WHO ARE THE JOB LEAVERS AND WHY DO THEY QUIT? EVIDENCE FROM A MANUFACTURING FIRM

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April 25, 2018

Abstract

Utilizing data on daily performance for newly hired workers at a light-manufacturing firm in central New York from January 1999 to April 2005, this study explores how innate productivity affects the propensity of voluntary quitting of fixed-wage workers and uncovers underlying mechanisms by estimating time effects on job performance. The regression analysis suggests high production quality increase the propensity of quitting; production speed and time spent in production have no effect on quitting. Dividing workers into high and low productivity groups to exploit the innate behavioral differences, I find initially low-performing workers increase production quality over time, yet there is no significant difference between high and low-performing workers. Further splitting workers into job leavers and stayers, the regression estimates show the production quality of initially high-performing job leavers decreases over time, and production quality of low-performing job leavers increases. Stayers show no time effect on product quality. The results suggest that high-performing workers quit for they discover their overqualification and find bettef [(a) 0.2 (t) 0.2 (hi) 0.2 (gh)]TJ .gh

I.

II. Conceptual Framework and Hypotheses

Considering individual quit decision as intrinsic utility-maximizing behavior, existing literature on turnover theory fall into two major categories: job match model (Jovanovic, 1979; Miller, 1984) and job search model (Burdett, 1977; Morten, 1978). Job match model treats job as an experiencing good: workers learn about the quality of match through experiencing a job. The theory predicts workers who revealed high productivity remain on the job when wages are contingent worker marginal productivity. The feelings of competence and the corresponding monetary rewards motivate workers to stay. Using the data of new hires from the National Center for Research in Vocational Education (NCRVE) longitudinal data, Bishop (1990) found that less productive workers are more likely to quit. Jackson (2013) utilized longitudinal data of student test scores linked to teachers and schools in North Carolina from 1996 to 2006 and found that teachers with high school-specific quality are more likely to exit the profession. Since

the stereotypical view. One standard argument of female quitting is that females need to take

care of family25.2667c 17o 0.2 (a)h 0.2 (l) 0.2 (y2d) 0.2 (y2n133333 0 0 030.2(s) -0.2(y2n13333fo(y2n133

employees, including 134 operators who were directly involved with the production. The company has grown rapidly from 30 workers in 1988 and real sales had tripled since 1995.

PARTS produces small components[1] that are used by larger manufacturers in a number of industries and applications. The industry is very competitive and profit margins are thin, for the unit price of its product is low and the technology is fairly simple. PARTS firm culture emphasizes producing reliable products. PARTS stresses the importance of “high quality standard and durability to achieve customer satisfaction and ensure competitive ability” on the company website and downloadable products catalog. “Zero Defects” is frequently mentioned during team meetings. To motivate workers to achieve a higher quality standard, PARTS conducts quality audits on overage once every other day and publishes the rejection rates of all operators.

Production method at PARTS is batch production. A single operator operates a specific machine to complete one operation; a typical product takes only a few operations.

31, 2000, raised again to $6 on January 1, 2005, and then remained unchanged until the end of the study. Therefore, despite the high requirement of quality, workers at PARTS were paid only slightly above the minimum wage.

PARTS is a single-plant firm. All operators work in the same plant but are divided into 16 separate departments and three shifts. Team was introduced into PARTS in June 1999. Workers voluntarily chose whether to join a team, even though the firm management sometimes solicited certain workers. Teams at PARTS are “offline”—team members meet outside of production—rather than self-directed team production union.

Data Information

The two types of data were collected from PARTS: survey data and objective measures of productivity. The survey for all employees was undertaken in March 2001 and received a

effect model. The

Among three productivity measures, Efficiency captures the speed of production. The speed of operating naturally increases as workers become more familiar with the machine. The average efficiency of the sample is 70.14 percent with a standard deviation of 12.14. Job leavers seem to produce faster than

V. The Results

The Effects on Quitting

I estimate a simple linear probability model as my baseline:

In this equation,

from the management

Time Effects and the Behavior of Quitting

Intuitively, workers learn from their experiences and the Qualified Rate should increase over time. However, as predicted by fair wage-effort hypothesis, high-performing workers reduce their levels of efforts to match their wages. To fully examine Hypothesis 2 and 3, I construct a monthly performance panel data of all new workers and run an individual fixed-effect model for all new hires[6] after trial period[7]:

( ) ( ) ( )

In this fixed effect model, is the average monthly Qualified Rate of worker *i* in his *t*'th month at PARTS. ( ) worker *i*'s tenure in the unit of month at month *t*. The coefficient of ( ) captures the time effect of low-performing workers. ( ) ( ) is the interaction between high-performing dummy variable and tenure. High Performing is a time-invariant dummy variable that takes on value 1 if the worker's average qualified rate during the trial period[8] is above the median and zero otherwise. The coefficient of the interaction term captures the difference between high and low-ability workers. I linearly combine the coefficients of Months at PARTS and the interaction term to estimate the time effect for high-performing workers and test it significance using t test. Since this case study is not a randomized control trial, it is important to apply individual fixed effect to control for unobservable individual characteristics.

[6] Since fixed-effect model is applied, the newly hired operators are not restricted to those who completed the survey. We observe a slight increase in sample size. There are 66 workers in the sample with 28 stayers and 38 job leavers.
[7]

Each nature month over the entire period of study is represented by one dummy variable to capture the external shocks or firm-wide changes that apply to both high and low-performing workers.

One potential objection to the functional form is non-linearity of the time effect. I estimate the time effect with each tenure month *t* as a dummy variable (dropping the first month as the baseline) and plotted the coefficient for each month separately for low-performing stayers, low-performing leavers, high-performing stayers, and high-performing leavers. The scatter plots of coefficients are presented in Figure 3. All groups other than low-performing stayers seem to have linear time effect; low-performing leavers seem to increase qualified rate in the first year and then show a flat pattern. Notice that coefficients for the first 12 months are not statistically significant. Thus, the lack of precision prevents me from making any further conclusion about the early career of workers. I also estimate the time effect using quadratic functional form, the estimation results not seem to be in favor of quadratic time effect. Thus, I continue using linear model to test Hypothesis 2 and 3.

Table 4 summarizes the time effect of the full sample, stayers, and job leavers

of unfairness. For high-performing stayers, it is also possible that the feelings of competence overtake the feelings of unfairness, so they choose to stay and work with non-reduced efforts.

Low-performing job leavers have a positive time effect that is statistically significant at 5% level. One additional month at PARTS increase production quality by 0.023%. Even the magnitude is small, considering the long study period and small standard deviation of Qualified Rate, the finding is meaningful. The low-performing job leaver learning behavior is not consistent with Hypothesis 2 but provide supportive evidence for Hypothesis 3. Thus, low-performing job leavers are not likely to search for outside opportunities on the job. They chose to voluntarily separate from PARTS for different reason

of numbers of observation, I am unable to find supportive evidence for such a guess. The time effect of later leavers is consistent with the overall pattern, even though both the magnitude and the statistical significance are both slightly lower. This finding suggests that the overall time effect might be an underestimation for early leavers, but I am unable to test it using the current data set.

VI. Conclusion and Discussion

In this study, I

overmatch at the beginning of their career and form a sense of “fair productivity”. They gradually reduce effort to match the “fair productivity” later on in their career while searching for better outside opportunities. The lack of overall difference between high and low-performing workers suggests quitting is unlikely to be a prosocial behavior or gift-exchange behavior.

Additionally, age and gender seem to affect individual quit decision at PARTS. Young and male workers are more likely to quit. Education attainment has no significant effect on quitting. No heterogeneous productivity effect is found at PARTS. Among gender, education attainment, and wage, none of these three characteristics affect the magnitude or direction the productivity effect on quitting.

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						Difference
mean	*sd*	*mean*	*sd*	*mean*	*sd*	*mean*

***Table 2*. The Effects on Quitting**

VARIABLES	Standard Deviation	(1) LPM	(2) LPM	(3) Probit
Qualified Rate	1.760	0.0970***	0.0751***	0.390**
		(0.0335)	(0.0261)	(0.164)
Efficiency	12.137	-0.00844	-0.00661	-0.0308
		(0.00757)	(0.00472)	(0.0237)
Downtime	0.646	-0.0437	-0.00404	-0.157
		(0.108)	(0.0497)	(0.317)
Age	11.161	-0.0200**	-0.0146**	-0.0692**
		(0.00793)	(0.00607)	(0.0276)
Male	0.491	0.418***	0.218*	1.551***
		(0.148)	(0.114)	(0.561)
College	0.466	0.0673	0.0575	0.193
		(0.148)	(0.115)	(0.437)
Personal Characteristics		Yes	Yes	Yes
Control for crisis years		No	Yes	No
Include Switchers		Yes	Yes	Yes
Observations		45	45	45
R-squared		0.305	0.660	

: Data are for all white operators who joined PARTS after January 1, 1990, completed the survey conducted on March 1, 2001, paid less than $14 per hour, and are less than 62 years old when taking the survey. College takes on value 1 if the worker had any level of college education (including community college, college dropouts, etc.), zero otherwise. Additional control personal characteristics variables are offline team, wage residual, if married, if have children. Crisis years takes on value 1 if workers quitted in 2001 or 2002. Robust standard errors in parentheses

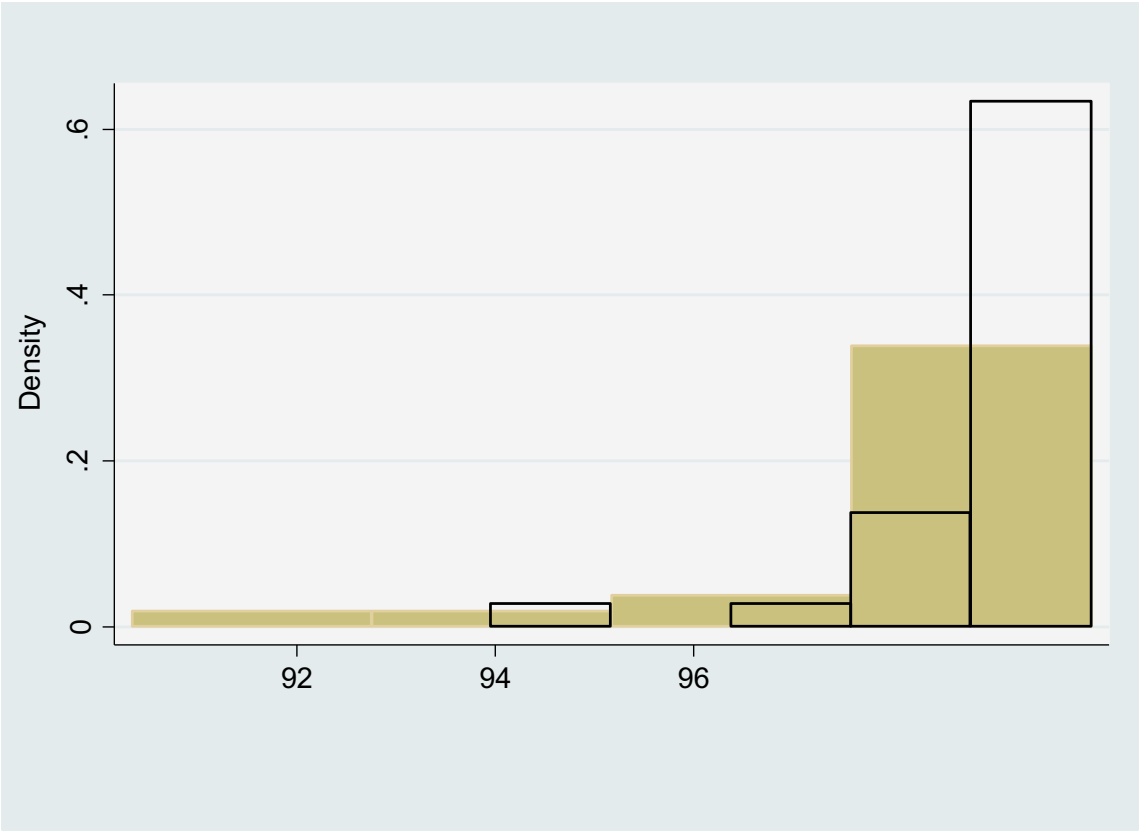
*** p<0.01, ** p<0.05, * p<0.1

: All data provided by PARTS.

	(1)	(2)	(3)	(4)
VARIABLES	Baseline			

VARIABLES	(1) 6 Days	(2) 11 Days	(3) 16 Days	(4) 100 Days	(5) 200 Days

	(1)	(2)	(3)
VARIABLES	40 Days	60 Days	80 Days
Qualified Rate	0.0537**	0.0751***	0.0683**
	(0.0209)	(0.0261)	(0.0269)
Efficiency	-0.00661	-0.00802	-0.00635
	(0.00472)	(0.00504)	(0.00477)
Downtime	-0.00404	-0.0343	-0.00360
	(0.0497)	(0.0484)	(0.0503)
Age	-0.0146**	-0.0117**	-0.0146**
	(0.00607)	(0.00567)	(0.00619)
Male	0.218*	0.198*	0.219*
	(0.114)	(0.116)	(0.116)
College	0.0575	0.0711	0.0562
	(0.115)	(0.119)	(0.117)
Personal Characteristics	Yes	Yes	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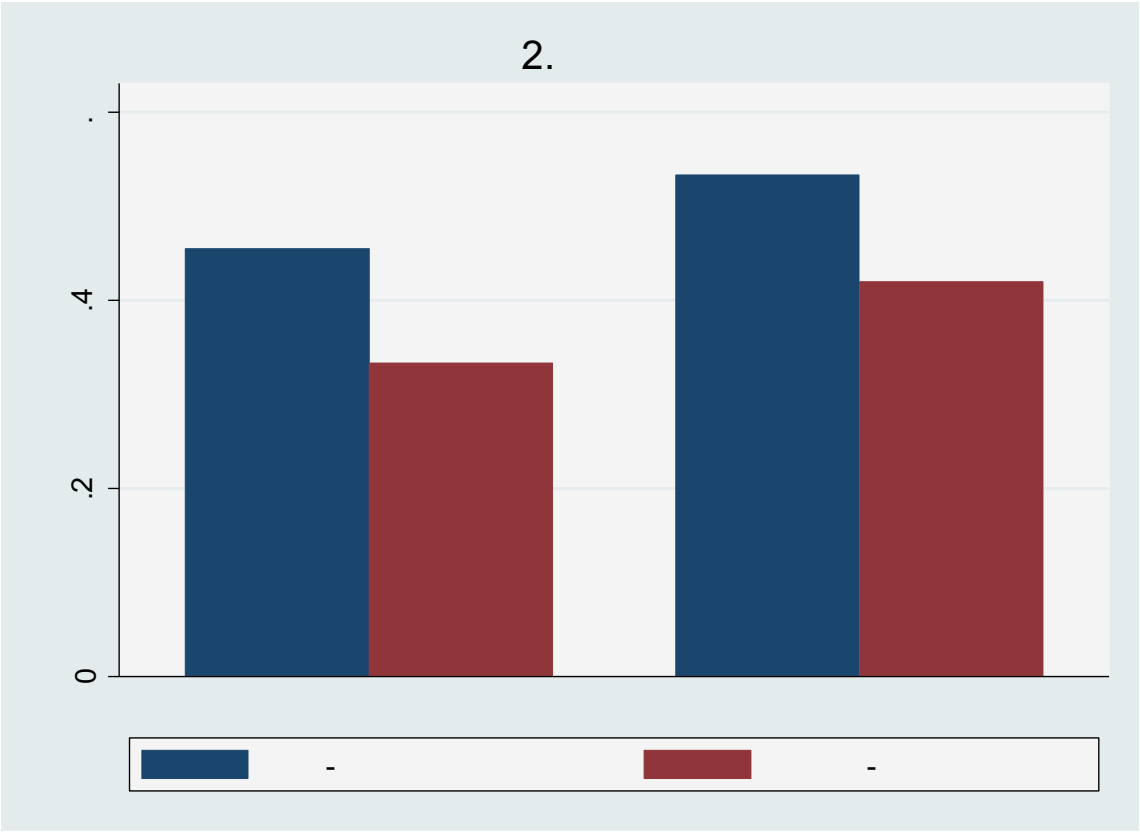
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