Mean Vacancy Duration Rebounds to 28.9 Working Days in June

This edition of **DHI Hiring Indicators** reports updated statistics on mean vacancy durations and recruiting intensity per vacancy for the U.S. economy, including results by industry sector, region and employer size. It also reports updated labor market tightness measures for 38 skill categories.

Section I contains highlights. Section II draws on the **DHI Vacancy and Application Flow Database** to present the skill-level tightness measures. Section III draws on the **Job Openings and Labor Turnover Survey** to present statistics on vacancy durations and recruiting intensity per vacancy. Section IV provides additional information about the **DHI Hiring Indicators** and DHI Group, Inc. A separate Excel file contains monthly time-series data for the statistics discussed in this report and a large set of additional statistics.

I. Highlights
1. The **DHI-DFH Mean Vacancy Duration Measure** for the U.S. economy rose to 28.9 working days in June 2017, 1.2 days above the revised value for May,
2. Mean vacancy durations rose from May to June in every major industry sector except Leisure & Hospitality.
3. Jobs that require skills in "Hadoop," "SharePoint," "User Interface" "Salesforce," ".NET" and "JAVA" are among those that have experienced a fall in relative labor market tightness since 2012. That is, job postings with these skill requirements saw large relative increases in the average daily flow of applications per posting.
4. Jobs that require skills in "Applications," "Security," "Solutions" and "Other Software" experienced an increase in relative labor market tightness from 2012 to 2016. Relative labor market tightness for jobs requiring these skills has declined in 2017, but they remain well above pre-2015 levels.

"The June rebound in mean vacancy durations is further confirmation of increasingly tight labor markets in the U.S. economy," said Dr. Steven Davis, William H. Abbott Professor of International Business and Economics at the University of Chicago Booth School of Business. 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 new skill-level measures of labor market tightness constructed using the DHI Database.

"The market to recruit tech talent continues to be incredibly tough and though turnover is on the rise amongst tech pros, companies still can't hire tech pros to work on initiatives quickly enough," said Michael Durney, President and CEO of DHI Group, Inc. "If the recruitment market continues this way – with few available trained professionals and increasing demand for talent—companies are going to have to explore alternative options such as leveraging contractors or freelance professionals to remain competitive and move innovation forward."

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 several specialized online platforms for posting job vacancies and attracting applications. 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 9.5 million unique vacancy postings from more than fifty thousand employer-side clients.[1] These postings have attracted more than 79 million applications since January 2012.[2]

When job openings are plentiful and few people seek new jobs, each vacancy posting tends to attract few applicants. In this situation, we say labor markets are "tight." Conversely, when job openings are scarce relative to job seekers, each posting tends to attract many applicants, and labor markets are "slack." We use DHI data on the daily flow of applications per vacancy posting to operationalize this concept of labor market tightness. Of course, applicant numbers also depend on job characteristics. Partly for this reason, we focus on tightness measures for particular job titles or skills.

To identify skill requirements, we read the extended job descriptions supplied by the prospective employer (or recruiter) for each vacancy posting.[3] For this report, we identify 38 skills that appear often in each month covered by the DHI Database. Table II.1 lists these skills and reports the top-three broad job titles associated with each skill category. The rightmost column reports the number of distinct postings for which the indicated skill is the first skill requirement referenced in the extended job description.

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[1] Currently, the DHI Database draws mainly from DHI's Dice.com platform. Other DHI platforms include eFinancialCareers, Biospace, Rigzone, ClearanceJobs, Health eCareers, and Hcareers. Analysis of the DHI Database in this report draws on "Application Flows" by Steven J. Davis and Brenda Samaniego de la Parra.

[2] 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.

[3] This month's report focuses on "standard postings" and full-month "long-duration postings" that mention at least one of the skills listed in Table II.1. See the October 2016 edition of the DHI Hiring Indicators for a discussion of standard and long-duration postings. The term "full-month" refers to long-duration postings that are active on the first and last day of the month.

Table II.1. Skill Requirements that Appear Often in the DHI Database

First Skill Mentioned	Skill Description	Top 3 Broad Job Titles by (% of Vacancy Postings)	Vacancy IDs
OTHERSOFT	Software skills not covered by other skills on this list	Engineer (65%), Developer (15%), Manager (4%)	657,495
JAVA	Java or Javascript programming languages	Developer (67%), Engineer (16%), Architect (5%)	620,983
SYSTEMS	Jobs that mention "SYSTEMS" before any other skill. A common example is "SYSTEMS ANALYST"	Engineer (30%), Administrator (21%), Analyst (12%)	440,927
.NET	Microsoft's .NET software framework	Developer (79%), Engineer (6%), Architect (4%)	367,387
SAP	(Systems, Applications & Products in Data Processing) refers to any of SAP's software products	Consultant (33%), Manager (11%), Analyst (6%)	296,206
NETWORK	Jobs that mention "NETWORK" before any other skill, e.g., "NETWORK ADMINISTRATOR"	Engineer (56%), Administrator (11%), Architect (6%)	266,787
DATA	Data analysis, administration, storing, etc.	Analyst (21%), Scientist (14%), Engineer (13%)	260,291
ORACLE	Oracle's software or systems products	Administrator (22%), Developer (21%), Consultant (16%)	239,719
WEB	Jobs that mention the "WEB" first, e.g., jobs that require website development skills	Developer (64%), Designer (7%), Engineer (6%)	226,222
APPLICATIONS	Jobs associated with application development	Developer (27%), Engineer (15%), Help / Support (14%)	183,892
SECURITY	Security assurance and development skills	Engineer (29%), Analyst (24%), Architect (6%)	168,302
C	C programming language or development software	Developer (60%), Engineer (23%), Programmer (5%)	165,278
SQL	Structured query programming language or Microsoft's database management system, SQL Server	Developer (42%), Administrator (32%), Analyst (5%)	143,536
DATABASE	Database analysis, administration, storing, processing, security, etc.	Administrator (55%), Developer (15%), Engineer (8%)	105,157
PHP	PHP programming language	Developer (83%), Engineer (8%), Programmer (2%)	103,063
USERIF	Jobs that require skills related to the user interface	Developer (52%), Designer (20%), Engineer (16%)	94,612
MOBILE	Skill required to develop, operate, maintain, etc. mobile applications, systems, or platforms.	Developer (44%), Engineer (18%), Architect (5%)	93,464
LINUX	LINUX operating system	Administrator (42%), Engineer (28%), Development Operations Engineer (12%)	89,658
SOLUTION	Jobs in solutions development teams.	Architect (54%), Engineer (11%), Sales (8%)	87,491

IOS	Apple's mobile operating system	Developer (73%), Engineer (19%), Architect (2%)	79,840
RUBY	Ruby on Rails or RoR, a server-side web application framework	Developer (66%), Engineer (22%), Architect (3%)	78,738
PEOPLESOFT	Oracle's business management software and products	Consultant (21%), Developer (18%), Analyst (10%),	76,376
SALESFORCE	Salesforce.com's customer relationship management platform	Developer (37%), Architect (15%), Administrator (12%)	74,654
SHAREPOINT	Microsoft's web-based application	Developer (44%), Administrator (18%), Architect (11%)	74,589
PYTHON	Python programming language	Developer (53%), Engineer (32%), Development Operations Engineer (4%)	72,925
WINDOWS	Microsoft's operating system.	Administrator (35%), Engineer (27%), Help / Support (9%)	64,624
CLOUD	Internet-based computing that provides shared processing resources and data	Engineer (30%), Architect (22%), Developer (9%)	62,292
ETL	Processes of Extracting, Transforming, and Loading data	Developer (56%), Tester (8%), Architect (8%)	53,685
CISCO	Cisco's networking hardware, telecommunications equipment, services and products	Engineer (56%), Architect (12%), Sales (9%)	45,084
USEREXP	Jobs that require skills related to the user's experience	Designer (61%), Developer (12%), Architect (6%)	37,906
BIGDATA	Jobs that require bigdata skills	Engineer (32%), Architect (25%), Developer (14%)	35,347
INFORMATICA	Informatica's data integration software	Developer (52%), Administrator (12%), Architect (9%)	33,647
UNIX	UNIX operating system	Administrator (53%), Engineer (18%), Help / Support (6%)	32,981
HADOOP	Hadoop's open-source software framework	Developer (36%), Administrator (18%), Engineer (14%)	27,283
WEBSPHERE	IBM's Websphere software products	Administrator (35%), Developer (29%), Architect (8%)	26,152
IBM	Jobs that require skill in using IBM's software and/or hardware	Developer (23%), Consultant (14%), Administrator (9%)	25,400
SAS	Statistical Analysis System software	Programmer (29%), Administrator (18%), Analyst (13%)	21,480
COGNOS	IBM's business intelligence, analytics, and performance management software	Developer (50%), Administrator (10%), Architect (10%)	21,314

Figure II.1 shows the evolution of relative labor market tightness measures for the 38 skill categories. (The figure plots quarterly averages of monthly values.) To construct these measures, we proceed in four steps:

1. Sort vacancies into categories based on the first skill referenced in the extended job description.
2. Compute the average daily flow of applications per posting by skill category and month.
3. Deflate the skill-specific measures from Step 2 by the overall average daily flow of applications per posting. We compute this average by month using all standard and full-month long duration postings that mention at least one of the 38 skills listed in Table II.1.[4]
4. Multiply each deflated series by the overall 2015 average value of daily applications per posting (to recover the units of daily applications per vacancy posting).

The units of the resulting measures in Figure II.1 are average daily applications per active vacancy posting.

As Figure II.1 shows, the level and time path of relative tightness differs greatly by skill category. For example, jobs requiring "Ruby" skills attract relatively few applicants. Active vacancy postings for jobs that require Ruby skills attracted 0.12 applications per day in the first half of 2017, up from an average of 0.07 applications per day in 2012. Postings for jobs that require User Interface skills attracted 2 applications per day in the first half of 2017, a dramatic increase since 2014 and earlier. These results say that relative tightness fell for jobs requiring "Ruby" and "User Interface" skills, perhaps because the supply of workers with these skills rose.

In contrast, job postings that require skills related to "Security," "Solution Development," and "Application Development" experienced an increase in relative tightness since 2012. Job postings with these skill requirements saw large relative declines in the average daily flow of applications per posting between 2012 and 2016. In 2017, relative labor market tightness for jobs with these skill requirements decreased relative to their 2016 levels, but they remain well above pre-2015 levels.

Figure II.1. Skill-Based Relative Labor Market Tightness Measures
3-month Moving Averages, March 2012 to July 2017

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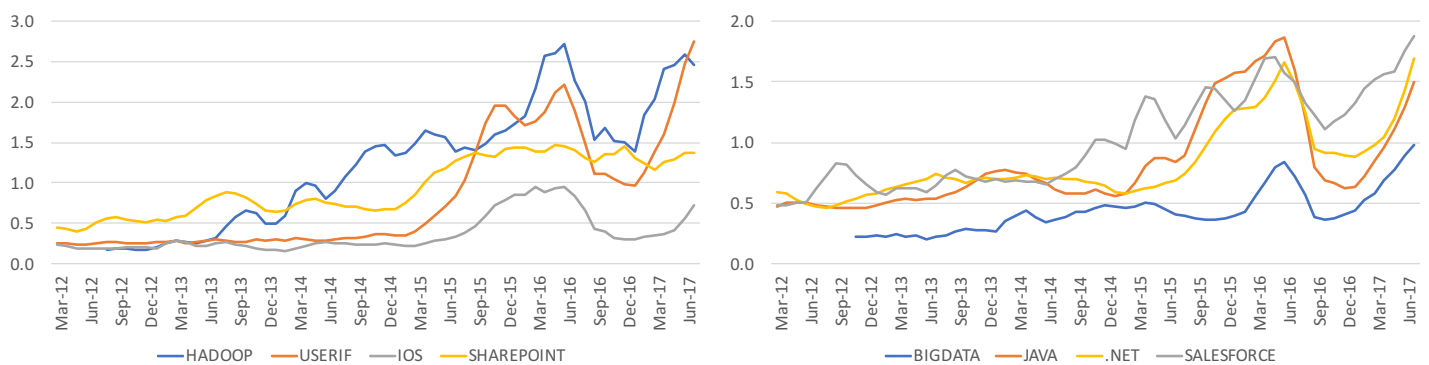
[4] DHI modified the functionality of its Dice.com platform during our sample period in ways that affect application flows. Overall market tightness developments and changes to Dice.com market shares also affect our skill-specific tightness measures. Deflating our skill measures using aggregate daily application flows removes the effects of these changes, assuming they affect all job postings in the sample in a similar manner. The resulting indicators provide us with relative measures of labor market tightness.

Figure II.1. Continued
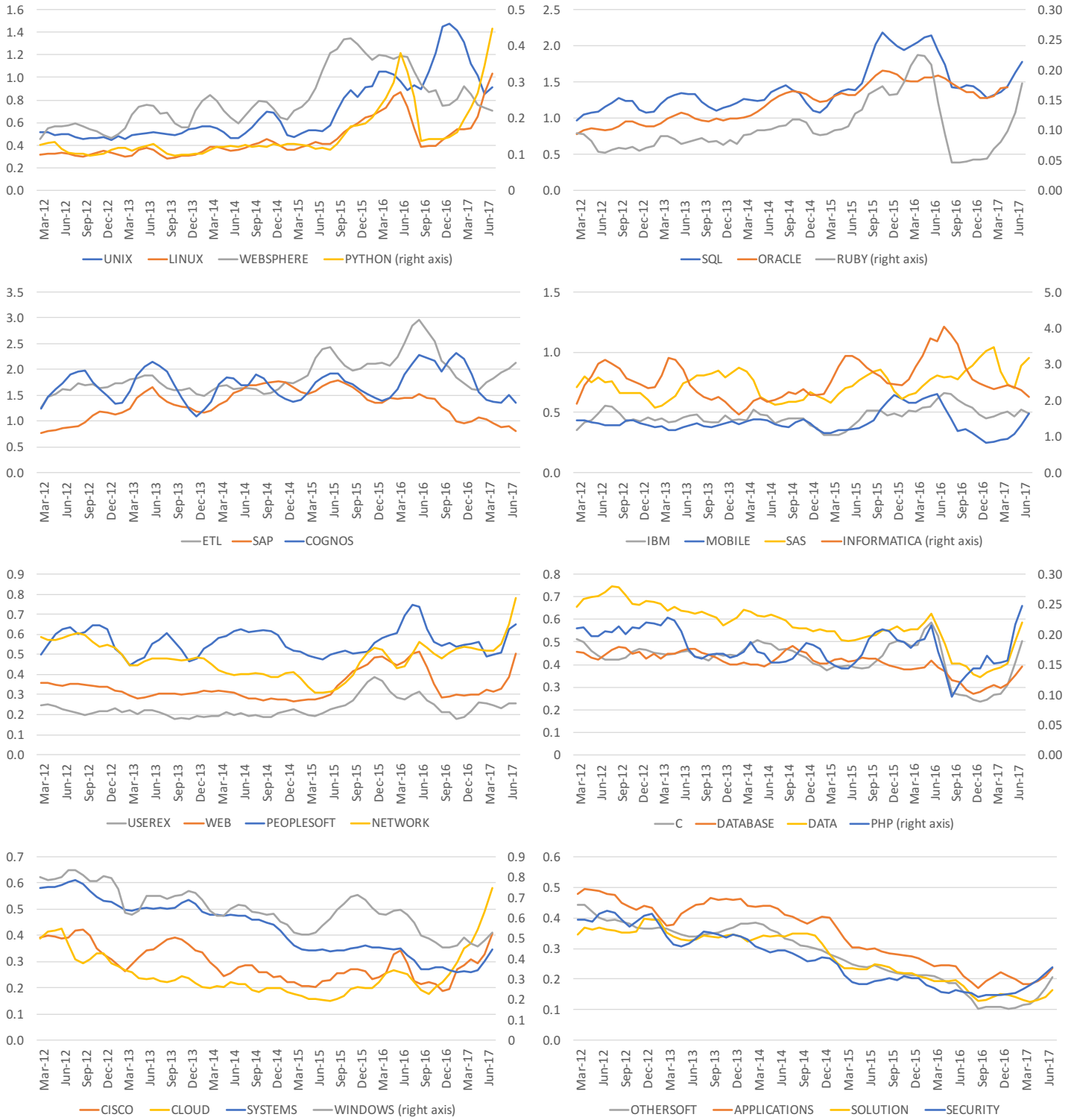
III. Results Based on the Job Openings and Labor Turnover Survey

The **DHI-DFH Mean Vacancy Duration Measure** rose to 28.9 working days in June, 1.2 days above its revised value for May and 1.4 days below the historical peak in April 2017. 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 – now exceed their peak values prior to the recession of 2008-2009. The post-recession rise in the mean vacancy duration is especially pronounced.

Figure III.1. DHI-DFH Measure of National Mean Vacancy Duration, January 2001 to June 2017
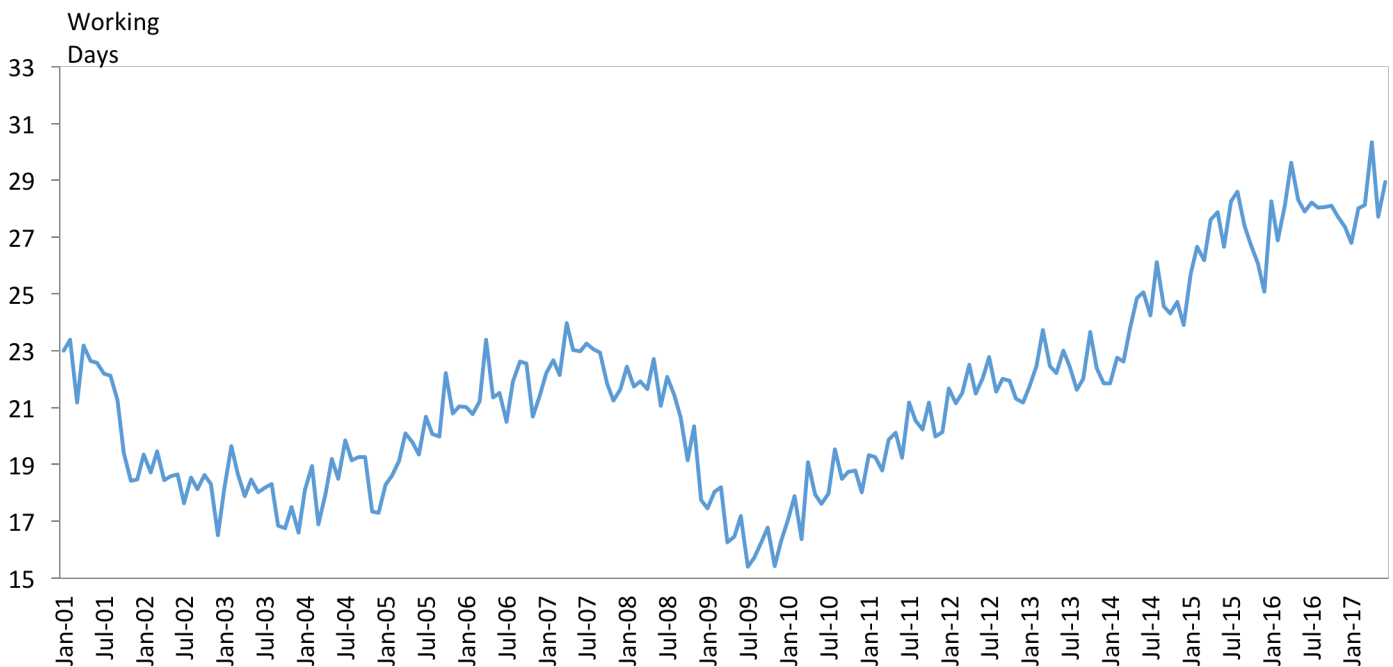
The **DHI-DFH Recruiting Intensity Index,** plotted in Figure III.3, was 1.03 in June, a decrease of 0.02 from the May level of 1.05.

Figure III.2. National Labor Market Slackness Measures, January 2001 to June 2017
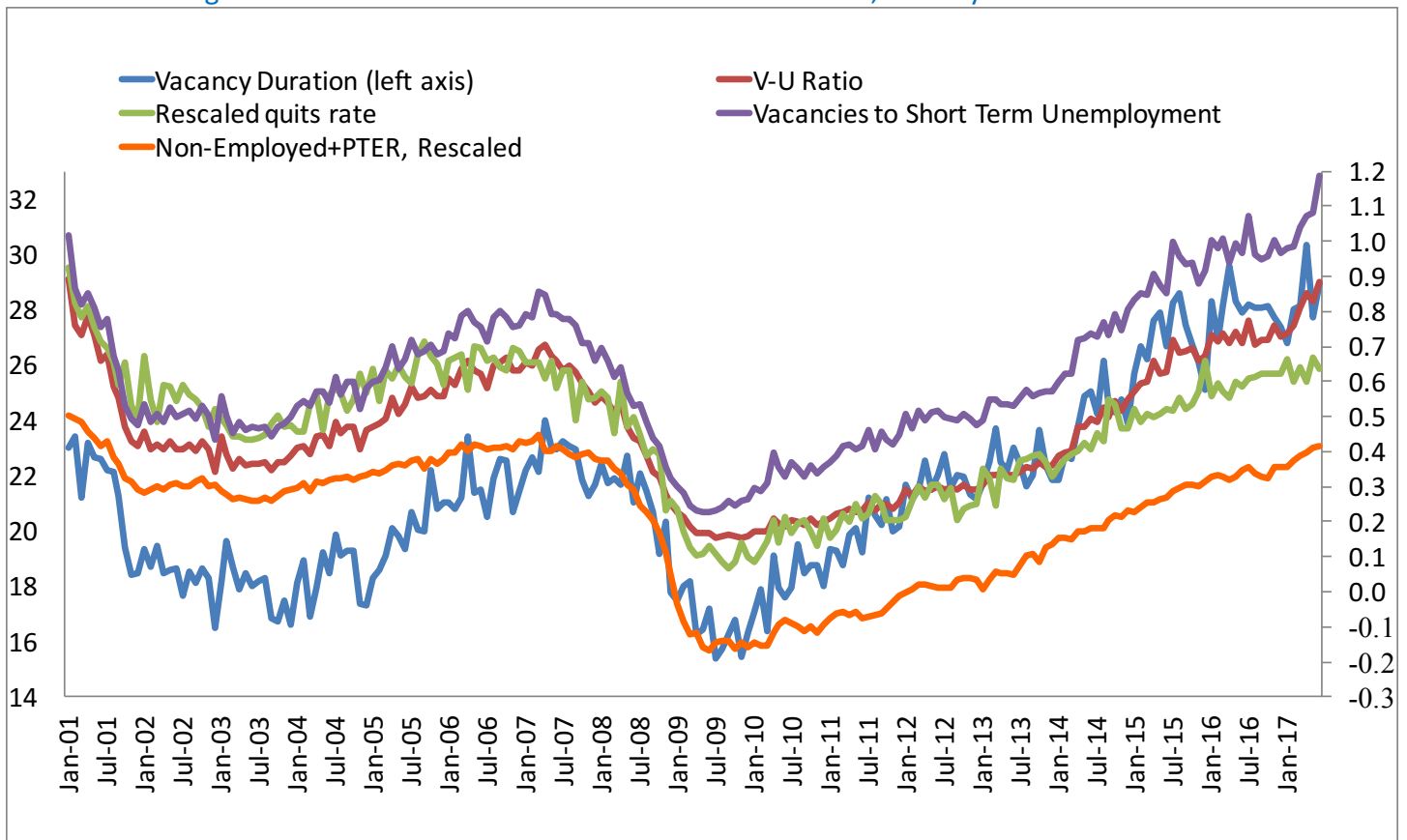
Notes: Short Term Unemployment is the number of persons unemployed 26 weeks or less. The Quit Rate is rescaled to have the same mean and variance as the Vacancy-Unemployment Ratio from January 2001 to date. Non-Employment + PTER, an index developed by Hornstein, Kudlyak and Lange, reflects all persons who are not employed (weighted by labor force attachment) plus persons working part time for economic reasons who would prefer full-time work. Here, their index is multiplied by minus one and then rescaled to have the standard deviation as the Vacancy-Unemployment Ratio from January 2001 to date.

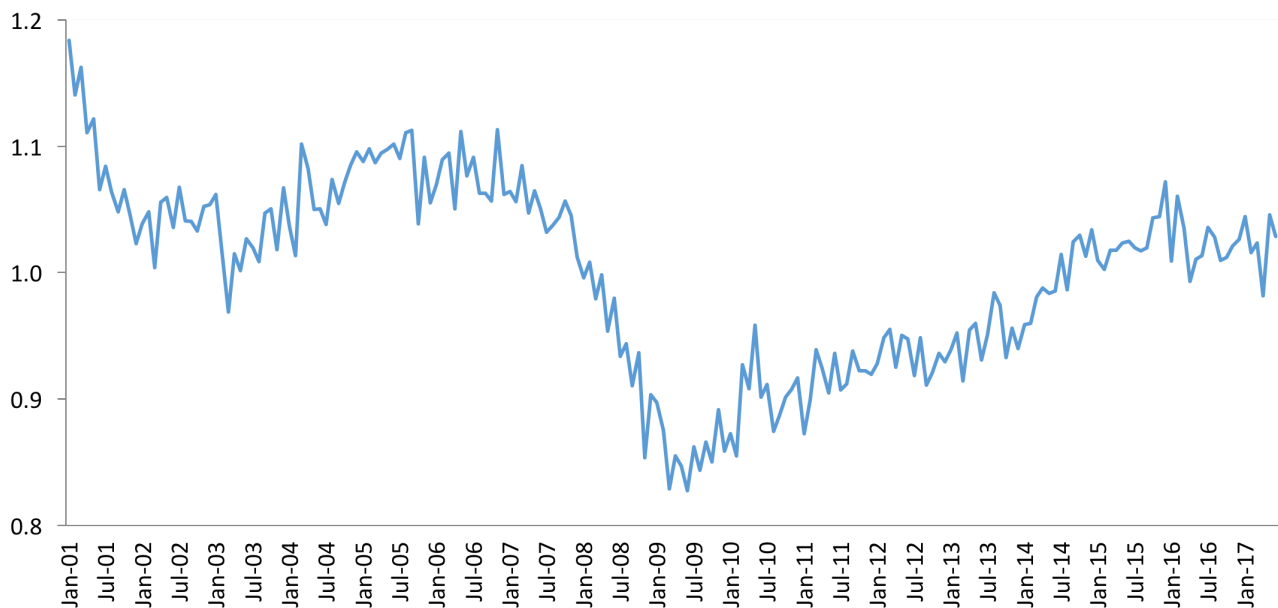Figure III.3.DHI-DFH Index of Recruiting Intensity per Vacancy, January 2001 to June 2017

Table III.1. DHI-DFH Measure of Mean Vacancy Duration by Industry and Time Period, No. of Working Days, January 2001 to June 2017

	2001 to 2003	2004 to 2006	2008	2009	2010 to 2012	2013	2014	2015	2016	Jan.-Jun. 2017
Resources	12.0	14.0	18.1	13.5	18.7	17.5	22.5	17.5	13.0	17.8
Construction	7.9	8.8	7.3	4.3	6.1	9.5	10.9	11.4	14.9	12.3
Manufacturing	17.4	20.9	21.6	13.8	23.4	28.4	29.2	30.4	32.1	30.5
Wholesale and Retail Trade	14.2	15.8	15.5	13.1	15.9	19.8	18.6	21.0	24.1	24.5
Warehouse, Trans. & Utilities	18.6	17.0	20.6	11.3	18.2	22.5	23.9	29.1	27.3	24.1
Information	25.8	36.0	34.5	23.4	40.9	36.4	36.8	35.6	29.1	31.6
Financial Services	28.0	32.1	27.6	25.7	33.4	36.1	37.1	43.1	44.7	45.6
Professional and Business Services	18.3	19.9	21.3	16.6	18.8	19.6	22.0	27.0	26.3	25.5
Education	21.3	25.0	22.0	18.5	21.1	23.7	26.5	29.9	28.8	29.6
Health Services	39.1	35.8	36.4	29.8	33.5	34.6	38.4	44.6	47.7	49.3
Leisure and Hospitality	13.7	14.8	14.9	10.4	13.3	16.6	19.3	19.6	19.7	20.7
Other Services	22.5	18.6	25.2	16.9	18.9	20.1	21.0	22.3	30.1	30.4
Government	33.2	30.7	35.7	32.2	33.0	35.9	37.7	37.8	37.8	40.7
Non-Farm	19.3	20.0	21.1	16.6	20.0	22.5	24.1	26.9	28.0	28.3

Table III.2. DHI-DFH Recruiting Intensity Index by Industry and Time Period, January 2001 to June 2017

	2001 to 2003	2004 to 2006	2008	2009	2010 to 2012	2013	2014	2015	2016	Jan.-Jun. 2017
Resources	0.99	1.06	1.05	0.70	1.00	0.98	1.04	0.89	1.03	1.29
Construction	1.07	1.04	0.89	0.90	1.01	0.94	0.89	0.88	0.87	0.92
Manufacturing	1.02	1.09	0.95	0.85	0.94	0.88	0.92	0.93	0.96	1.06
Wholesale and Retail Trade	1.05	1.10	0.96	0.84	0.89	0.94	1.04	1.04	1.00	0.99
Warehouse, Trans. & Utilities	0.96	1.13	0.94	0.92	0.96	1.01	1.11	1.12	1.09	1.07
Information	1.10	1.08	0.87	0.83	0.91	1.06	1.11	1.16	1.12	1.07
Financial Services	1.06	1.09	0.99	0.84	0.87	0.99	0.95	0.95	0.92	0.96
Professional and Business Services	1.08	1.07	0.90	0.83	0.94	0.96	1.00	1.01	1.03	1.01
Education	1.00	0.99	1.04	0.96	0.99	0.95	1.00	1.07	1.07	1.03
Health Services	1.08	1.04	1.01	0.93	0.89	0.92	0.97	1.01	1.00	1.01
Leisure and Hospitality	1.08	1.08	0.97	0.84	0.88	0.92	0.96	1.01	1.01	0.98
Other Services	1.02	1.07	0.94	0.96	0.95	0.98	0.96	1.04	0.93	1.08
Government	1.05	1.05	0.94	0.87	0.93	0.93	0.99	1.10	1.13	1.06
Non-Farm	1.05	1.08	0.95	0.86	0.92	0.95	1.00	1.03	1.02	1.02

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 analyze 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 connections through our specialized services for professional communities including technology and security clearance, financial services, energy, healthcare and hospitality. Our mission is to empower professionals and organizations to compete and win through expert insights and relevant employment connections. Employers and recruiters use our websites and services to source and hire the most qualified professionals in select and highly-skilled occupations, while professionals use our websites and services to find the best employment opportunities in and the most timely news and information about their respective areas of expertise. For over 25 years, we have built our company on providing employers and recruiters with efficient access to high-quality, unique professional communities, and offering the professionals in those communities access to highly-relevant career opportunities, 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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