

# Chicago Fed Letter

## Job switching and wage growth

by R. Jason Faberman, senior economist, and Alejandro Justiniano, senior economist and research advisor

This article shows a remarkably strong relationship between job switching and nominal wage growth. We also find a fairly strong relationship between job switching and the cyclical component of inflation. Furthermore, job switching seems to be predictive of both wage growth and inflation.

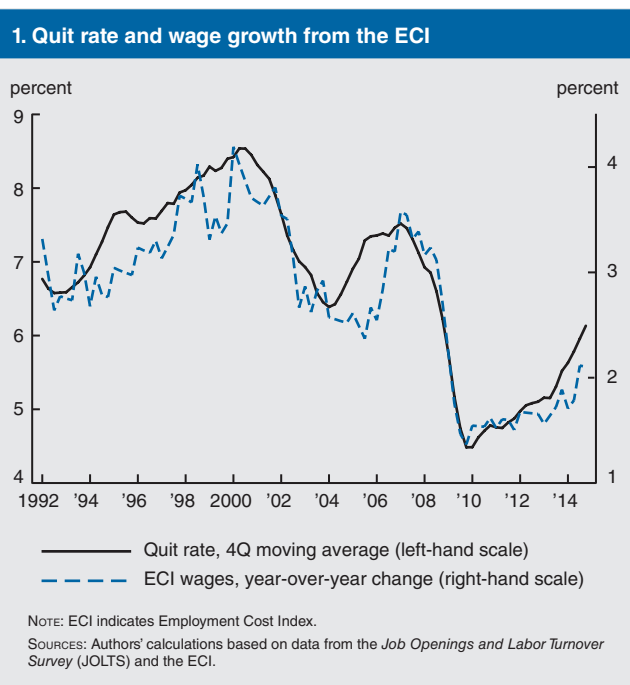
The current debate on monetary policy centers around the issue that inflation has remained weak and below expectations, despite a relatively strong labor market. It is unclear when policymakers

can expect inflation to rise, which could signal a need to raise interest rates.

remains below expectations is that the quit rate is rising but remains relatively low, despite overall growth in the labor market and a rapidly declining unemployment rate. As the quit rate nears its pre-recession pace, it may be predictive of increased wage growth and, ultimately, higher inflation.

### The cyclical nature of quits and wage growth

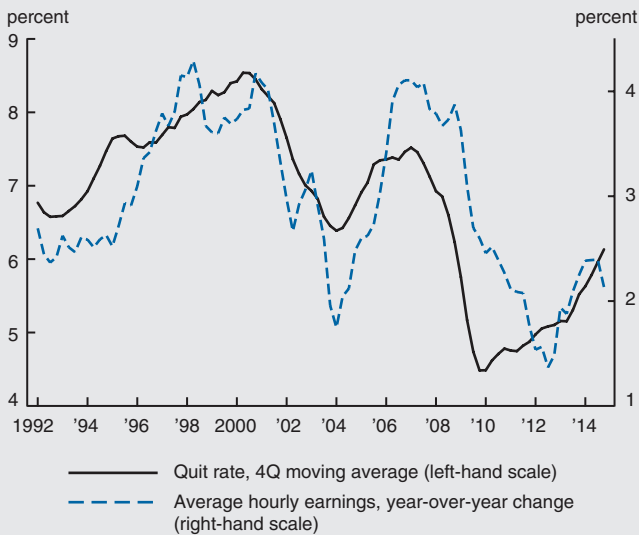
People generally switch jobs by quitting (rather than losing) their previous job. Furthermore, the vast majority of people observed quitting their job tend to move directly to a new job, rather than becoming unemployed or exiting the labor force.<sup>2</sup> Therefore, estimates of worker quits provide a good measure of job switching in the U.S. economy. Data from the *Job Openings and Labor Turnover Survey (JOLTS)* provide an estimate of the aggregate quit rate each month for the U.S. economy since 2000. Recent research by Steven Davis, R. Jason Faberman, and John Haltiwanger has extended the JOLTS data series back to the early 1990s.<sup>3</sup> Their work shows that quits are highly procyclical. That is, they rise during expansions and fall during recessions. This is seen in figure 1, which shows the quit rate (solid line), measured as total quits during the quarter divided by quarterly employment, since the last quarter of 1991. It varies between a peak of 8.7% of employment during the boom



Economists often focus on the negative relationship between the unemployment rate and wage growth as a gauge of future inflation.<sup>1</sup> In this *Chicago Fed Letter*, we show that the worker quit rate, a proxy for the pace of job switching in the U.S. labor market, is also a strong predictor of nominal wage growth. This is not surprising, given that job switching tends to reflect individuals moving up a

“job ladder” to higher-paying jobs. Nevertheless, the strength of the relationship is striking. The quit rate also helps predict the inflation gap, which is the difference between actual and long-run expected inflation. Our analysis suggests that one reason inflation currently

## 2. Quits and wages, production and nonsupervisory workers



SOURCES: Authors' calculations based on data from the *Job Openings and Labor Turnover Survey (JOLTS)* and the *Current Employment Statistics (CES)*.

of the late 1990s and a trough of 4.3% at the height of the Great Recession. At the end of 2014, the quit rate stood at 6.6%, still below its pre-recession peak of 7.6%.

The fact that quits are procyclical makes intuitive economic sense. Quits reflect job switching. People are more likely to switch jobs during economic expansions. During these times, there are more jobs available and labor markets are tighter. A tighter labor market implies that employers are more willing to offer higher wages to attract new workers. These higher wages provide a greater incentive for workers to leave their current position and move up what is often referred to as the job ladder. During recessions, labor markets are more slack. There are fewer available jobs and unemployment is higher, so workers have less bargaining power to obtain a better wage offer. Research by Gadi Barlevy suggests that this can create a “sully” effect of recessions, where workers become stuck in either low-quality jobs or jobs to which their skills are poorly matched because of the difficulty in moving up the job ladder during an economic downturn.<sup>4</sup>

The economic intuition behind the procyclicality of quits suggests that wages should be procyclical as well. Since job switching generally involves individuals moving to higher-paying jobs, aggregate wages should rise as the quit rate

increases. Since job switching is more prevalent during expansions, wage growth is higher during these periods and lower during recessions, when the quit rate declines. A similar logic suggests that a low unemployment rate will have a similar effect on wages. Unemployment is low when labor markets are tight. Fewer unemployed means that job seekers will be less likely to accept whatever wage employers offer, which drives the aggregate wage upward. In contrast, unemployment is high during recessions. There are more job seekers competing for relatively fewer job openings. As a result, workers have less bargaining power, leading to reduced wage pressures. Some recent research has shown that there is a strong link between the unemployment rate and wage growth, though these studies differ in their emphasis on the importance of the long-term unemployed (those seeking work for least six months) in affecting aggregate wage growth.<sup>5</sup>

While the evidence thus far suggests a strong link between worker quits and wages, how can these affect inflation? Wage growth and inflation are the outcome of the interaction between workers, who seek to maintain the purchasing power of their wages, and firms, which aim to stabilize their profits through changes in production costs. As a result, inflation and (nominal) wage growth

move in tandem and can reinforce each other. Specifically, since the cost of producing an additional unit of output (known as marginal cost) is a key determinant of a firm’s profits, current (and future) marginal costs are a crucial determinant of inflation.<sup>6</sup> In turn, workers consume goods using income from their wages. Increases in their current (and expected) wages will allow them to demand more goods, increasing their prices. As wages feed into marginal costs and prices determine how many goods workers will demand, the growth rates of the two are tightly linked. Thus, if the worker quit rate influences wage growth, then it should also affect production costs and, hence, inflation.

### Evidence on the quit rate, wage growth, and inflation

Figure 1 plots the year-over-year percentage change in the wage component of the Employment Compensation Index (ECI, dashed line), together with the quit rate (solid line). Both the quit rate and this measure of wage growth are quite procyclical and exhibit strong comovement. Moreover, fluctuations in the quit rate seem to precede fluctuations in wage growth by roughly one to two quarters, suggesting that quits may be a useful predictor of future wage growth. Figure 2 plots the quit rate against an alternative measure of wage growth using

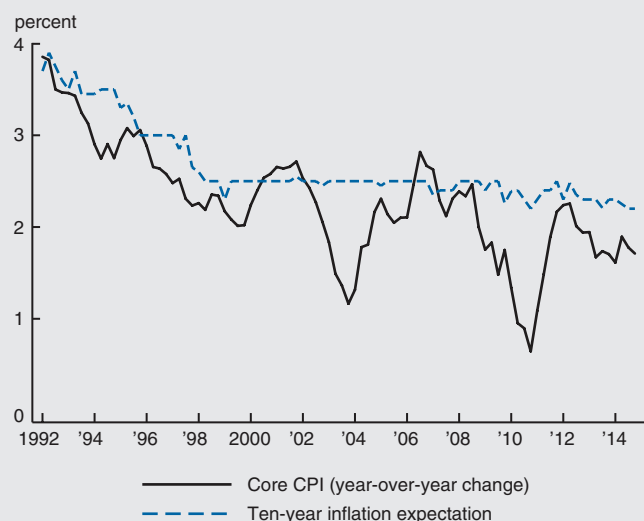
## 3. Quit rate, wage growth, and inflation gap correlation

Correlation between quits ( $q_t$ ) and $x_{t+k}$ , $k$ quarters ahead	$x_t$ equals:		
	Wage growth, ECI	Wage growth, AHE	Inflation gap
$q_t, x_t$	0.88	0.66	0.50
$q_t, x_{t+1}$	0.92	0.71	0.52
$q_t, x_{t+2}$	0.94	0.76	0.53
$q_t, x_{t+3}$	0.93	0.77	0.53
$q_t, x_{t+4}$	0.91	0.78	0.52
$q_t, x_{t+8}$	0.76	0.69	0.25

NOTES: ECI indicates Employment Cost Index; AHE indicates average hourly earnings.

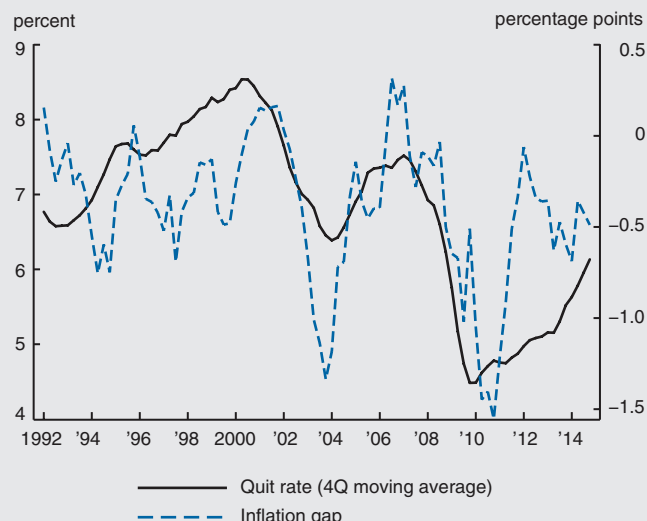
SOURCES: Authors' calculations based on data from the *Job Openings and Labor Turnover Survey (JOLTS)*, the *Employment Cost Index (ECI)*, the *Current Employment Statistics (CES)*, and the *Survey of Professional Forecasters*.

#### 4. Ten-year-ahead expected inflation and actual core CPI inflation



NOTE: Core CPI refers to the Consumer Price Index, excluding food and energy.  
 SOURCES: Authors' calculations based on data from the CPI and the *Survey of Professional Forecasters*.

#### 5. The quit rate and the CPI inflation gap



NOTE: The inflation gap is the difference between core Consumer Price Index (CPI) inflation and ten-year-ahead expected inflation.  
 SOURCES: Authors' calculations based on data from the *Job Openings and Labor Turnover Survey (JOLTS)*, the CPI, and the *Survey of Professional Forecasters*.

the average hourly earnings of production and nonsupervisory workers (dashed line). Wage growth and the quit rate continue to co-move over time, albeit less strongly than in figure 1, and both series exhibit strong procyclical patterns.

Figure 3 shows that the co-movement of the quit rate and wage growth is in fact quite strong. It measures the correlation between them not only contemporaneously but up to eight quarters into the future. The first column reports the correlations between the quit rate and wage growth from the ECI, while the second column reports the correlations between the quit rate and average hourly earnings growth. All correlations are large, but particularly so with the ECI. Moreover, the largest correlations occur between the quit rate and wage growth two quarters ahead using the ECI and four quarters ahead using average hourly earnings. This suggests that changes in the quit rate lead changes in wage growth by six months to a year. More formal evidence is provided by a statistical test that indicates past quit rates help forecast the current behavior of wage growth, beyond using the history of wages alone.<sup>7</sup> In contrast, we find no evidence that past wage growth helps forecast the current quit rate.

As mentioned, because changes in prices and wages are so intertwined, the strong predictive relationship between quits and wage growth should, in theory, translate to inflation. Figure 4 plots the yearly core CPI inflation rate—that is, inflation excluding food and energy—together with expected (yearly) inflation ten years from now from the *Survey of Professional Forecasters*. Both realized and expected inflation exhibited a significant downward trend during most of the 1990s, which is widely attributed to the emergence of an implicit inflation target by the Federal Reserve during this time. Following this period, long-run expected inflation remains remarkably stable. Economists and policymakers often focus on the *inflation gap*, which is the difference between actual and long-run expected inflation, because it better captures movements in inflation that are cyclical rather than part of a longer-run trend. Figure 4 shows that inflation has been running below expectations since the start of the Great Recession, resulting in a persistently negative inflation gap.

Figure 5 shows the relationship between the quit rate and the inflation gap. The quit rate exhibits substantial co-movement with the inflation gap, albeit less so than was the case for wage growth. Most importantly, fluctuations in the quit rate

appear also to lead the inflation gap. The last column in figure 3 reinforces this point: Correlations of the quit rate with future values of the inflation gap are fairly large and peak two to three quarters ahead. As was the case with wage growth, a statistical test showed that past quit rates help forecast the

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inflation gap, but not vice versa. The evidence suggests that the quit rate can help predict future inflation pressures as well as future wage growth.

## Conclusion

Economic theory provides intuitive reasons why the worker quit rate should be highly procyclical and a determinant of wage growth: Job switchers drive up wages as they move up the job ladder,

and opportunities for these moves are more plentiful during booms. Furthermore, theory suggests that since the quit rate helps predict current and future costs of production (through wages), then it should also be important for predicting inflation. We find that these predictions hold true in the data. The quit rate is strongly procyclical and highly correlated with different measures of

wage growth, particularly, and quite remarkably, with the Employment Compensation Index. Moreover, the quit rate also co-moves with the inflation gap. Variations in the quit rate also lead changes in both wage growth and the inflation gap by two to four quarters. This suggests that the pace of job switching is a useful indicator for forecasting the behavior of wages and inflation.

<sup>1</sup> For example, see recent research by Mary C. Daly, Bart Hobijn, and Timothy Ni, 2013, "The path of wage growth and unemployment," *FRBSF Economic Letter*, Federal Reserve Bank of San Francisco, No. 2013-20, July 15, available at <http://www.frbsf.org/economic-research/publications/economic-letter/2013/july/wages-unemployment-rate/>.

<sup>2</sup> For example, Michael W. L. Elsby, Bart Hobijn, and Ayşegül Şahin find that only 16% of quits, on average, enter unemployment; the remainder move to new jobs. See Elsby, Hobijn, and Şahin, 2010, "The labor market in the Great Recession," *Brookings Papers on Economic Activity*, Spring, pp. 1–48.

<sup>3</sup> See Steven J. Davis, R. Jason Faberman, and John C. Haltiwanger, 2012, "Labor market flows in the cross section and over time," *Journal of Monetary Economics*, Vol. 59, No. 1, January, pp. 1–18.

<sup>4</sup> See Gadi Barlevy, 2002, "The sully effect of recessions," *Review of Economic Studies*, Vol. 69, No. 1, January, pp. 65–96.

<sup>5</sup> Examples include Michael T. Kiley, 2014, "An evaluation of the inflationary pressure associated with short- and long-term unemployment," Finance and Economics Discussion Series, Board of Governors of the Federal Reserve System, No. 2014-28; Alan B. Krueger, Judd Cramer, and David Cho, 2014, "Are the long-term unemployed on the margins of the labor market?," *Brookings Papers on Economic Activity*, Spring, pp. 229–280; and Daniel Aaronson and Andrew Jordan, 2014, "Understanding the relationship between real wage growth and labor market conditions," *Chicago Fed Letter*, Federal Reserve Bank of Chicago, No. 327, October, available at <https://www.chicagofed.org/publications/chicago-fed-letter/2014/october-327>.

<sup>6</sup> The dependence on both current and future conditions is because not all prices and wages can be adjusted every period in response to economic conditions. The equations describing the determination of wages and prices are known as the goods price and wage Phillips curve. See, for in-

stance, Argia M. Sbordone, 2006, "U.S. wage and price dynamics: A limited-information approach," *International Journal of Central Banking*, Vol. 2, No. 3, September, pp. 155–191, for a model that formalizes these ideas and empirical evidence that describes reasonably well the evolution of both inflation and nominal wage growth.

<sup>7</sup> This is known as a Granger causality test, a statistical concept that need not imply causality as usually understood. Formally, a variable (say, quits) is said to Granger-cause another (say, wage growth) if the former's lagged values help forecast the latter's beyond the information contained in the latter's own lags. We implement the test using four lags of the quit rate and wage growth and reject the hypothesis that lagged quits do not contain information for future wage growth at the 5% significance level, but do not find evidence in the other direction. See C. W. J. Granger, 1980, "Testing for causality: A personal viewpoint," *Journal of Economic Dynamics and Control*, Vol. 2, pp. 329–352, for more information.