May 2017
Report 37

DHI Releases Labor Market Tightness Measures for 45 Skill Categories

This edition of the ***DHI Hiring Indicators*** presents a new set of statistics on the evolution of labor market tightness for 45 skill categories. Section I contains highlights. Section II explains how we construct the new tightness measures using the **DHI Vacancy and Application Flow Database**. Section III draws on the Job Openings and Labor Turnover Survey to present statistics on vacancy duration and recruiting intensity per vacancy. Section IV provides additional information about the ***DHI Hiring Indicators*** and DHI Group, Inc.

I. Highlights

1. We develop statistics on the evolution of labor market tightness for 45 skill categories that appear often in vacancy postings covered by the DHI database. Our skill categories pertain mostly to software, data analytics, the administration of computer systems and databases, and other computer-related jobs.
2. For jobs that require computer systems administration skills and those that require security assurance and development skills, labor market conditions tightened greatly from 2012 to 2016 relative to the average of all jobs in the database. That is, job postings with these skill requirements saw large relative declines in the average daily flow of applications per posting.
3. Jobs that require "COBOL" and "PHP" programming skills also saw strong increases in relative labor market tightness from 2012 to 2016.
4. In contrast, relative labor market tightness fell sharply from 2012 to 2016 for jobs that require skills related to Oracle products, Apple's iOS, Microsoft's .NET software framework and Java/Javascript. For these jobs, the daily flow of applications per posting rose sharply in recent years, pointing to a growing relative abundance of job seekers with these skills.
5. The **DHI-DFH Mean Vacancy Duration Measure** rose to 28.3 working days in March 2017, 0.3 days higher than its revised value for February and 1.3 day below its historical peak in April 2016.

"We continue to roll out new labor market metrics based on the DHI Vacancy and Application Flow Database," said Dr. Steven Davis, William H. Abbott Professor of International Business and Economics at the University of Chicago Booth School of Business. "This month's report provides granular information about changes in skill scarcity and skill abundance in the labor market." Davis is a co-developer of the DHI Database and co-creator of the DHI-DFH Mean Vacancy Duration Measure and Recruiting Intensity Index.

"The labor market conditions for tech professionals are really positive right now, with low unemployment and increasing demand to fill open roles pressuring employers to make appealing offers," said Michael Durney, President and CEO of DHI Group, Inc. "Now is the time for tech talent to polish their skillset, map their career path and seize a new opportunity. Tech pros who research their market worth and recognize the challenging recruiting environment can feel confident to go for that job that may have previously been just out of reach."

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 currently contains nearly 9 million unique vacancy postings from more than 50,000 employer-side clients.[1] These postings have attracted more than 71 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 we say 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, as in this month's report, for particular skills.

To identify skill requirements, we read the extended job descriptions supplied by the prospective employer (or recruiter) for each vacancy posting.[3] From these readings, we identify 45 skills that appear often in the DHI Database. We then sort postings into categories based on the first skill mentioned in the extended job description. Table II.1 lists 45 frequently referenced 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. The most frequently referenced skills in the DHI Database are security assurance and development (SECURITY); systems engineering and administration (SYSTEMS); data analysis, administration and storing (DATA); network engineering and administration (NETWORK); website development (WEB); C programming (C); SAP software (SAP); Microsoft's SQL database management system and server (SQL); Oracle software and systems (ORACLE); Microsoft's .NET software framework (.NET); and Java and Javascript programming (JAVA).

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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.com, 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," which together account for about 88 percent of all postings in the DHI Database. 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

Skill	Description	Top 3 Broad Job Titles by Skill Category (% of all Vacancy Postings)	Number of Vacancy IDs
MATLAB	MathWork's statistical analysis software and products	ENGINEER (36%) DEVELOPER (27%) ANALYST (8%)	1,153
SOFTWARE	Software skills not covered by other skills on this list	ENGINEER (65%) DEVELOPER (15%) MANAGER (4%)	616,532
COBOL	Cobol programming language	DEVELOPER (49%) PROGRAMMER (33%) ANALYST (3%)	10,793
SECURITY	Security assurance and development skills	ENGINEER (29%) ANALYST (23%) ARCHITECT (7%)	164,410
LOTUS	IBM's business collaboration software (Lotus) Notes	DEVELOPER (39%) ADMINISTRATOR (30%) HELP / SUPPORT (5%)	3,009
SYSTEMS	Jobs that mention "SYSTEMS" before any other skill. A common example is "SYSTEMS ANALYST"	ENGINEER (33%) ADMINISTRATOR (20%) ANALYST (13%)	334,272
CISCO	Cisco's networking hardware, telecommunications equipment, services and products	ENGINEER (55%) ARCHITECT (12%) SALES (9%)	42,816
PERL	Perl programming language	DEVELOPER (70%) ENGINEER (11%) PROGRAMMER (8%)	8,171
PHP	PHP programming language	DEVELOPER (82%) ENGINEER (8%) PROGRAMMER (2%)	97,188
DATA	Data analysis, administration, storing, etc.	ANALYST (25%) SCIENTIST (13%) ENGINEER (13%)	240,517
C	C programming language or development software	DEVELOPER (60%) ENGINEER (22%) PROGRAMMER (5%)	159,872
DATABASE	Database analysis, administration, storing, processing, security, etc.	ADMINISTRATOR (41%) DEVELOPER (21%) ENGINEER (11%)	72,045
NETWORK	Jobs that mention "NETWORK" before any other skill, e.g., "NETWORK ADMINISTRATOR"	ENGINEER (57%) ADMINISTRATOR (12%) ARCHITECT (6%)	238,302
WEB	Jobs that mention the "WEB" first, e.g., jobs that require website development skills	DEVELOPER (64%) DESIGNER (7%) ENGINEER (6%)	218,507
PEOPLESOFT	Oracle's business management software and products	CONSULTANT (21%) DEVELOPER (18%) ANALYST (13%)	72,130
RUBY	Ruby on Rails or RoR, a server-side web application framework	DEVELOPER (66%) ENGINEER (22%) ARCHITECT (2%)	74,367
UX	Jobs that require skills related to the user's experience	DESIGNER (61%) DEVELOPER (13%) ARCHITECT (6%)	34,995
SAS	Statistical Analysis System software	PROGRAMMER (29%) ADMINISTRATOR (18%) ANALYST (15%)	20,224
VISUALBASIC	Jobs that require VisualBasic programming language	DEVELOPER (71%) PROGRAMMER (13%) ANALYST (2%)	14,684

IBM	Jobs that require skill in using IBM's software and/or hardware	DEVELOPER (23%) CONSULTANT (14%) ADMINISTRATOR (10%)	23,010
COGNOS	IBM's business intelligence, analytics, and performance management software	DEVELOPER (50%) ARCHITECT (10%) ADMINISTRATOR (10%)	20,125
INFORMATICA	Informatica's data integration software	DEVELOPER (52%) ADMINISTRATOR (11%) ARCHITECT (9%)	31,640
SAP	(Systems, Applications & Products in Data Processing) refers to any of SAP's software products	CONSULTANT (33%) MANAGER (12%) ANALYST (9%)	277,918
PYTHON	Python programming language	DEVELOPER (53%) ENGINEER (32%) DEVELOPMENT OPERATIONS ENGINEER (4%)	68,853
ETL	Processes of Extracting, Transforming, and Loading data	DEVELOPER (56%) ARCHITECT (8%) TESTER (8%)	50,395
SQL	Structured query programming language or Microsoft's database management system, SQL Server	DEVELOPER (42%) ADMINISTRATOR (31%) ANALYST (7%)	136,164
DRUPAL	Drupal's open platform for web content management and digital experiences	DEVELOPER (81%) ARCHITECT (6%) CONSULTANT (2%)	17,837
LINUX	LINUX operating system	ADMINISTRATOR (42%) ENGINEER (28%) DEVELOPMENT OPERATIONS ENGINEER (11%)	88,512
SOA	Service-Oriented Architecture software design	ARCHITECT (32%) DEVELOPER (23%) TESTER (7%)	11,761
TIBCO	TIBCO's integration, analytics and events processing software	DEVELOPER (43%) ARCHITECT (13%) ADMINISTRATOR (11%)	13,603
NET	Jobs that mention "NET" first, e.g., "NET APPLICATIONS ADMINISTRATOR"	DEVELOPER (55%) ENGINEER (12%) ARCHITECT (4%)	6,964
ABINITIO	Abinitio's software and applications	DEVELOPER (62%) ARCHITECT (9%) ADMINISTRATOR (5%)	6,423
HYPERION	Hyperion's performance management software and products	CONSULTANT (23%) DEVELOPER (21%) ADMINISTRATOR (12%)	15,835
ORACLE	Oracle's software or systems products	ADMINISTRATOR (22%) DEVELOPER (21%) CONSULTANT (16%)	226,805
.NET	Microsoft's .NET software framework	DEVELOPER (79%) ENGINEER (6%) ARCHITECT (5%)	347,138
SALESFORCE	Salesforce.com's customer relationship management platform	DEVELOPER (37%) ARCHITECT (14%) ADMINISTRATOR (12%)	57,463
WEBSPHERE	IBM's Websphere software products	ADMINISTRATOR (35%) DEVELOPER (29%) ARCHITECT (8%)	25,238
UNIX	UNIX operating system	ADMINISTRATOR (53%) ENGINEER (18%)	32,495

		HELP / SUPPORT (7%)	
SSIS	Platform for data integration and workflow applications	DEVELOPER (72%) ARCHITECT (5%) CONSULTANT (3%)	7,487
IOS	Apple's mobile operating system	DEVELOPER (72%) ENGINEER (18%) ARCHITECT (3%)	86,542
BIGDATA	Jobs that require bigdata skills	ENGINEER (31%) ARCHITECT (25%) DEVELOPER (14%)	32,347
JAVA	Java or Javascript programming languages	DEVELOPER (67%) ENGINEER (14%) ARCHITECT (6%)	501,628
SHAREPOINT	Microsoft's web-based application	DEVELOPER (44%) ADMINISTRATOR (18%) ARCHITECT (11%)	70,492
USERINTERFACE	Jobs that require skills related to the user interface	DEVELOPER (52%) DESIGNER (19%) ENGINEER (16%)	91,002
HADOOP	Hadoop's open-source software framework	DEVELOPER (36%) ADMINISTRATOR (18%) ENGINEER (14%)	25,197

Table II.2 reports annual relative tightness measures for our 45 skill categories.[4] 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.[5]
2. Compute the average daily flow of applications per posting by skill category and year.
3. Deflate the skill-specific measures from Step 2 by the overall average daily flow of applications per posting. We compute this average by year using all postings.
4. Multiply each deflated series by the overall 2015 average value of daily applications per posting.

DHI modified the functionality of its Dice.com platform during our sample period in ways that affect application flows. It streamlined the registration and application process for job seekers, improved the search engine available to job seekers, made it possible for employers to signal particular jobseekers and solicit an application, and removed information from vacancy postings that, in some cases, had facilitated applications outside the DHI system. The most important changes occurred in December 2014, and they probably account for much of the growth in applications per posting during 2015.[6] Overall market tightness developments and changes to Dice.com market shares also affect our skill-specific tightness measures. Since we cannot confidently disentangle the various forces that drive changes over time in the daily application flows, we use Step 3 to remove them from our tightness measures for specific skill categories. The result is a set of skill-specific relative tightness measures. Step 4 restores information about the level of daily applications per vacancy posting.

The skill categories in Table II.2 differ greatly with respect to (a) the average daily flow of applications per active posting, and (b) the evolution of the average daily flow from 2012 to 2016. Ratio value greater than one

[4] The March 2017 edition of the DHI Hiring Indicators also reports tightness statistics for selected skills. Compared to the March report, the current report provides tightness measures for more than twice as many skill categories. The current report also computes the tightness measures in a somewhat different manner.
[5] We drop the 46 percent of postings that reference none of our 45 skills. However, we retain all postings when calculating the average daily flow of applications per posting in Step 3.
[6] See Davis and Samaniego de la Parra (2017) and the March 2017 edition of the DHI Hiring Indicators for more discussion.

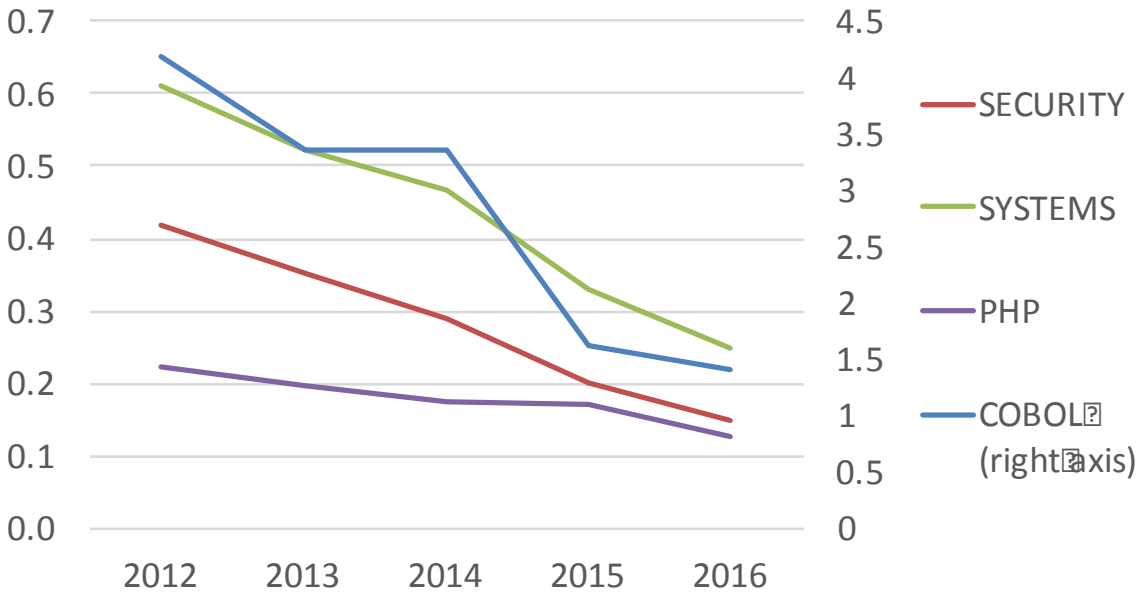
in the rightmost column indicate a decline in relative tightness from 2012 to 2016. Ratio values below one indicate an increase in relative tightness over this period. Some of the largest increases in relative tightness occurred for MATLAB, COBOL, SECURITY and LOTUS. Some of the largest falls occurred for JAVA, SHAREPOINT, USERINTERFACE, and HADOOP. Figure II.1 and II.2 display the same information as Table II.2 in graphical form for selected skills.

Table II.2. Relative Labor Market Tightness by Skill Category and Year

Skill	2012	2013	2014	2015	2016	2016 to 2012 ratio
MATLAB	0.43	0.42	0.30	0.27	0.10	0.22
SOFTWARE	0.42	0.37	0.34	0.23	0.12	0.30
COBOL	4.20	3.35	3.35	1.62	1.41	0.34
SECURITY	0.42	0.35	0.29	0.20	0.15	0.36
LOTUS	1.10	1.09	1.01	0.66	0.43	0.39
SYSTEMS	0.61	0.52	0.47	0.33	0.25	0.41
CISCO	0.41	0.36	0.28	0.24	0.22	0.54
PERL	0.37	0.34	0.33	0.28	0.20	0.55
PHP	0.22	0.20	0.17	0.17	0.13	0.57
DATA	0.74	0.66	0.62	0.54	0.45	0.61
C	0.49	0.47	0.49	0.41	0.32	0.65
DATABASE	0.46	0.46	0.43	0.40	0.32	0.69
NETWORK	0.62	0.50	0.43	0.41	0.50	0.80
WEB	0.36	0.32	0.30	0.38	0.34	0.95
PEOPLESOFT	0.62	0.54	0.63	0.52	0.61	0.98
RUBY	0.08	0.08	0.10	0.13	0.08	1.01
UX	0.22	0.21	0.21	0.28	0.23	1.03
SAS	0.76	0.75	0.70	0.72	0.79	1.03
VISUALBASIC	0.59	0.53	0.53	0.49	0.62	1.04
IBM	0.47	0.48	0.46	0.44	0.55	1.16
COGNOS	1.67	1.73	1.74	1.69	2.02	1.21
INFORMATICA	2.64	2.53	2.12	2.76	3.35	1.27
SAP	0.97	1.40	1.64	1.59	1.31	1.35
PYTHON	0.11	0.11	0.12	0.14	0.15	1.35
ETL	1.63	1.82	1.70	2.13	2.30	1.41
SQL	1.19	1.30	1.34	1.62	1.68	1.42
DRUPAL	0.15	0.11	0.13	0.21	0.22	1.42
LINUX	0.34	0.34	0.41	0.47	0.50	1.45
SOA	0.48	0.53	0.68	0.73	0.71	1.48
TIBCO	0.74	0.72	0.53	1.08	1.10	1.49
NET	0.57	0.59	0.58	0.94	0.87	1.52
ABINITIO	0.45	0.58	0.68	1.06	0.72	1.60
HYPERION	0.59	0.99	0.72	0.75	0.96	1.64
ORACLE	0.91	1.05	1.26	1.45	1.50	1.65

.NET	0.57	0.72	0.72	0.84	1.09	1.92
SALESFORCE	0.73	0.74	0.88	1.38	1.40	1.92
WEBSPHERE	0.55	0.69	0.77	1.05	1.08	1.96
UNIX	0.52	0.53	0.58	0.64	1.06	2.04
SSIS	1.52	1.67	1.95	3.13	3.22	2.12
IOS	0.22	0.24	0.24	0.44	0.49	2.21
BIGDATA	0.22	0.25	0.44	0.41	0.49	2.26
JAVA	0.52	0.66	0.74	1.20	1.29	2.47
SHAREPOINT	0.52	0.76	0.75	1.22	1.38	2.65
USERINTERFACE	0.26	0.30	0.32	1.18	1.34	5.22
HADOOP	0.17	0.42	1.15	1.53	1.95	11.74

Figure II.1. Skill Categories with Rising Relative Labor Market Tightness



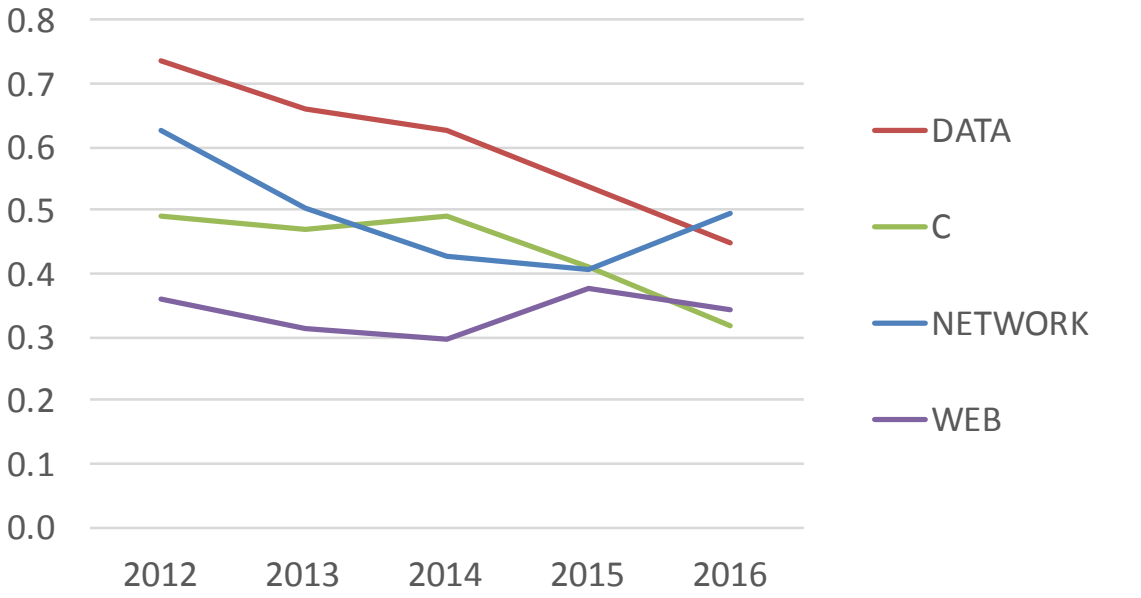
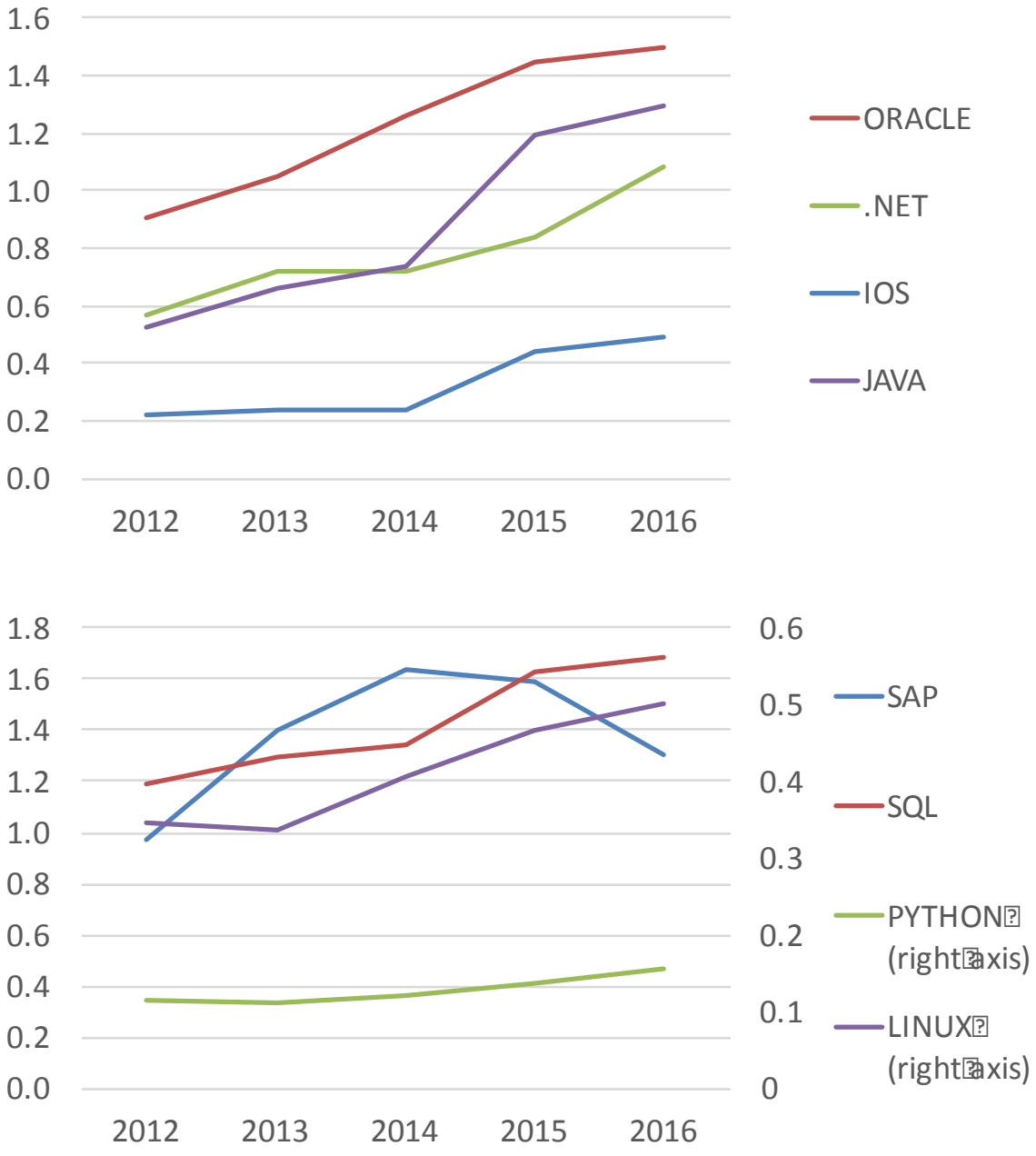


Figure II.2. Skill Categories with Decreasing Relative Labor Market Tightness



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

The **DHI-DFH Mean Vacancy Duration Measure** rose to 28.3 working days in March, 0.3 days above its revised value for February and 1.3 days below its historical peak in April 2016. 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.

The **DHI-DFH Recruiting Intensity Index,** plotted in Figure III.3, was 1.02 in March, the same as the revised level of 1.02 in February. Tables III.1 and III.2 below report industry-level statistics for mean vacancy duration and recruiting intensity per vacancy, respectively.

Figure III.1. DHI-DFH Measure of National Mean Vacancy Duration, January 2001 to March 2017

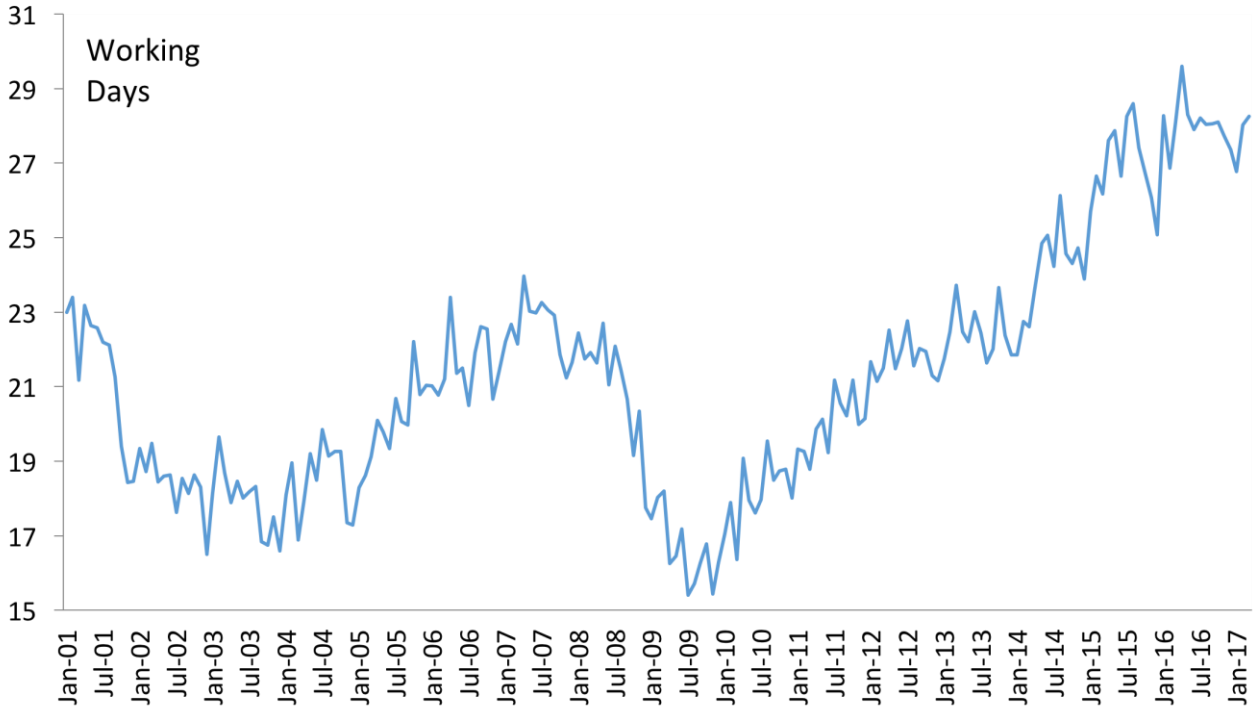
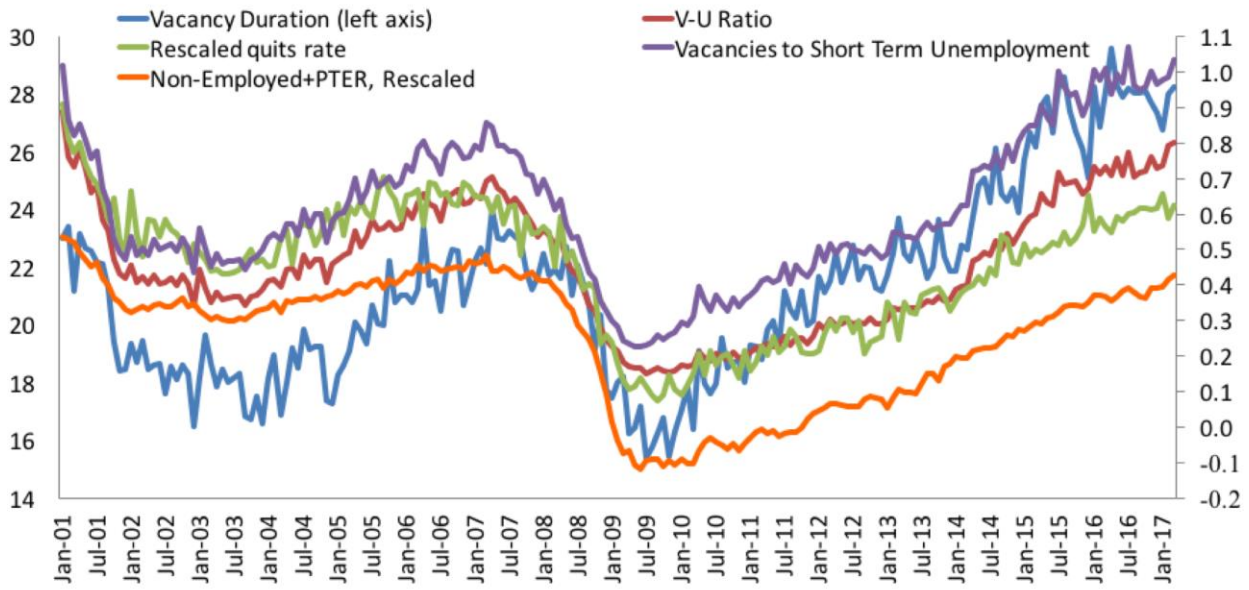


Figure III.2. National Labor Market Slackness Measures, January 2001 to March 2017



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 full. 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 March 2017

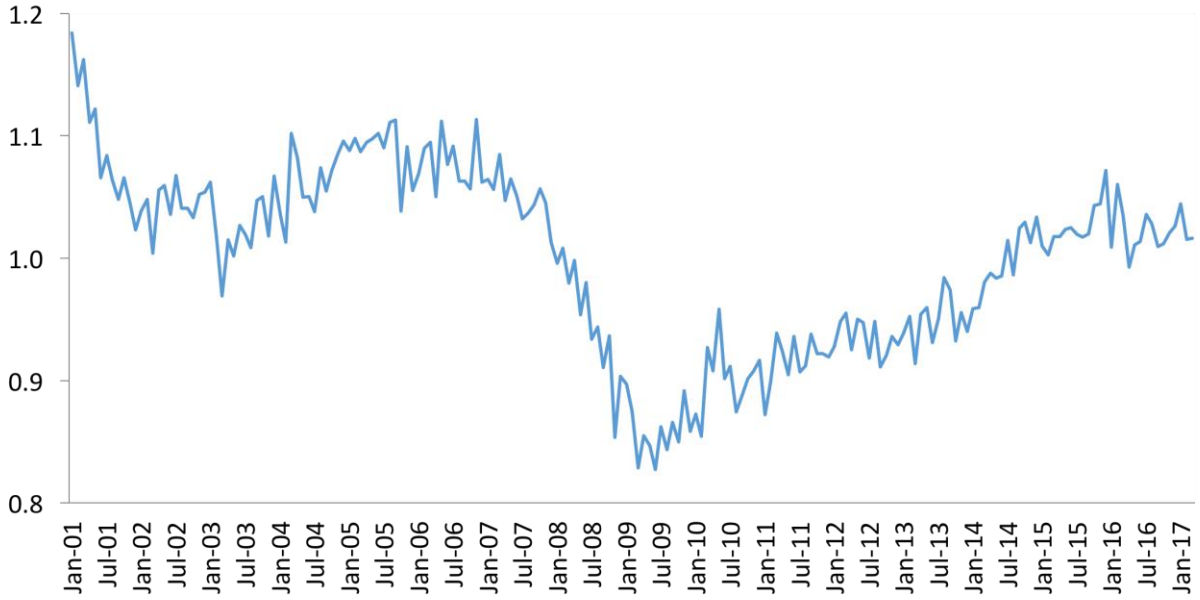


Table III.1. DHI-DFH Measure of Mean Vacancy Duration by Industry and Time Period, No. of Working Days, January 2001 to March 2017

	2001 to 2003	2004 to 2006	2008	2009	2010 to 2012	2013	2014	2015	2016	Jan.-Mar. 2017
Resources	12.0	14.0	18.1	13.5	18.7	17.4	22.5	17.5	13.0	17.3
Construction	7.9	8.8	7.3	4.3	6.1	9.5	10.9	11.4	14.9	11.2
Manufacturing	17.4	20.9	21.6	13.8	23.4	28.4	29.2	30.4	32.1	30.9
Wholesale and Retail Trade	14.2	15.8	15.5	13.1	15.9	19.8	18.6	21.0	24.1	23.7
Warehouse, Trans. & Utilities	18.6	17.0	20.6	11.3	18.2	22.5	23.9	29.1	27.3	25.1
Information	25.8	36.0	34.5	23.4	40.9	36.4	36.8	35.6	29.1	26.7
Financial Services	28.0	32.1	27.6	25.7	33.3	36.1	37.1	43.1	44.7	46.8
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	31.8
Health Services	39.1	35.8	36.4	29.8	33.5	34.6	38.4	44.6	47.7	49.7
Leisure and Hospitality	13.7	14.8	14.9	10.4	13.3	16.6	19.3	19.6	19.7	19.5
Other Services	22.5	18.6	25.2	16.9	18.9	20.1	21.0	22.2	30.1	29.7
Government	33.2	30.7	35.7	32.2	33.0	35.9	37.7	37.8	37.8	37.9
Non-Farm	19.3	20.0	21.1	16.6	20.0	22.5	24.1	26.9	28.0	27.7

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

	2001 to 2003	2004 to 2006	2008	2009	2010 to 2012	2013	2014	2015	2016	Jan.-Mar. 2017
Resources	0.99	1.06	1.05	0.70	1.00	0.98	1.04	0.89	1.03	1.25
Construction	1.07	1.04	0.89	0.90	1.01	0.94	0.89	0.88	0.87	0.94
Manufacturing	1.02	1.09	0.95	0.85	0.94	0.88	0.92	0.93	0.96	1.04
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	1.10
Information	1.10	1.08	0.87	0.83	0.91	1.06	1.11	1.16	1.12	1.14
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	0.98
Education	1.00	0.99	1.04	0.96	0.99	0.95	1.00	1.07	1.07	0.99
Health Services	1.08	1.04	1.01	0.93	0.89	0.92	0.97	1.01	1.00	1.03
Leisure and Hospitality	1.08	1.08	0.97	0.84	0.88	0.92	0.96	1.01	1.01	1.00
Other Services	1.02	1.07	0.94	0.96	0.95	0.98	0.96	1.04	0.93	1.04
Government	1.05	1.05	0.94	0.87	0.93	0.93	0.99	1.10	1.13	1.08
Non-Farm	1.05	1.08	0.95	0.86	0.92	0.95	1.00	1.03	1.02	1.03

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.

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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