The Signaling Role of Early Career Job Loss

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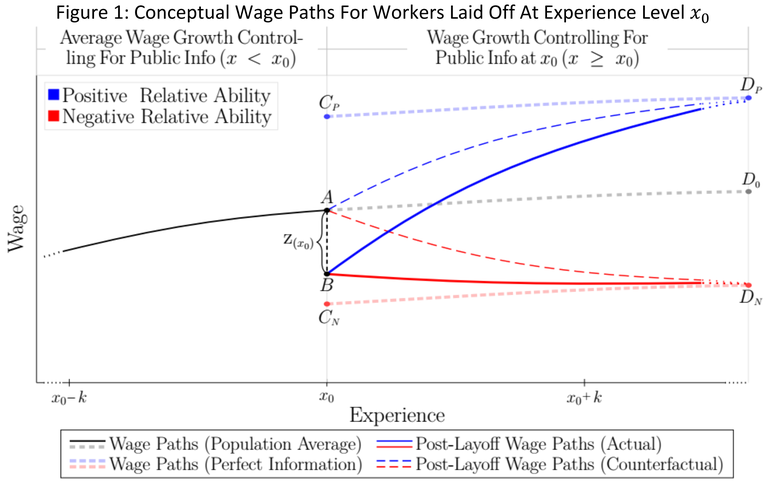
Introduction

I examine the extent to which ability signaling explains long-term wage losses suffered by young workers who experience layoffs. Young workers are of particular interest because employers have limited information about their ability, so signaling theoretically plays a larger role in determining wages. In addition, young workers are unlikely to experience wage losses due to loss of industry-specific human capital or separation from high-quality job matches, which may explain long-term wage decreases among older workers.

I consider a setting in which layoff signals vary based on the amount of public information available about a laid off worker relative to the amount of private information held by the worker's prior employer, under the assumption that downsizing employers prefer to lay off their lowest productivity workers first, though some are unable to do so. This yields layoff signals that act as a form of dynamic statistical discrimination. Workers who are incorrectly assigned a low-ability signal due to being laid off suffer a negative initial signal effect that is decreasing in pre-layoff experience, followed by a gradual recovery that is proportional to both the size of the signal and the return to the worker's ability level in the absence of a layoff. Figure 1 illustrates the effect of a layoff signal at experience level x_0, after accounting for public information prior to the layoff, for two "types" of workers, one with a positive relative ability (type-P) and another with a negative relative ability (type-N).

Figure 1: Conceptual Wage Paths For Workers Laid Off At Experience Level x_0



Conceptual Implications

1. **The initial signal effect disproportionately affects workers with positive relative ability.** Since the layoff signal is assumed to contain negative information about a worker, it moves a type-P worker's wage further from their full information wage than for a type-N worker's wage. *In Figure 1: If* $z_{(x_0)} > 0$, *then* $|BC_P| > |BC_N|$.
2. **Following a layoff signal, the wage return to ability for laid off workers increases at a faster rate with experience than for their non-laid off counterfactual.** Since the rate at which the wage return to ability changes with new information is a function of how far a worker's wage is from their full information wage and the negative layoff signal increases this distance for type-P laid off workers, the wage return to their ability increases at a faster rate with experience than for similar non-laid off workers. *In Figure 1: The slope of* $\overline{BD_P}$ *is greater than the slope of* $\overline{AD_P}$.
3. **The initial signal effect is weakly decreasing in pre-layoff experience.** Since the difference between public and private information about a worker's ability is assumed to decrease with experience, the information content of a layoff should decrease with experience as well. *In Figure 1:* $\partial z_{(x_0)}/\partial x \leq 0$.
4. **The faster increase in the wage return to ability for laid off workers, relative to non-laid off workers, is decreasing in pre-layoff experience.** This follows from the fact that the layoff signal is weakly decreasing with pre-layoff experience. *In Figure 1:* $\partial z_{(x_0)}/\partial x \leq 0$ *implies that* $|BC_i| \lim_{x_0 \to \infty} = |AC_i|$, *which implies that* $\overline{BD_i} \lim_{x_0 \to \infty} = \overline{AD_i}$ for $i = P, N$.

Data

I use data from the National Longitudinal Survey of Youth (NLSY97) to test the implications of the layoff signaling framework. The NLSY97 is a survey of around 9,000 individuals ages 12-16 in 1997. Importantly for this study, these data also contain measures of workers' cognitive ability derived from components of the ASVAB test, specifically workers' AFQT scores. To analyze the long-run effects of layoffs, I construct a quarterly employment panel using the NLSY97's extensive weekly employment event-history data matched with employer-specific characteristics and information regarding the specific nature of job changes. My analysis sample consists of approximately 4,000 workers who made their first long-term transition into the labor market prior to 2008. Finally, as the primary analysis is based on the way in which employers learn about workers' relative ability, as opposed to their overall ability, I follow Farber and Gibbons (1996) and proxy for relative ability using the residual from a regression of AFQT scores on a vector of observable characteristics and each worker's entry period log wage, which is included to account for any characteristics related to a worker's productivity that are observed by employers but are not available in the data.

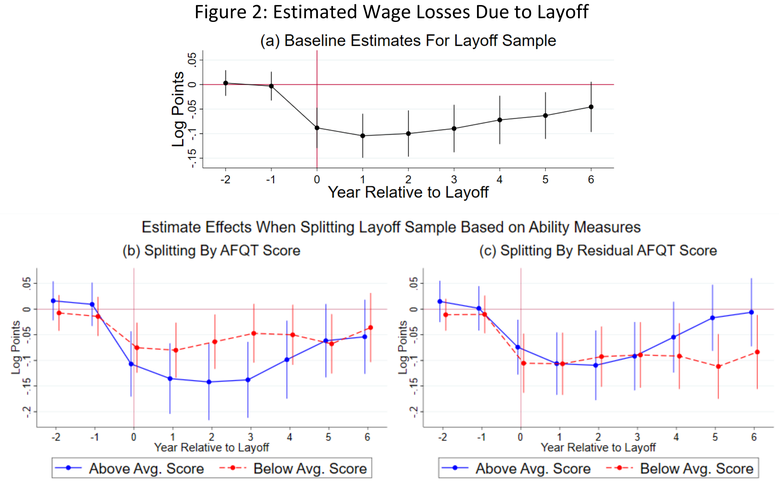
Initial Event Study Evidence

Conceptual implications 1 and 2 yield the initial testable prediction that, while high and low relative ability workers will experience similar initial layoff effects, high relative ability workers will gradually recover as employers correct their inaccurate beliefs based on the layoff signal, while the effects for low relative ability workers will remain relatively constant as employers confirm their beliefs based on the layoff signal. To test the initial hypothesis that layoff signaling leads to long-run divergent layoff recovery paths for high versus low ability workers, I first estimate the following baseline event-study model using the NLSY97 data:

$$w_{it} = \alpha_i + \gamma_t + \boldsymbol{X}_{it}\beta_1 + \boldsymbol{Z}_{ie_0}\beta_2 + \sum_{K \geq -2}^{6} D_{it}^k \delta^k + \epsilon_{it},$$

where w_{it} is the log wage for individual i in period t, α_i is a worker specific fixed effect, γ_t is a time effect, $\boldsymbol{X}_{it}$ is a vector of worker characteristics, $\boldsymbol{Z}_{ie_0}$ is a vector of characteristics of the worker's first employer when they entered the labor market, D_{it}^k is an indicator for the k^{th} year relative to a layoff, and ϵ_{it} is a stochastic error term. To test for the presence of divergent recovery trends, I split the laid off worker sample by whether a worker has an above or below average ability score and re-estimate the event-study model separately for each group. Figure 2 (a) plots the estimated $\delta^{k\prime}$s from the above model using the entire sample of laid off workers, while subfigures (b) and (c) plot the split sample estimated layoff effects when splitting on actual AFQT score and on residual AFQT score, respectively.

Figure 2: Estimated Wage Losses Due to Layoff



Estimated effects of a layoff on log wages, split in (b) and (c) by whether the worker is above or below average AFQT score or residual AFQT, respectively, pooled at the year level. Whiskers denote 95-percent confidence intervals based on standard errors clustered at the individual worker level.

Main Empirical Approach

Results from the split sample event-study analysis provide evidence for divergent recovery paths by residual but not actual AFQT score. While divergent recovery paths provide encouraging initial support for statistical discrimination based on layoff signals, other possible theoretical explanations may also lead to this finding.

In order to empirically identify layoff signaling, I develop an empirical approach based on Farber and Gibbons (1996) and Altonji and Pierret (2001) that exploits the dynamic relationship between pre-layoff public information and post-layoff employer learning. As a baseline, the empirical model includes controls for each worker's residual AFQT score ($AFQT_i^*$), the interaction of residual AFQT score and experience, as well as variables to control for the general effect of a layoff. In this baseline model, the return to a worker's residual AFQT score is predicted to be zero when the worker first enters the labor market but to increase with experience as employers learn the worker's true productivity. To study the effects of layoff signaling, I include the following variables:

1. $Layoff_{it} \times AFQT_i^*$ - to account for the initial disproportionate signal effect by worker's relative ability
2. $Layoff_{it} \times AFQT_i^* \times Post\ Exp_{it}$ - to account for faster increases in the return to ability for laid off workers than for non-laid off workers
3. $Layoff_{it} \times AFQT_i^* \times Pre\ Exp_{it_0}$ - to account for the effect of pre-layoff information on the layoff signal effect
4. $Layoff_{it} \times AFQT_i^* \times Post\ Exp_{it} \times Pre\ Exp_{it_0}$ - to account for the effect of pre-layoff information on the rate of change in the return to ability over post-layoff experience

Additionally, the general interaction of residual AFQT score and experience is held constant at the pre-layoff experience levels for laid off workers to control for the general effect of the public information available prior to the layoff. Estimates from models based on the above are reported in Table 1.

Table 1: Layoff Signaling Model Log Wage Regression Estimates

Independent Variable	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage
AFQT*	-0.001	-0.002	0.001	0.001	0.001
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
AFQT* × Total Exp/10	0.027***	0.034***	0.030**	0.029**	0.029**
	(0.008)	(0.008)	(0.009)	(0.010)	(0.010)
Layoff × AFQT*		-0.013	-0.021	-0.026	-0.052*
		(0.013)	(0.013)	(0.022)	(0.023)
Layoff × AFQT* × Post Exp			0.002	0.005*	0.012**
			(0.003)	(0.002)	(0.004)
Layoff × AFQT* × Pre Exp				0.002	0.009*
				(0.004)	(0.004)
Layoff × AFQT* × Post × Pre Exp					-0.002*
					(0.001)
R^2	0.381	0.391	0.393	0.394	0.395
Observations	153,241	153,241	153,241	153,241	153,241
Individuals	4,009	4,009	4,009	4,009	4,009
No. of Layoffs	.	774	774	774	774

Cluster-robust standard errors in parentheses are computed at the individual worker level
$^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

*E*stimates of the log wage effects of laid off workers' residual AFQT scores that vary dynamically with pre- and post-layoff experience, compared to effects of residual AFQT scores over experience for observationally similar non-laid off workers. Estimates support the discussed conceptual implications.

Conclusion

Using data from the National Longitudinal Survey of Youth 1997, I show that young workers of all ability levels initially experience similar wage losses following layoffs, but high relative ability workers fully recover within five years while low relative ability workers experience persistent wage losses. Consistent with traditional learning models, relative, not actual, ability affects wage trajectories. I find that low relative ability workers' inability to overcome negative layoff signals explains a substantial proportion of long-term wage losses among young workers.

Altonji, Joseph G., and Charles R. Pierret (2001). "Employer Learning and Statistical Discrimination." *The Quarterly Journal of Economics* 116(1), pp. 313-350.
Farber, Henry and Robert Gibbons (1996). "Learning and Wage Dynamics." *The Quarterly Journal of Economics* 111(4), pp. 1007-1047.