

## Job Applications Rise Strongly with Posted Wages

This edition of *DHI Hiring Indicators* reports new evidence on wage posting behavior by employers and recruiters, and the relationship of posted wages to the number of applicants. The evidence reflects millions of vacancy announcements on Dice.com, an online platform for professionals, employers and recruiters in technology sectors, software development, other computer-related occupations, engineering, financial services, and other professional occupations.

Section I summarizes our key findings. Section II draws on the **DHI Vacancy and Application Flow Database** to present evidence related to wage posting behavior. Section III draws on the **Job Openings and Labor Turnover Survey (JOLTS)** to present statistics on vacancy durations and recruiting intensity per vacancy. Section IV provides more information about the *DHI Hiring Indicators* and DHI Group, Inc. A separate Excel file contains monthly time-series data for statistics in this report and a large set of additional statistics.

### I. Highlights

1. Many job openings posted to Dice.com include numerical information about wages, but most do not.
  - a. At the high end, 47 percent of vacancy announcements for Government jobs and 32 percent for jobs in the Education sector specify a wage or wage range.
  - b. About 12-13 percent of job vacancies in the Technology and Consulting sectors include numerical wage information.
  - c. At the low end, only 3-5 percent of vacancy announcements in Banking, Manufacturing and Electronics contain numerical information about wages.
2. Vacancy announcements with numerical wage information attract more applicants, but the effect is modest.
3. When vacancy announcements contain numerical wage information, those with higher posted wages draw many more applicants. After controlling for the employer, the job title, the job location and other factors, a 1 percent increase in the posted wage is associated with a 9.5 percent increase in the number of applicants.
4. Turning to JOLTS data for the entire U.S. economy, the **DHI-DFH Mean Vacancy Duration Measure** rose to 28.9 working days in February, a full day greater than its revised value for January.

“When employers offer higher wages, they attract more applicants. That’s no surprise, but the size of the effect is large,” said Dr. Steven Davis, Chicago Booth professor and Senior Fellow at the Hoover Institution. “Applicant numbers rise by 9 percent for each 1% rise in the posted wage for vacancy announcements on Dice.com.” Davis is a co-developer of the DHI Database and co-creator of the DHI-DFH Mean Vacancy Duration Measure, the Recruiting Intensity Index and the DHI skill-level measures of labor market tightness.

“Competition remains fierce for tech talent across the United States,” said George McFerran, EVP of Product & Marketing for DHI Group, Inc. “As companies increasingly need tech professionals to build out key products

and support critical initiatives, the competitive landscape becomes more difficult for employers and ideal for tech talent with indispensable, hard-to-find skills.”

## ***II. Results Based on the DHI Vacancy and Application Flow Database***

The **DHI Vacancy and Application Flow Database** links daily application flows to millions of online vacancy postings. The raw data come from DHI Group, Inc., which owns and operates Dice.com and other specialized online platforms for posting job vacancies and attracting applications.<sup>1</sup> Employer-side clients comprise organizations that directly hire their own employees, recruitment firms that solicit applicants for third parties, and staffing firms that hire workers to lease to other firms. Vacancy postings are concentrated in technology sectors, software development, other computer-related occupations, engineering, financial services, and certain other professional occupations. The DHI Database contains over 10 million unique vacancies posted to the Dice.com platform from more than sixty thousand employer-side clients. These postings have attracted over 130 million applications since January 2012.<sup>2</sup>

This report summarizes three findings about wage posting behavior on the Dice.com platform in the period from January 2012 to September 2016.<sup>3</sup> We define “wage posting” as the provision of numerical information about prospective wages in the job vacancy announcement posted to the platform.

First, as shown in Table II.1, the frequency of wage posting varies greatly across industries. At the high end, 47 percent of vacancy postings for Government jobs and 32 percent for Education contain numerical wage information. By way of comparison, about 12-13 percent of postings for jobs in Technology and Consulting include numerical wage information. At the low end, only 3-5 percent of vacancy postings in Banking, Manufacturing and Electronics include numerical information about wages. These results persist when we use regression models to control for the title and location of the job. Thus, the prevalence of wage posting varies greatly across industries even for jobs that are similar in terms of function and location.

Second, our statistical analysis also finds that wage posting is associated with somewhat greater application numbers. Specifically, when we regress the flow of applications per completed posting spell on an indicator variable for wage posting – while controlling for the duration of the vacancy posting, the job title, the employer, the location of the job, and the time period – we find that wage posting involves a 3 percent greater flow of applications.

Third, for vacancy postings that contain numerical wage information – and controlling for the same set of variables as before – we find that a 1 percent increase in the posted wage is associated with a 9.5 percent

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<sup>1</sup> Other DHI platforms include [eFinancialCareers](#), [Rigzone](#), [ClearanceJobs](#) and [Hcareers](#). Analysis of the DHI Database in this report draws on “Application Flows” by Steven J. Davis and Brenda Samaniego de la Parra.

<sup>2</sup> When posting a vacancy, the DHI client decides whether job seekers must file an application via email through the DHI platform or through an external URL operated by the client or a third party. In the first case, the DHI database records the number of completed email applications. In the second case, the database records how often job seekers click through to the external URL. We pool these two classes of vacancies and applications in this report.

<sup>3</sup> These results are based on “[To Post or Not to Post: An Investigation of Posted Wage Information in Online Job Advertisements](#)” by Sylvia Klosin, University of Chicago Bachelor’s Thesis, May 2017.

increase in the number of applicants.<sup>4</sup> This is a large effect, and it suggests that the applications volume is highly sensitive to the posted wage for otherwise similar jobs.

Table II.2. Wage Posting Frequency by Industry

Industry	Number of Vacancy Postings	Percent with Posted Wages
Government	11,026	46.9
Education	18,110	31.5
Utilities	32,630	19.3
Retail	133,812	17.7
Healthcare	19,839	16.0
Technology	1,825,328	12.3
Construction	42,582	10.7
Consulting	1,604,656	10.7
Engineering	31,100	9.0
Finance	33,252	7.9
Telecommunications	39,130	7.6
Banking	38,268	7.0
Insurance	48,597	5.3
Manufacturing	74,651	4.2
Electronics	89,961	2.9

Note: The table lists all industries with at least 10,000 distinct vacancy posting on Dice.com from January 2012 to September 2016.

### **III. Results Based on the Job Openings and Labor Turnover Survey**

The **DHI-DFH Mean Vacancy Duration Measure** rose to 28.9 working days in February, 1 full day above its revised value for January. Figure III.1 shows the evolution of the mean vacancy duration in the United States since 2001. This duration measure reflects the vacancy concept in the Job Openings and Labor Turnover Survey (JOLTS). Specifically, a job opening gets “filled” according to JOLTS when a job offer for the open position is accepted. Thus, the duration statistic refers to the average length of time required to fill open positions. Typically, there is also a lag between the fill date and the new hire's start date on the new job.

Figure III.2 displays four other indicators of labor market slack alongside the mean vacancy duration. All five measures show a pronounced tightening of U.S. labor markets since 2009. Three of the measures – mean vacancy duration, the vacancy-unemployment ratio, and the ratio of vacancies to the number of persons unemployed for 26 weeks or less – exceed their peak values prior to the recession of 2008-2009. The post-recession rise in the mean vacancy duration is especially pronounced.

The **DHI-DFH Recruiting Intensity Index**, plotted in Figure III.3, was 1.04 in February, 0.01 points lower than its revised value for January. Tables III.1 and III.2 below report industry-level statistics for mean vacancy duration and recruiting intensity per vacancy

<sup>4</sup> If the vacancy posting specifies a range of potential offer wages, we set the posted wage to the midpoint for this analysis.

Figure III.1. DHI-DFH Measure of National Mean Vacancy Duration, January 2001 to February 2018

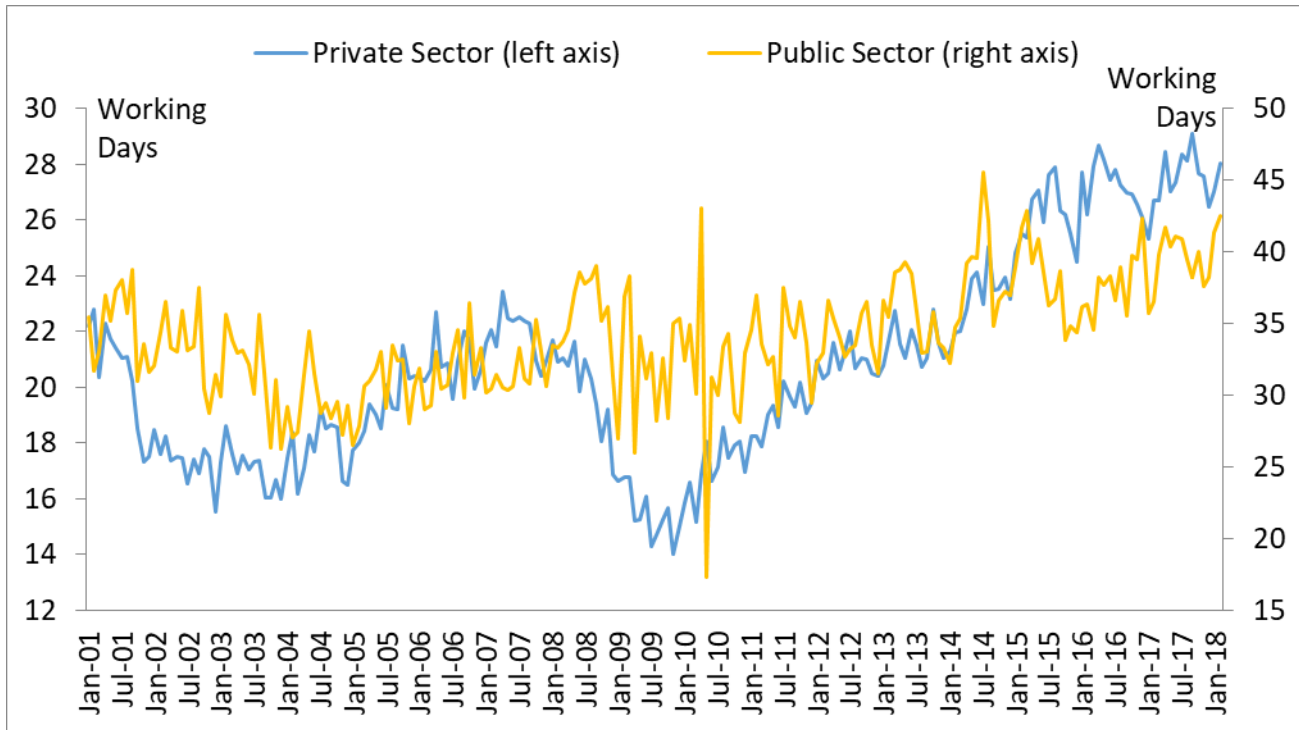
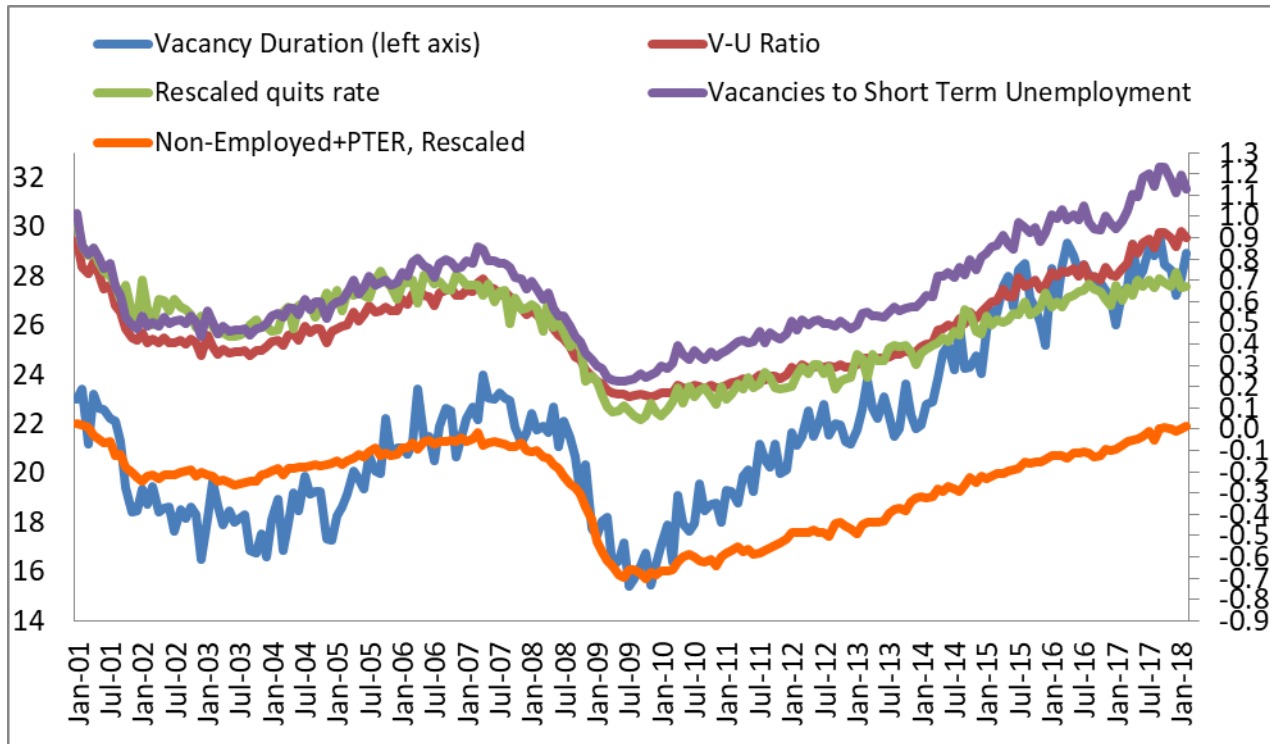


Figure III.2. National Labor Market Slackness Measures, January 2001 to February 2018



Notes: Short Term Unemployment is the number of persons unemployed 26 weeks or less. The Quit Rate is rescaled to have the same mean and variance as the Vacancy-Unemployment Ratio from January 2001 to date. Non-Employment + PTER, an index developed by Hornstein, Kudlyak and Lange, reflects all persons who are not employed (weighted by labor force attachment) plus persons working part time for economic reasons who would prefer full-time work full. Here, their index is multiplied by minus one and then rescaled to have the same standard deviation as the Vacancy-Unemployment Ratio from January 2001 to date.

Figure III.3. DHI-DFH Index of Recruiting Intensity per Vacancy, January 2001 to February 2018

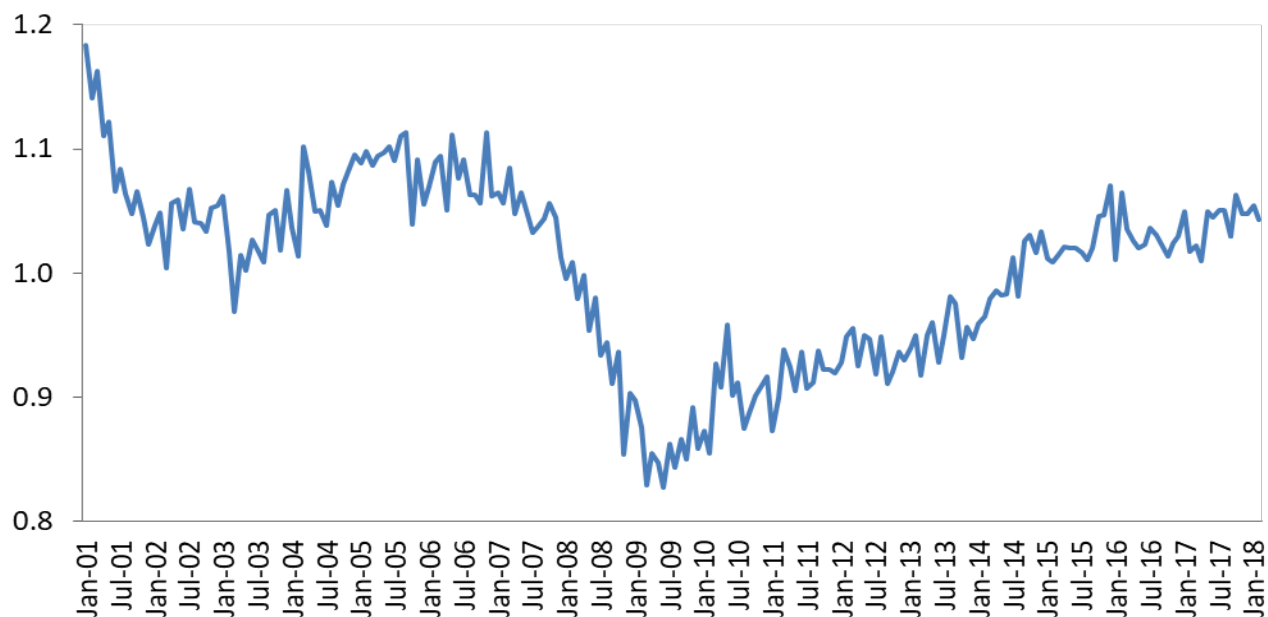


Table III.1. DHI-DFH Measure of Mean Vacancy Duration by Industry and Time Period, No. of Working Days, January 2001 to February 2018

	2001 to 2003	2004 to 2006	2008	2009	2010 to 2012	2013 to 2014	2015 to 2016	2017	Jan-Feb 2018
Resources	12.0	14.0	18.1	13.5	18.7	20.0	15.7	19.9	20.4
Construction	7.9	8.8	7.3	4.3	6.1	10.2	13.1	14.0	15.6
Manufacturing	17.4	20.9	21.6	13.8	23.4	28.8	31.1	30.5	29.1
Wholesale and Retail Trade	14.2	15.8	15.5	13.1	15.9	19.2	22.6	25.9	27.2
Warehouse, Trans. & Utilities	18.6	17.0	20.6	11.3	18.2	23.2	28.5	25.9	32.1
Information	25.8	36.0	34.5	23.4	40.9	36.7	32.4	33.0	37.2
Financial Services	28.0	32.1	27.6	25.7	33.4	36.6	43.8	46.1	41.8
Professional and Business Services	18.3	19.9	21.3	16.6	18.8	20.8	26.7	23.5	22.1
Education	21.3	25.0	22.0	18.5	21.1	25.2	29.7	28.4	27.2
Health Services	39.1	35.8	36.4	29.8	33.5	36.5	46.1	47.7	47.4
Leisure and Hospitality	13.7	14.8	14.9	10.4	13.3	18.0	19.6	20.9	21.7
Other Services	22.5	18.6	25.2	16.9	18.9	20.5	26.0	32.2	30.1
Government	33.2	30.7	35.7	32.2	33.0	36.9	38.0	39.1	42.0
Non-Farm	19.3	20.0	21.1	16.6	20.0	23.3	27.5	28.2	28.4

Table III.2. DHI-DFH Recruiting Intensity Index by Industry and Time Period, January 2001 to February 2018

	2001 to 2003	2004 to 2006	2008	2009	2010 to 2012	2013 to 2014	2015 to 2016	2017	Jan-Feb 2018
Resources	0.99	1.06	1.05	0.70	1.00	1.01	0.95	1.24	1.23
Construction	1.07	1.04	0.89	0.90	1.01	0.91	0.88	0.91	0.88
Manufacturing	1.02	1.09	0.95	0.85	0.94	0.90	0.95	1.09	1.18
Wholesale and Retail Trade	1.05	1.10	0.96	0.84	0.89	0.99	1.02	0.98	1.01
Warehouse, Trans. & Utilities	0.96	1.13	0.94	0.92	0.96	1.06	1.12	1.12	1.17
Information	1.10	1.08	0.87	0.83	0.91	1.08	1.16	1.14	1.14
Financial Services	1.06	1.09	0.99	0.84	0.87	0.97	0.94	0.95	1.00
Professional and Business Services	1.08	1.07	0.90	0.83	0.94	0.98	1.02	1.04	1.05
Education	1.00	0.99	1.04	0.96	0.99	0.97	1.08	1.06	1.07
Health Services	1.08	1.04	1.01	0.93	0.89	0.94	1.01	1.03	1.04
Leisure and Hospitality	1.08	1.08	0.97	0.84	0.88	0.94	1.02	1.00	1.01
Other Services	1.02	1.07	0.94	0.96	0.95	0.97	1.00	1.08	0.90
Government	1.05	1.05	0.94	0.87	0.93	0.96	1.11	1.08	1.08
Non-Farm	1.05	1.08	0.95	0.86	0.92	0.97	1.03	1.04	1.05

#### IV. About the DHI Hiring Indicators

The **DHI-DFH Recruiting Intensity Index** quantifies the effective intensity of recruiting efforts per vacancy by employers with vacant job positions. The index is normalized to an average value of 1.0 for the period from January 2001 to December 2012. It complements the monthly [Job Openings Rate](#) produced by the U.S. Bureau of Labor Statistics (BLS) from the [Job Openings and Labor Turnover Survey](#).

The pace of new hires in the economy depends on the number and types of job seekers, the number and types of job vacancies, and employer actions that affect how quickly vacant jobs are filled. These actions include the choice of recruiting methods, expenditures on help-wanted ads, how rapidly employers screen job applicants, hiring standards, and the attractiveness of compensation packages offered to prospective new hires. The BLS Job Openings Rate captures the availability of job vacancies in the economy, while the **DHI-DFH Recruiting Intensity Index** captures the intensity of employer efforts to fill those vacancies. The index is available at the national, regional and industry levels and by establishment size class (number of employees).

The index construction follows the method developed by Steven J. Davis, R. Jason Faberman and John Haltiwanger (DFH) in "[The Establishment-Level Behavior of Vacancies and Hiring](#)," published in the May 2013 issue of the *Quarterly Journal of Economics*, and extended to industry and regional indices in "[Recruiting Intensity during and after the Great Recession: National and Industry Evidence](#)," published in the May 2012 issue of the *American Economic Review*.

The **DHI-DFH Vacancy Duration Measure** quantifies the average number of working days taken to fill vacant job positions. It supplements other measures often used to assess the tightness of labor market conditions such as the ratio of vacant jobs to unemployed workers.

Vacancy durations depend on the relative numbers of job seekers and job vacancies, the recruiting and search methods available to employers and job seekers, employer recruiting intensity per vacancy, the search intensity of job seekers, and the degree to which the requirements of jobs on offer match the skills, locations and preferences of job seekers. Other things equal, a larger ratio of job vacancies to job seekers yields longer vacancy durations.

The **DHI-DFH Vacancy Duration Measure** follows the method developed by Steven J. Davis, R. Jason Faberman and John Haltiwanger (DFH) in "[The Establishment-Level Behavior of Vacancies and Hiring](#)," published in the May 2013 issue of the *Quarterly Journal of Economics*. That method combines a simple model of hiring dynamics with data on hires and vacancies from the [Job Openings and Labor Turnover Survey](#) (JOLTS) conducted by the U.S. Bureau of Labor Statistics. Using their model and the JOLTS data, DFH estimate an average daily job-filling rate for vacant job positions in each month. Taking the reciprocal of the daily job-filling rate yields the **DHI-DFH Vacancy Duration Measure**, which is available at the national, regional and industry levels and by establishment size class.

The average daily job-filling rate is closely related to the "vacancy yield," the ratio of hires during the month to the stock of vacancies on the last business day of the previous month. Unlike the vacancy yield, however, the daily job-filling rate (and the **DHI-DFH Vacancy Duration Measure**) adjusts for job vacancies that are posted and filled within the month. Working days are defined as Mondays through Saturdays, excluding major national holidays.

The **Skill-Level Slackness Measures** use the daily flow of applications per posting to quantify relative labor market tightness. These measures recognize that job characteristics, such as skill requirements, affect the applications received by each posting, and control for this by grouping vacancies based on the first skill mentioned in the job description. Rising (falling) values for this measure for a particular skill indicate that average daily application flows have increased (decreased), and hence, that labor market tightness fell (rose) for postings that require the skill. For more information about the DHI Vacancy and Application Flow Database and the skill-level tightness measures, see "Application Flows" by Steven J. Davis and Brenda Samaniego de la Parra.

### **About DHI Group, Inc.**

DHI Group, Inc. (NYSE:DHX) is a leading provider of data, insights and employment connections through our specialized services for technology professionals and other select online communities. Our mission is to empower tech professionals and organizations to compete and win through expert insights and relevant employment connections. Employers and recruiters use our websites and services to source, hire and connect with the most qualified and highly-skilled tech professionals, while professionals use our websites and services to find ideal employment opportunities, relevant job advice and tailored career-related data. For over 25 years, we have built our Company on providing employers and professionals with career connections, news, tools and information. Today, we serve multiple markets located throughout North America, Europe, the Middle East and the Asia Pacific region.

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