**Wage Dynamics of Workers with Temporary Job Experience:**

 **Wage Growth by Type of Job Transition**

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June, 16, 2017

**Abstract.** As the number of temporary jobs have increased over time, the labor markets in the world have seen increasingly more workers entering labor markets through temporary jobs and transiting to regular jobs later. Using a panel database (the Korean Labor and Income Panel Survey, KLIPS), we find evidence of partial convergence that the workers who held temporary jobs exhibit a higher wage growth than those who held regular jobs from the beginning of their work career. We also find that the higher wage growth tends to be associated with tenure for job stayers and with labor market experience for movers. Finally, we propose a theoretical framework to account for our findings. We argue that (i) for stayers, tenure reveals the learning process on worker ability and matching component between a worker and an employer, and (ii) for movers, labor market experience reflects the reward of searching for a productive match.

1. Introduction

 As the number of temporary jobs has increased since the late 1990's, many of new opened jobs are filled with temporary workers. Accordingly, the labor markets in the world have seen increasingly more workers entering labor markets through temporary jobs and transiting to regular job later. Little, however, is known about how workers' temporary job experience at early stage in labor market affects worker's future labor market outcomes and which factors cause the effect.

 Previous research related with temporary workers has mainly dealt with the effect of temporary job experience on probability of workers' transferring to regular jobs, which can be seen as somewhat short-run effect of temporary job experience (Amuedo-Dorantes, 2000; Chung and Kwon, 2016). Studies on long-term effect of the temporary work include Booth (2000) and Amuedo et al. (2007); both examine how the temporary work experience affects the future wage of workers. Booth et al. (2000) analyze influence of the number of previous temporary jobs on wage at regular jobs. Amuedo et al (2007) show the effect of temporary work duration on subsequent wage depending on job mobility. According to the results of both studies, while temporary job experience has negative effects on wage level, certain type of temporary job experience positively affects wage growth. Thus, these studies suggest that the wage difference between initial regular workers and regular workers with temporary job experience can decrease owing to higher wage growth of the latter group.

 Although these previous studies have shown how temporary work experience influences future wage, they did not explain what elements cause the effect. In this study, we focus on the mechanism through which temporary job experience affects the future wage of workers.

 Wage growth over a career reflects accumulation of general human capital, growth in firm-specific human capital within a given firm, and movement of job match component. This study pays attention to match component between firms and workers. For workers who have previously held temporary jobs and transit to regular jobs, temporary job experience potentially provides probationary stage and time to search a better matched job. Also, employers can learn worker's productivity and screen workers during temporary contract periods. The change of match component through these process is shown through wage change in regular job. "Experienced good" model of job matching (Nelson, 1970; Jovanovic, 1979b) has explained that match quality is not known ex ante but is learned over time as the match is experienced and productivity-related information is revealed. Thus, wage change by the match quality within a given firm has been gradually reflected into tenure. On the other hand, newly evaluated abilities obtained by mobility are represented through labor market experience.

 In an empirical analysis, by separating wage growth path into tenure and labor market experience, we could guess by which factors temporary work experience influence wage. Also, because the wage growth mechanism will be different depending on job mobility, we will distinguish whether a worker transfers to regular jobs within a firm or by moving to another firm: stayers and movers. Finally, to explain the empirical results, we provide the theoretical framework encompassing matching model and employers' learning.

 Using KLIPS data, wefind that the temporary job experience has negatively effect on wage level but higher wage growth of workers with temporary job experience narrows the wage difference from initial regular workers; the higher wage growth is shown through tenure for firm-stayers and through labor market experience for movers. The framework presents the explanation on the higher wage growth of workers with past temporary job experience. For stayers, the results of learning process on ability and matching component between workers and employers are revealed through tenure. For movers, reward of searching process for good matching is presented on labor market experience.

 In the following section, we describe the data source and descriptive statistics for workers with prior temporary experience in the Korea labor market. Section 3 & 4 show empirical specifications for examining the impact of past temporary experience on wage growth in regular jobs. In Section 5, we introduce theoretical background on mobility and wage growth. In Section 6, we provide a theoretical framework which integrates job matching model and employer's learning to explain the empirical results of section 4. In final section summarizes and draws conclusions.

2. DATA and Descriptive evidence

 This paper uses Korea data from Korea Labor and Income Panel Study (KLIPS) to show the wage dynamics of workers with temporary job experience. KLIPS has surveyed households and individuals on job-related items since 1998 and provides 18 waves which is long enough to demonstrate how workers wage have changed. Since KLIPS has included job history data, it is observable for a worker to start a job and move to another job. In addition, this data includes not only job-related characteristics such as wage being paid, the number of jobs held ,industry, and occupation but also individual characteristics such as age, sex, and marital status.

 KLIPS has given three sorts of data on the type of non-standard work contracts. The First of them is a voluntary declarative variable on whether individuals are included in non-standard contract. Considering the fact that type of variable has been surveyed since initial wave except 2000, voluntary declarative variable is adequate for study of wage dynamics. The second one is a work status variable, which distinguishes fully-employed workers, temporary workers and daily workers based on contract period. If contract spell of a worker is over only one year, the worker is classified into fully-employed worker. Otherwise, a workers is classified into temporary and daily workers. Because, in practice, many of temporary workers works over one year, the classification criteria of the work status variable does not fully distinguish between regular workers and temporary workers. The last of them is the variable of type of non-standard contract surveyed since 2003. It fully reflects the concept of Korea Economic Active Population Survey and provides detailed classification criteria on temporary workers. However, the missing of initial four surveys causes incomplete job history data for a lot of sample, which makes analysis of wage dynamics difficult. Consequently, we choose the voluntary declarative variable as indicator to distinguish temporary workers form regular workers.

 The wage variable is the logarithm of average hourly wages, computed as the ratio of monthly wage income to weekly hour of work. Hourly wages are deflated using the consumer price index. Duration of temporary jobs is computed using starting and end date variables[[1]](#footnote-1) at each job and if a worker has more than one temporary job, we sum the duration of temporary job the worker has had. We create the past temporary job number a worker has had. We generate a transition type dummy that utilizes job sequence variable; if the job sequence changes when the worker become a regular one, the transition dummy is one and if the job sequence remains when the worker becomes a regular one, the transition dummy is zero. The regular job entry age is the age the workers report themselves as regular workers for the first. Of course, the initial regular job entry age is the same as the labor market entry age.



 The sample only includes males who reports themselves as regular workers in the lastly observed survey. Table 1 summarizes key demographics, work history, and labor market outcomes for our full sample and for each group distinguished on regular jobs' entry type: initial workers, stayers, and movers. Of the sample reporting themselves as regular workers, 75% initially enter the labor market as regular workers(initial regular workers) and 25% have past temporary work experience; among the latter, 17.4% are transferred to regular jobs by changing firms(called mover) and 7.6% are promoted to regular jobs within a firm (called stayer). Most of the sample has postsecondary education. Although, compared to initial regular workers, movers show the lower ratio for postsecondary education, each distribution of education level is not quite different between two groups. However, stayers have slightly lower percentage of postsecondary education than other groups.

 Panel B of Table 1 shows the average earnings of stayer and mover in temporary jobs and how many they have temporary jobs and how long they work on the temporary jobs. There is no considerable difference in prior average wage and the number of temporary job between two groups. But, in terms of temporary job duration, stayer worked much longer time as a temporary worker than mover. The labor market outcome after transition to regular worker is presented in panel C in Table 1. The average wage in regular job is higher in order of initial workers, stayers and movers. Relatively, stayers have longer tenure than mover. That is natural because mover changed firms to transfer to regular worker. In addition, the regular entry age is noticeably high for stayers, though the age is not, which could imply that stayers enter labor market in similar period with other groups but they need longer time for promotion to regular job than other groups in a way consistent with the longer temporary job duration of stayers.

 Considering relatively low education level and long temporary experience of stayers, it is likely that stayers' productivity is evaluated through work-experience within a firm rather than signal from education. Movers' relatively high education level, frequent job movements and voluntary quit of temporary job[[2]](#footnote-2) suggest thatmovers' wage gain is achieved from job search process. In following section, we examine the effect of past temporary job experience on wage in regular jobs after controlling for individual and firm characteristics.

3. Empirical model

We now analyze the effect of prior temporary work experience on wage dynamics on regular job. The specification of wage equation adopting Mincer type can be written as

(1)

where the subscripts refer to worker *i* in firm *f* at time *t*. is the real average hourly wage*.*  denotes labor market experience and is worker tenure. We also include square terms of and . The term denotes the duration of temporary work of worker and and refer their interaction term with tenure and labor market experience, respectively. The vector of covariates(X) includes age, education, marital status, the sector and size of their employing organization, occupation, the dummy of existence of union in the firm, the number of temporary job held before transition to regular worker, the age when sample enters regular job, unemployment rate , year dummy . The error term contains a time-invariant individual-specific component, , a time-invariant firm-specific matching component, , and a white noise, . We assume that the three components are distributed independently distributed from each other.

 The OLS estimation of (1) are consistent only if regressors, especially *temp,* are conditionally uncorrelated with the error term. In particular, the duration of temporary work, and the number of temporary job have possibility to be correlated with unobserved individual characteristics. Using the advantage of longitudinal date, we use fixed effects models to estimate consistently the wage equation in presence of endogeneity of the temporary work experience. The fixed model takes the following equation:

(2)

4. Estimation Results

 Table 2 presents estimates of the causal effect of temporary work experience on subsequent wage dynamics on regular job. The sample of this estimate is confined to the sample who has observed more than three subsequent periods after transition to regular jobs for providing work history long enough to analyze the prior temporary job experience's effect on wage dynamics. Also, the sample of the estimate is restricted to workers who enter the regular job before 40 years old.

 Table 2 displays the coefficient estimates from pooled OLS specification as well as from fixed-effects model (Eq. (2)). The panel A of Table2 estimate implies that a man who had temporary job faces 1.7% wage gain as the duration of temporary job increases by six month but 7.6% wage reduction as the number of temporary jobs increases. For example, if a worker with one temporary job for six months works for one year as a regular worker, the worker has about 6% wage reduction compared to an initial regular worker.



 In wage growth, temporary job experience does not seem to have a significant effect on it through tenure and rather negatively affects it as labor market experience increases. However, OLS estimate results have possibility to systematically underestimate the effect of temporary work experience on wage dynamics. Thus, we focus our discussion on the more complete specification of the two, fixed-effect model. After we account for worker's unobserved heterogeneity in fixed-effects specification, the return to experience for worker with six-month temporary work history is higher 0.3% than for initial regular workers while the return to tenure is not significantly different between initial regular workers and workers with temporary work history.

 As we notice in descriptive statistics, there is heterogeneity between stayers and movers. Regarding stayers and movers as one group would mask the precise estimate result of temporary job effect on wage dynamics. In Table 3, we split workers with temporary job history into stayers and movers and display the coefficient of fixed-term work experience and their interaction term with tenure and labor market experience. Concentrating on the fixed-effect coefficient result in Table 3, we do not figure out the past temporary work effect on wage level, but catch the effect on wage growth and the path of the wage growth.

 The second column of Table 3 shows that stayers have 0.3% higher wage growth than initial permanent workers and it is shown through tenure. According to the fourth column of Table 3, movers' wage growth is higher by 0.3% than initial permanent workers as labor market experience increases by one year.



 Considering the negative effect of the number of temporary job on wage level in pooled OLS (column [1], [3]),[[3]](#footnote-3) the higher growth rate of the stayers and the movers narrows the wage differential from initial permanent worker's wage. However, the fact that the path of wage growth is represented differently by the type of transition to regular job leaves the question about the cause of wage growth. The next sections provide a theoretical framework to answer the question.

5. Theoretical Background of wage dynamics and mobility

 A number of theoretical model have attempted to explain the wage dynamics and mobility. The models we focus on are search model and matching model. Matching model can be divided into two group: "search good" model of job matching and "experienced good" model of job matching. Search good model (Burdett (1978), Jovanovic (1979a)) assume constant productivity within a particular job and it is observable ex ante. Job mobility is the process of searching a good match. Due to job movement cost, the wage oﬀer, which is matching quality, in the new job needs to be significantly greater than current wage to induce an individual to switch jobs. "Experienced good" model ( Nelson, 1970; Jovanovic, 1979b) argues that productivity in a particular job is constant but there may initially be uncertain over a worker’s actual productivity within a particular job. Workers face a distribution of actual productivity arising from their different ability within jobs available in the labor market. As job tenure increase, additional information related to the worker’s actual productivity is revealed. If the realized match quality is lower than workers expected, workers move to another job. In sense that the match component is not known ex ante, the experienced good matching model seem to be more realistic.[[4]](#footnote-4) Thus we encompass the logic of experienced good matching model. In addition, considering that employers cannot have full information on workers' abilities in reality, we adopt the employers' learning model (Farber and Gibbons,1996; Altonji and Pirret, 2001). Although each model suggests different prediction on wage dynamics, only one model could not explain consistently the wage dynamics and mobility observed in data. Thus, synthesis of each model help to understand the empirical results.

6. Model

 In each period, labor markets opens. Workers *i*'s innate ability is denoted , which follows normal distribution with mean, , and standard deviation, . A worker 's effective ability, , is a function of the worker's innate ability, matching component, with firm *,* and worker's tenure, , in a firm,.

 (3)

where and

 All firms are identical and the only input is labor. A firm consists of two different jobs, regular job(R), and temporary job(U). While regular job guarantee job security, temporary workers are employed only one period and fired unless they are promoted to regular job workers. Workers produce output by the following production function at each job,

 (4)

where and are constants known to all labor market participants and is a noise term drawn from a normal distribution with mean 0 and variance, . We assume that . This type of production function specification (Gibbons and Waldman, 1999) implies that, in a temporary job, once labor is inputted, certain level of productivity is guaranteed but the growth rate of productivity of it reacts less sensitive to workers' effective abilities. This type of productivity technology can be shown in routine and standardized work. On the other hand, in regular jobs, inputting labor does not substantially increase productivity in a regular job but productivity substantially increases responding to workers' innate abilities. In high skilled and sophisticated works, this kind of technology could be observed.[[5]](#footnote-5) Considering the fact that temporary jobs are concentrated on routine jobs and regular jobs show high ratio on high skilled job, this distinction of production technology between regular job and temporary job seem to be appropriate.



Figure1. Productivity Technology of Regular and Temporary Job

 This production technology characterizes that the a worker's productivity is not influenced by other worker's job assignment, which is also shown to those in Waldman (1984b) , Gibbons and Katz (1992), and Bernhardt (1995). Thus, under this production technology, for the optimization of the firm's productivity, it is sufficient to properly assign all the workers to one of two jobs. There exists such as . Therefore, given full information on worker's innate ability, by the efficient assignment rule, the employer assign worker to regular job(R) if and to temporary job(U) if .

Time line

 At the beginning of each period, each firm announces recruiting plan and workers apply to each job. Then, each firm employs workers according to efficient allocation rule. Once workers are employed, matching components are realized and workers product outputs. After observing the output, employer updates the worker's effective ability and determine whether they promote each temporary worker to regular job. Remaining temporary workers decide whether they try moving to regular job.



Figure 2. Time line

A. The Full information

 Under full information on workers' innate abilities, an employer can observe workers' innate abilities. Hoever, before employment, employers and employee do not know how matching component will be realized. Thus. employers employ workers based on expected productivity and pay wage as same as the expected productivity.

 (5-1)

 (5-2)

 Let denote expected effective level at which is equal to and let =. Then, employers allocate workers to regular job if and to temporary job if . After employment, matching component get realized and workers produce output.

 (6-1)

 (6-2)

 Then, Employers observe the outputs and decide promotion of temporary workers to regular job based on efficient allocation rule. Because, once the matching component is realized and output is produced, employers know the each factor of productivity, there is no uncertainty of information for promotion decision. Each temporary worker is promoted to regular job if and not promoted if Remaining temporary workers can try to apply the regular job in another firm at next period. However, each firms already knows each worker's innate ability and expected productivity do not vary at next period. Thus, remaining temporary workers are again employed as temporary worker.

 Among temporary workers at the first period, only some workers who has sufficient high matching component and moderate innate ability can be promoted to regular job. Most of temporary workers remain in temporary jobs and go through low wage growth than regular workers. Promoted workers face wage growth through tenure because of good matching component learned during temporary job. Initial regular workers' wage grow as tenure increase. This result is accordance with the empirical result of stayer group. However, the full information case cannot explain the mover group. Thus, in next step, we ease the assumption on the completeness of information on workers' innate abilities.

B. Incomplete Information

 We now analyze the case of the incomplete information on worker's innate ability. Under incomplete information on workers' innate abilities, when workers enter the labor market, employers have uncertainty on workers' innate abilities. Employers know only the distribution of workers innate ability, Once employers announce recruiting plan, workers send signal on their innate ability,

 (7)

 Signal can be thought as an application form including education, job-related experience, and growth background and an interview through which employers can figure out the worker's characteristic. After observing the signal, employers update their belief on workers' innate abilities through bayesian learning.

 (8)

Then, employers assign workers based on the expected worker's innate ability following the efficient assignment rule.

Completing assignment, each worker's matching component is revealed and workers produce output, , . To promote the temporary workers to regular job, employer, again updates the innate abilities of temporary workers using each worker's output as another signal. Define which denote the signal extracted from the output produced by worker *.* at period 1.

The updated expected worker 's innate ability is

 (9)

Using employers form the worker 's effective productivity. The promotion rule is also same as in full information case. Temporary worker is

 Unlike the full information case, employers still do not know the each worker's innate ability exactly. Under full information, remaining temporary workers do not have incentive to apply regular jobs because their innate abilities are already revealed to other employers, there is no possibility for the worker to be employed in regular job even if they try one more. In other words, the job assignment process has no possibility of misallocation. However, in the incomplete information on the innate ability of worker, there is noise in the information of workers' innate abilities. That causes the case that a worker is assigned to temporary jobs who should be assigned to regular jobs if the workers' innate abilities is observable. The opposite case also can occur especially in the narrow range of centered on the . Thus, if possibility to be assigned to regular job is sufficient large, remaining temporary workers try applying the regular job. The probability of regular job employment is

 (10)

The expected payoff of applying regular job is

 (11)

 is the expected wage in regular job and is the expected wage in temporary job and is the application cost which is non-negative. Worker applies to regular job *if* and do not apply and stay in temporary job *if* . Among the temporary workers who apply to regular job, the successors called mover will go through higher wage growth. (Movers occur because their innate abilities were underestimated at the first period.) The wage growth is shown through labor market experience; a mover transfers a new employer who estimate his innate ability better and thus the wage increases by moving to new job which could not be presented through tenure.

 This incomplete information case shows why stayers and movers present different path of wage growth after transition to regular job. Like the full information case, for stayer, high matching component within a firm enables the worker to be promoted to regular job even though his own productivity shown through signal is not high enough to be employed as a regular worker. Then, higher wage growth as the result of promotion is shown through tenure. In case of mover, unlike the full information case in which mover does not occur at all, the noise in the signal on the worker's innate ability causes non-perfect efficient assignment. Some temporary workers who have sufficient high probability of regular job assignment try to move to regular job and get one more time to be reevaluated on their innate ability. Those who succeed in the turnover as a regular worker face higher wage growth through total labor market experience.

7. Conclusion

 With increase of the number of temporary jobs, many of new entrants in labor market have gone through temporary jobs and move to regular jobs. Using data from Korea Labor and Income Panel Study – which distinguish regular workers with past temporary job experience depending on the type of transition to regular jobs, stayers and movers – we show that, while temporary job experience have negative effects on wage level, regular workers with temporary job experience have higher wage than initial regular workers. For stayers, higher wage growth is represented through tenure. For movers, it is observed through labor market experience. Thus, the higher wage growth for stayers and movers reduces the wage differential from initial regular workers. To explain our finding, we propose theoretical framework encompassing "experienced good" matching model and employers' learning. We argue that, for stayers, tenure reveals the learning process on worker ability and matching component between a worker and an employer, and, for movers, labor market experience reflects the reward of searching for a productive match. This result implies that temporary job experience could provide probationary stage and search time for workers and screening device for employers.

 Although this study tend to view the past temporary job experience mainly from matching model, there exist possibilities that the higher wage growth of workers with temporary workers is also contributed from other factors which are not considered in this study. In addition. in terms that this study could not provide reasons for past temporary job experience's negative effects on wage level in regular jobs, further research is necessary. At last, because the ratio of temporary workers who later move to regular jobs is not high, we need to interpret our results considering our sample's specificity.

Reference

Amuedo-Dorantes, C., & Serrano-Padial, R. (2007). Wage growth implications of fixed-term employment: An analysis by contract duration and job mobility. *Labour Economics*, *14*(5), 829-847.

Altonji, J. G., & Pierret, C. R. (2001). Employer learning and statistical discrimination. *The Quarterly Journal of Economics*, *116*(1), 313-350.

Booth, A. L., Francesconi, M., & Frank, J. (2002). Temporary jobs: stepping stones or dead ends?. *The economic journal*, *112*(480), F189-F213.

Ghinetti, P. (2013). Temporary Employment, Job Mobility and Wage Growth in Italy. *Rivista italiana degli economisti*, *18*(2), 175-200.

Light, A., & McGarry, K. (1998). Job change patterns and the wages of young men. *Review of Economics and Statistics*, *80*(2), 276-286.

Farber, H. S., & Gibbons, R. (1996). Learning and wage dynamics. *The Quarterly Journal of Economics*, *111*(4), 1007-1047.

Nelson, P. (1970). Information and consumer behavior. *Journal of political economy*, *78*(2), 311-329.

Jovanovic, Boyan. "Job matching and the theory of turnover." *Journal of political economy* 87.5, Part 1 (1979): 972-990.

Jovanovic, B. (1979). Firm-specific capital and turnover. *Journal of political economy*, *87*(6), 1246-1260.

Burdett, K. (1978). A theory of employee job search and quit rates. *The American Economic Review*, *68*(1), 212-220.

Chung, & Kwon. (2016). 가교 혹은 함정? 노동시장 구조와 비정규직 근로자의 고용형태 전환에 대한 연구. *인사조직연구*, *24*, 9-41.

1. In case of missing values of end date, using next job start date variable, the end date is imputed. For minimizing the imputing error, job duration variable is categorized by six month. [↑](#footnote-ref-1)
2. Although the number of job movement and the reasons of job movement are not shown in the Table 1, this information can be provided on request. [↑](#footnote-ref-2)
3. The amount of the negative effect of the past temporary job is corresponding to the estimate result of Booth et al(2002) using IV-GLS model. [↑](#footnote-ref-3)
4. Light, A., & McGarry, K. (1998) examine which model can explain the wage change of young workers among several models explain the wage and mobility. As a result of the examination, they support "experienced good" matching model. [↑](#footnote-ref-4)
5. Not all temporary jobs are represented in routine and standardized work and not all regular jobs are sophisticated and high skilled work. [↑](#footnote-ref-5)