21.7	35	-13.3	-2.84	0.0023
21.7	30	-8.3	-1.77	0.0380
21.7	25	-3.3	-0.71	0.2389
21.7	23	-1.3	-0.28	0.3882
21.7	22	-0.3	-0.07	0.4716

Figure 1 below provides a visual display of the table data. The x-axis is inverted, ranging from highest point to lowest.

Figure 1
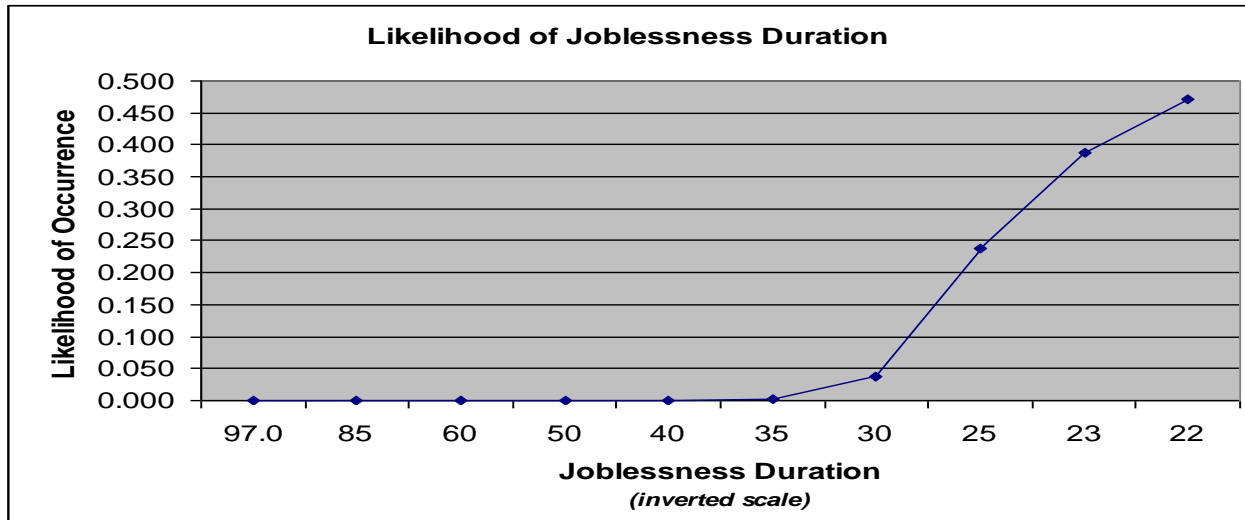
Analysis

Title VII of the Civil Rights Act of 1964, §706(g)(1), provided that, "Interim earnings or amounts earnable with reasonable diligence by the person or persons discriminated against shall operate to reduce the back pay otherwise allowable."[23]   Although this language applies only to Title VII cases, the concept has been applied by specific reference to the Americans with Disabilities Act, and by court cases to the Age Discrimination in Employment Act and other wrongful termination cases.

The "amounts earnable with reasonable diligence" language is based on the common-law principle that a plaintiff, whether in a tort or breach of contract case, should not be entitled to damages that the plaintiff could reasonably have avoided. "An unemployed or underemployed claimant, like all other Title VII claimants, is subject to the statutory duty to minimize damages set out in §706(g). This duty, rooted in an ancient principle of law, requires the claimant to use reasonable diligence in finding other suitable employment."[24]

However, even though based on common law, §706(g)(1) cases still are based on interpretation of the specific statutory language. Thus, "Although the unemployed or underemployed claimant need not go into another line of work, accept a demotion, or take a demeaning position, he forfeits his right to backpay if he refuses a job substantially equivalent to the one he was denied."[25]   In other words, modern cases do not apply the common-law mitigation of damages principle without qualification. While the mitigation defense is not limited to the narrow situation where a plaintiff refuses a substantially equivalent job, it is clear that mitigation of damages under §706(g)(1) does not require the plaintiff to pursue and accept any available job for the sole purpose of mitigating the defendant's damages.

The defendant has the burden of showing, by a preponderance of the evidence, what the plaintiff would have earned with reasonable diligence. There are three separate challenges that the defendant has to meet: First, there has to be evidence that is legally admissible as relevant. Second, the defendant has to prove the substantive elements of

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[23] Now codified at 42 U.S.C. §2000e-5(g)(1).
[24] Ford Motor Co. v. EEOC, 458 U.S. 219, 231 (1982), footnotes omitted.
[25] Id., at 231-2, footnotes omitted.

the mitigation defense. Third, since mitigation is a factual determination often made by a jury, the evidence needs to be presented in a manner that is comprehensible to the average juror. We can address these in order.

The first question is whether the statistical evidence will be admissible as relevant. Statistical analysis has been used by plaintiffs for years in employment discrimination cases, generally to show that a pattern of discrimination in a disparate impact case cannot be explained by chance. Early cases involved simple comparisons of proportions.[26] As more complicated studies were introduced courts discussed standard deviations,[27] correlation coefficients,[28] significance levels,[29] hypothesis tests,[30] Mantel-Haenzel tests,[31] scattergrams,[32] ordinary least square regressions,[33] reverse regressions.[34]

One Court of Appeals has stated plainly, "It is now well-established that statistical evidence is admissible to prove employment discrimination."[35] Additionally, the Supreme Court has stated that statistics alone can be enough for the plaintiff to prove a prima facie case of discrimination, thus shifting the burden of proof to the defendant.[36]

It does not necessarily follow, however, that a technique successfully used by a plaintiff to shift the burden of proof to the defendant could be used by the defendant to shift the burden of proof to the plaintiff. This is because these cases involved the question of whether the plaintiff has made out a prima facie case of discrimination, generally by showing discriminatory impact. What the plaintiff set out to prove was the existence of a discriminatory pattern, where statistics provided valuable evidence that an existing pattern would not have been produced by chance. This is different from the employer's burden in defending a wrongful discharge case, where the burden is not to prove that a pattern would not have been created by chance, but rather that one specific individual did or did not act in a particular manner.

Clearly, not every legal matter can be resolved by resort to statistics. For instance, in Department of Commerce, et al. v. U.S. House of Representatives, et al, the U.S. Supreme Court ruled that statistical sampling could not be used for census purposes to apportion Congressional representation.[37]

However, the cases where plaintiffs used statistical evidence to prove a prima facie case of discrimination may still be instrumental to the defendant attempting to prove a mitigation defense. Even if these cases do not give a defendant the ability to shift the burden of proof, they do appear to settle the issue of admissibility of statistical evidence.

One example of where statistical evidence was offered by the defense to a claim of discrimination was Laugesen v. The Anaconda Company.[38] There the trial court admitted statistical evidence offered by the defendant to demonstrate that it did not have a pattern of age discrimination, and the Court of Appeals affirmed.

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[26] Washington v. Davis, 426 U.S. 229, 235-36 (1976) (discussing the disparate impact of a civil service test on African-Americans seeking jobs as police officers); Griggs v. Duke Power Co., 401 U.S. 424, 429-30 (1971) (discussing the disparate impact on African-Americans of a high school diploma requirement and employment tests).

[27] EEOC v. Fed. Reserve Bank, 698 F.2d 633, 651 (4th Cir. 1983) ("If our computation is correct, the standard deviation for pay grade 5 was -1.87.")

[28] Bernard v. Gulf Oil Corp., 890 F.2d 735, 742 (5th Cir. 1989) ("Plaintiffs urge that a correlation coefficient in the .30-.40 range be established as the minimum for proof of a job related test. We decline to establish a bright line cut-off point for the establishment of jobrelatedness in testing.").

[29] Fed. Reserve Bank, 698 F.2d at 647 (recognizing that the 0.05 level is arbitrary).

[30] Moultrie v. Martin, 690 F.2d 1078, 1082 (4th Cir. 1982) ("Statisticians compare figures through an objective process known as hypothesis testing.").

[31] Hogan v. Pierce, 31 Fair Empl. Prac. Cas. (BNA) 115 (D.D.C. 1983).

[32] Cherry v. Amoco Oil Co., 490 F. Supp. 1026, 1028-29, 1030 (D. Ga. 1980) (finding that a sociologist's scattergram of "credit application acceptance rate" and the proportions of nonwhites residing in zip code regions merely demonstrated that "the computerized grading system [for issuing gasoline credit cards] taken as a whole tends to reject a disproportionate number of persons living in predominantly black areas").

[33] Craik v. Minn. State Univ. Bd., 731 F.2d 465, 476 n.13 (8th Cir. 1984) (noting that logistic regression should have been used, but relying on ordinary least squares regression because neither party explained the difference in the methods).

[34] Penk v. Or. State Bd. of Higher Educ., 36 Empl. Prac. Dec. (CCH) P 35,049 (D. Or. 1985), aff'd, 816 F.2d 458 (9th Cir. 1987).

[35] Sledge et al. v. J.P. Stevens, Inc., 585 F.2d 625, 635 (1978).

[36] Hazelwood School District v. U.S., 392 F. Supp. 1276 (E.D. Mo.), rev'd 534 F. 2nd 805, vacated and remanded, 433 U.S. 299 (1977). [concerning the race of newly hired teachers.]

[37] 525 U.S. 316 (1999)

[38] 510 F.2d 307 (6th Cir. 1975)

Another example is Green et al. v. United States Steel Corp.[39] This was a class action discrimination claim, where the parties stipulated that damages would be calculated on a group basis. In this case, as the back pay was determined on a group basis, the mitigation of damages was also determined statistically. Although this case falls short of indicating that statistical measures can be used to calculate mitigation in an individual discrimination case, it confirms with the other cases cited above the admissibility of this type of evidence.

The second question is whether the defendant has proved the substantive elements of the mitigation defense.

Although the court cases are not entirely uniform, it appears that there are two elements to the mitigation defense, both of which must be proved by the defendant:

- The plaintiff failed to exercise reasonable diligence in seeking other employment, and

- There was a reasonable chance that the plaintiff might have found comparable employment if the plaintiff had exercised reasonable diligence.[40]

What then, does the defendant have to demonstrate at trial? The easiest scenario from the defendant's point of view is the one presented in the *Ford Motor Co.*[41] case, where the defendant actually offered to the plaintiffs the same jobs they were originally denied.

In the absence of a documented job offer, proof becomes more difficult. While the existence of other jobs, and the plaintiff's qualifications for those jobs could be shown, what does a defendant have to demonstrate to prove that the plaintiff did not exercise reasonable diligence?

The answer is, whatever will convince the trial fact finder, typically the jury. Although both elements must be proved separately, in practice it may be that a jury really only needs to see direct proof of the second element, and is willing to interpolate proof of the first element. As long as evidence supplied by the defendant is adequate to permit an appellate court to hold that a "...rational jury had a legally sufficient basis..."[42] for the finding, the jury's decision will not be overturned on appeal. Thus, a jury was satisfied by evidence that the plaintiff "...was an undisputedly qualified employee with a long and hitherto substantially unbroken work history."[43] Despite the fact that this was not direct evidence of whether or not the plaintiff was out pounding the proverbial pavement, the jury accepted it as circumstantial evidence, and its finding was affirmed on appeal. So, even if statistical evidence will not literally shift the burden of proof to the plaintiff, it may have the effect of doing so in the eyes of the jurors.

Thus, since juries are willing to conclude circumstantially that the plaintiff did not exercise reasonable diligence in seeking other employment, and since appellate courts are disinclined to overturn a jury verdict supported by legally-sufficient evidence, ultimately the defendant has to meet the third challenge, presenting the statistical evidence in a manner that is comprehensible to the average juror.

Part of the challenge is the use of terminology that is understandable by jurors. In this regard, courts have already taken the lead, by using the term "mitigation of damages" instead of the more oblique "doctrine of avoidable consequences." Similarly, economic and statistical experts will need to tailor their communications to their audience.

At the present time, it is likely that a juror will respond more to "less than a five percent possibility that this could happen by chance" than he or she would to "greater than 2 standard deviations." Certainly, this might change over time. A Lexis-Nexis search of U. S. District Court cases shows that the term "standard deviation" was used in 95

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[39] 640 F. Supp. 1521 (E.D.Pa. 1986) (aff'd sub nom. Green et al. v. USX Corporation 896 F.2d 801 (3d Cir. 1990).
[40] E.g., Anastasio v. Schering Corporation, 838 F.2d 701, 18-19 (3d Cir. 1988), stating that the "...court's interrogatories to jury properly placed on defendant the burden of showing 'both that plaintiff failed to exercise reasonable diligence to mitigate his damages, and that there was a reasonable likelihood that plaintiff might have found comparable work if he had exercised reasonable diligence.'"); Weir v. Burroughs Corp. 619 F.2d 276, 278 (3d Cir. 1980); and EEOC v. Gurnee Inn Corp., 914 F.2d 815, 818 (7th Cir. 1990).]
[41] Ford Motor Co. v. EEOC, 458 U.S. 219
[42] Sheehan v. Donlen Corp., 173 F.3d 1039, 1049 (7th Cir. 1999)
[43] Id.

cases between 1990 and 1994, and in 180 cases between 2000 and 2004. It may be that statistics will follow DNA evidence in becoming a concept with which jurors are familiar. However, in the meantime, an expert witness will need to be conscious of the clarity with which the statistical evidence is presented.

Concluding Comments

In this paper we empirically establish the expected joblessness duration period for a plaintiff's population cohort in a wrongful termination lawsuit; we also calculated the estimated duration period's associated standard error. We develop a hypothesis test examining whether the plaintiff's period of joblessness is statistically significantly different from the predicted test statistic in a manner consistent with case law. Thus, we are able to empirically assess the soundness of the duration of plaintiff's job search and thereby enhance the robustness of present-day approaches.

The approach presented here has many limitations; several econometric, others necessarily subordinated to the law and its interpretations. As is well known, the complexity of multiple regression analysis can be challenged on a variety of grounds.

For example, plaintiff could argue that essential variables are omitted from the model. After all, the Displaced Worker Survey recognizes many possibly relevant variables but does not account for many others, including those that are possibly a result of the discrimination process itself, such as the patient's emotional distress or lack of confidence.

In addition, we rely on Displaced Worker Survey data. Like other statistical procedure, the proposed test as used here can be challenged on the grounds that the Displaced Worker Survey may not be the appropriate population for comparison purposes; again, the DWS does not (knowingly) reflect workers that may have been terminated as a result of discrimination.

However, to properly contest the model alleging omitted variables, plaintiff cannot merely list or allude to variables or factors but must demonstrate that including them would alter the statistical disparity. In *Bazemore*, a unanimous Supreme Court noted: "The [Fourth Circuit's] view of the evidentiary value of the regression analysis was plainly incorrect. While the omission of variables from regression analysis may render the analysis less probative than may otherwise might be, it can hardly be said, absent some other infirmity, that an analysis which accounts for the major factors "must be considered unacceptable as evidence of discrimination." Normally, failure to include variables will affect the analysis' probativeness, not its admissibility. Importantly, it is clear that a regression analysis that includes less than "all measurable variables" may serve to prove a plaintiff's case."[44]

We cannot claim that the model does more than to improve on the subjectiveness of the opinion of job placement specialists, vocational experts and other experts typically proffered by counsel in raising a challenge to the reasonableness of a plaintiff's job search. Clearly, the duty to mitigate challenge must be accompanied by collateral evidence in conjunction with the model; in tandem, they could be persuasive.

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[44] Noted in Phillip I. Good, Applying Statistics in the Courtroom (Boca Raton: Chapman & Hall/CRC, 2001) at 199.

Appendix

Table 6: Ancillary Regression, Calculation of Logarithm Adjustment Factor

Source	SS	df	MS			
				Number of obs =	248	
				F(1, 247)	173.71	
Model	74954.7806	1	74954.7806	Prob > F	0	
Residual	106579.219	247	431.494815	R-squared	0.4129	
				Adj R-squared	0.4105	
Total	181534	248	731.991935	Root MSE	20.772	

Joblessness Duration	Coefficient	Std. Error	t-statistic	P>t	[95% Conf. Interval]	
mhat	1.660754	0.1260067	13.18	0	1.41257	1.90894

NOTES