

Policy Report



Demand for H-1B Visas in New England: An Analysis of Employer Requests for Highly Skilled Guest Workers

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Acknowledgments

The author is grateful for excellent and careful fact-checking provided by Angela Cools and research support provided by Joshua Ballance and Teresa Huie. He is thankful to his colleagues at the Federal Reserve Bank of Boston for their advice and direction on the project, especially Yolanda Kodrzycki, Bob Triest, and Suzanne Lorant. This report benefited greatly from extensive feedback from Patricia Cortes (Boston University) and Alicia Sasser Modestino (Northeastern University). Valuable insights and feedback were provided by attendees of the New England Study Group and New England Public Policy Center advisory board meetings, where early versions of the research were presented. The author also gained helpful insights from discussions with Neil Ruiz and Jill Wilson (The Brookings Institution Metropolitan Policy Program), Ron Hira (Rochester Institute of Technology), and Hal Salzman (Rutgers University). The views expressed in this report are solely those of the author and should not be attributed to any individuals or groups consulted during the course of the research.

Demand for H-1B Visas in New England: An Analysis of Employer Requests for Highly Skilled Guest Workers

Introduction

New England has the most highly educated and skilled immigrant workforce in the United States.¹ The region is also home to many institutions of higher education that train and educate talent from around the globe.² And while U.S. immigration policy provides fairly easy access for qualified foreign students to attend these institutions (largely through the F-1 student visa), only a small number of visas are offered for employment-based immigration. This disconnect between attracting global talent for higher education while limiting opportunities for employers to hire and retain such talent is motivating a number of national and regional entities to advocate for immigration reforms that increase the availability of employment-based visas and permanent residency slots for visa holders.³

The H-1B visa serves as an entry route for many highly skilled guest workers into the U.S. labor market by allowing employers to temporarily employ foreign workers in

“specialty occupations.” However, demand for such visas persistently exceeds the available supply, leading business and industry groups to argue for an increase in the number of H-1B visas in order to allow employment of such temporary guest workers, and in the number of green cards (allowing for permanent residency) in order to retain highly skilled immigrants.⁴ The arguments for increasing visas for highly skilled guest workers typically center on the need to address a shortage of workers in STEM (science, technology, engineering, and mathematics) fields and to allow the businesses to compete globally for “the best and the brightest” talent. Proponents of such a policy often cite research showing that highly skilled guest workers play important roles in innovation and research and development, and that their presence does not have adverse wage or employment effects on native workers.⁵

The argument against increasing the number of H-1B visas is based primarily on research that finds the program is used to employ guest workers at lower wages than their American counterparts and is heavily used by outsourcing firms to facilitate the transfer of jobs to less costly destinations,

1 See Owens (2008) for a portrait of New England’s immigrants. In 2012, 29.8 percent of immigrants in the national labor force had a bachelor’s degree (BA) or higher. In New England, over a third (34.2 percent) of immigrants in the labor force had such levels of education, exceeding all other divisions, with the Middle Atlantic second highest at 33.8 percent. Source: U.S. Census Bureau, 2012 American Community Survey.

2 The number of students with foreign residency (mostly F-1 visas) completing a bachelor’s degree or higher in 2012 was around 177,000: 64,000 bachelor’s degrees, 93,000 master’s degrees and 19,500 doctorates. In New England there were 5,200 bachelor’s degrees, 9,100 master’s degrees, and 1,700 doctorates granted to foreign students in 2012. Source: National Center for Education Statistics, Integrated Postsecondary Education Data System, 2011–2012 Completions Survey.

3 For examples see “NEC Statement on Comprehensive Immigration Reform Bill,” The New England Council, June 12, 2013 and “Business for Skilled Worker Immigration,” Greater Boston Chamber of Commerce.

4 See “U.S. Immigration Reform and STEM Jobs...by the Numbers,” U.S. Chamber of Commerce, September 4, 2013; “Silicon Valley leaders unite as FWD.us in push for more H-1B visas,” *InfoWorld*, April 11, 2013; “NEC Statement on Comprehensive Immigration Reform Bill,” The New England Council, June 12, 2013; “Business for Skilled Worker Immigration,” Greater Boston Chamber of Commerce.

5 See Hunt and Gauthier-Loiselle (2010), Kerr and Lincoln (2010), Hunt (2011), Mithas and Lucas (2010), and Lofstrom and Hayes (2011). The Mithas and Lucas (2010) and Hunt (2011) studies rely on survey data that include other temporary visa categories, such as L-1, O-1, and TN, that may mask the implications for H-1B visas.

typically overseas.⁶ For example, a series of studies identifies major H-1B employers nationally that engage in significant “offshore outsourcing,” a line of business in which workers learn a job function on-site to transfer knowledge off-site so the work can be done remotely.⁷ These studies find that these employers rotate through guest workers and rarely sponsor them for permanent residency.

The debate about the role of H-1B visas is based almost entirely on analysis at the national level. To better inform policy discussions in New England, this report provides new insight into the geographic variation of demand for H-1B visas, the types of workers requested and their regional concentrations, and the types of employers that demand H-1B workers in New England. This more granular information can help to strengthen discussions surrounding national visa reform and its potential regional implications.

This report finds that along with having some of the highest concentrations of regional employment in STEM occupations nationally, New England has some of the highest levels of demand for H-1B workers nationwide relative to employment, due to significant demand from a few metropolitan labor markets in Connecticut and Massachusetts, and also has some of the highest demand for STEM H-1B workers. As is the case nationally, computer occupations, generally in IT, account for the majority of New England employers’ H-1B visa requests. Annual demand for H-1B workers to fill IT positions is equivalent to 5 percent of total IT employment—far higher than the demand for other STEM occupations such as scientists and engineers.

The relatively elevated use of H-1B workers for IT jobs may be a signal of the difficulties New England employers have in filling all their vacancies without hiring foreign IT workers. However, a scarcity of suitably skilled domestic IT workers cannot

fully explain the demand for H-1B workers in the region, as many of the New England H-1B visa applications come from outsourcing firms that do not have a large base of employment in New England.

All in all, the evidence indicates that the discussion about the H-1B program needs to move beyond the issue of the total number of visas granted. To make this possible in a manner that sets the stage for a fruitful discussion, it is important—even essential—that the policy goal of the program be clearly established. With a clearly defined policy goal in place, policymakers would have a framework within which to consider the number of visas to be granted and to establish allocation criteria aligned with the goal.

An H-1B Visa Primer

In general, foreign citizens are able to migrate to the United States on family-based or employment-based visas that require the sponsorship of U.S. citizens, legal permanent residents, or prospective employers.⁸ However, only a small number of permanent resident visas, or “green cards,” are allocated for employment-based immigration.⁹ Employment-based visa recipients tend to be highly skilled and highly educated, as the visas are allocated on a preference-based system that favors those with exceptional abilities, professional experience, and advanced degrees.¹⁰

8 Additional visas are allocated for humanitarian reasons and to encourage diversity.

9 Approximately 140,000 employment-based green cards are allocated every year. Source: U.S. Citizens and Immigration Services (USCIS).

10 USCIS lists five employment-based immigration preferences: First preference (EB-1) is for those who have an extraordinary ability, are outstanding professors or researchers, or are multinational executives or managers; second preference (EB-2) is for members of the professions holding an advanced degree or its equivalent, or foreign nationals who have exceptional ability. Third preference (EB-3) is for “skilled workers” (employment requiring a minimum of two years training or work experience that is not of a temporary or seasonal nature), “professionals” (employment requiring at least a U.S. baccalaureate degree or foreign equivalent), and “other workers” (for persons performing unskilled labor requiring less than two years training or experience, not of a temporary or seasonal nature); fourth preference (EB-4) is for specialty immigrants such as religious workers, Iraqi/Afghan translators, and international organization employees; fifth preference (EB-5) is for those who generally provide minimum qualifying investment for projects in the United States of

6 For examples, see Matloff (2003), Miano (2005), Matloff (2008), Miano (2008), Hira (2010), and Salzman, Kuehn, and Lowell (2013). “Outsourced, at Home,” Farah Stockman, *Boston Globe*, March 31, 2013.

7 See Hira (2007, 2010, and 2013).

However, obtaining an employment-based green card can take years due to numerical limits for certain employment preferences and nationalities. Therefore, a typical avenue for highly skilled immigrants to work in the United States is through a temporary employment visa, the most common being the H-1B visa.

Created in 1990, the H-1B visa program allows employers to hire guest workers in “specialty occupations” (See “Legislative History of the H-1B Visa Program”).¹¹ Visas are granted for an initial three-year interval and are allowed an extension for an additional three-year term. The H-1B visa program also allows these guest workers to apply for legal permanent residency while working on the temporary visa, a practice referred to as “dual intent.”¹²

Currently, the annual cap on initial H-1B visas is set at 65,000, with an additional 20,000 visas set aside for individuals with a master’s degree or higher from an educational institution in the United States. Higher education institutions and their affiliated nonprofits, nonprofit research organizations, and government research organizations are exempt from these numerical limitations and are typically able to obtain the number of H-1B workers they request, as long as they meet all other visa requirements.

To obtain an H-1B visa an employer must first file a Labor Condition Application (LCA)

with the Department of Labor (DOL). Unlike other temporary employment visas, such as the H-2A for agricultural workers, the program does not require employers to prove that they attempted to hire a U.S. worker for the position, a common misperception about the H-1B program. However, the requesting employer does have to attest to protect both the jobs of domestic workers and the rights and working conditions of guest workers.¹³

If the DOL certifies the LCA, the employer submits it along with an I-129 “Petition for a Nonimmigrant Worker,” which proves the worker’s qualifications for a specialty occupation, to U.S. Citizenship and Immigration Services (USCIS). At this stage in the application process the employer pays a filing fee, with fees going to the H-1B Nonimmigrant Petitioner Account to fund workforce training programs and educational initiatives in mathematics, engineering, or sciences.¹⁴

Applications are approved in the order in which they are received. However, for years in which USCIS anticipates that the number of petitions will exceed the cap, it holds a lottery to determine which petitions will be accepted for review.¹⁵ For example, with the opening of applications for H-1B visas in fiscal year (FY) 2015

\$1 million, or \$500,000 in a high-unemployment or rural area, that create or preserve at least 10 full-time jobs for qualifying U.S. workers within two years.

11 USCIS defines a specialty occupation as “an occupation that requires (A) the theoretical and practical application of a body of highly specialized knowledge, and (B) attainment of a bachelor’s or higher degree in the specific specialty (or its equivalent) as a minimum requirement for entry into the occupation in the United States.”

12 While awaiting their green card, H-1B workers are able to obtain additional one-year extensions on their temporary work visas. A potential downside to dual intent is that H-1B workers are effectively unable to leave their employers during this period. This interval can be considerable for citizens from countries with backlogs in the employment-based preference system, such as China and India. As of November 2013, employer-based visas for those of Indian nationality qualifying under EB-3 preference were being processed for applications filed on or before September 22, 2003. Source: U.S. Department of State, November 2013 Visas Bulletin.

13 The LCA includes four employer attestations; the employer must certify that: (1) the employer pays the higher of the prevailing wage or the actual wage to those aliens and all similar workers in the area of intended employment, (2) the hiring of such aliens does not adversely affect the working conditions of similar U.S. workers, (3) there is no strike or lockout in the course of a labor dispute involving the occupational classification at the place of employment, and (4) workers have been informed of the intent to employ H-1B workers. Additional attestations are required for employers that are H-1B dependent or employers that have willfully misrepresented information in the H-1B visa application process in the previous five years. The DOL review of the LCA is not substantive; it checks only for completeness and obvious errors.

14 Fees range from \$1,575 to \$4,325. For cap-subject petitions not randomly selected, USCIS will reject and return the petition with filing fees, unless the filing is found to be a duplicate. Source: USCIS.

15 For the lottery, USCIS uses a computer-generated random selection process to select the number of petitions necessary to reach the cap. USCIS runs two lotteries—one for cases subject to the 65,000 cap, and another for the 20,000 visas available to foreign workers holding a master’s degree or higher from a U.S. institution of higher education.

Legislative History of the H-1B Visa Program:^a

The Immigration and Nationality Act of 1952 set forth the H-1 visa program to allow a citizen of a foreign country, who is of “distinguished merit and ability,” to temporarily perform services of an exceptional nature in the United States.

The Immigration Nursing Relief Act of 1989 split the H-1 visa program into A and B categories. The H-1A classification focused on registered nurses, and the rest of the occupations were classified as H-1B.

The Immigration Act of 1990 established the major aspects of the H-1B program: replacing “distinguished merit and ability” with “specialty occupations,” establishing an annual numerical cap of 65,000 visas beginning in FY 1992, and dropping the requirements for foreign residency and temporary intent to allow for the “dual intent” of visa holders.

The American Competitiveness and Workforce Improvement Act of 1998 raised the cap to 115,000 for FY 1999 and FY 2001. This act also implemented a fee paid by petitioning employers to fund workforce training programs, scholarships for low-income students enrolled in a program of study leading to a degree in mathematics, engineering, or computer science, and National Science Foundation grants.

The American Competitiveness in the Twenty-First Century Act of 2000 raised the cap to 195,000 for FY 2001–2003, reverting to 65,000 in FY 2004. The act also exempted from the cap H-1B petitions from higher education institutions and their affiliate nonprofits, nonprofit research organizations, and government research organizations.

The H-1B Visa Reform Act of 2004 allocated an additional 20,000 visas for individuals with a master’s degree or higher obtained at an institution of higher education in the United States.

a For a complete legislative history, see GAO (2011) Appendix V and Wasem (2006).

on April 1, 2014, USCIS received a sufficient number of applications to fill the quota by April 7, 2014.¹⁶ Prospective H-1B workers who did not receive an H-1B visa and employers who could not hire the desired

16 See U.S. Citizenship and Immigration Services, “USCIS Reaches FY 2015 H-1B Cap” April 7, 2014.

worker had to seek alternative immigration and employment options or wait until April 1, 2015, to reapply. The lottery is often a point of contention among requesting employers, as they are unable to rank requests in terms of their priority and are constrained in their ability to recruit based on business needs, due to the annual nature of the application process.

If selected and approved, the prospective H-1B recipient submits an approved H-1B package to the Department of State. At this stage the H-1B applicant is interviewed to verify the consistency of documentation and to confirm that the applicant meets all the legal requirements. If all the information is verified, the visa is approved.

Data Sources: Limitations Constrain Analysis

A major limitation to analyzing the H-1B visa program is a lack of quality data on the recipient population. In 2011 the Government Accountability Office (GAO) reported that “the total number of H-1B workers in the United States at any one time—and information about the length of their stay—is unknown because (1) data systems among the various agencies that process such individuals are not linked, so individuals cannot be readily tracked, and (2) H-1B workers are not assigned a unique identifier that would allow for tracking them over time—particularly if and when their visa status changes.” Since it is not possible to measure the stock of the H-1B population, research tends to use flow measures obtained from various points in the application process.

Even these flow measures provide little information on the regional concentrations of H-1B workers. In the same comprehensive GAO (2011) report reviewing the H-1B visa program, only one paragraph in the appendix provides any insight into the geographic distribution of H-1B workers.¹⁷ Apart from the

17 The GAO’s analysis found that H-1B hiring firms in FY 2009 “tended to be concentrated in several high-technology pockets of the country such as Silicon Valley, Southern California, and the Tri-State area of New York, New Jersey, and Connecticut.” This information is based on analysis of firewalled data in Homeland Security’s

GAO study, which uses confidential data, the remaining research is based heavily on the only publicly available data source with detailed geographic information: the LCA.¹⁸ As this application indicates an employer's potential interest in hiring a guest worker, researchers treat such applications as a measure of an area's dependency on or demand for H-1B workers.¹⁹

In this report, we expand upon previous evidence by looking at regional demand for H-1B workers for 2008 through 2012 for all Census divisions, states, and metropolitan areas nationwide to understand how New England's requests for such workers compare with those of the rest of the nation. The report uses the LCA data to produce an intensity of demand measure: LCA requests per 1,000 payroll employees.²⁰ As most analyses of H-1B visas show, the program is largely used to employ people within STEM occupations, particularly computer/IT workers. This report provides a more detailed measure of the demand for H-1B workers than available in previous studies, by normalizing employer requests for workers in STEM occupations by the occupational employment in STEM fields across geographies. The charts and figures in

Computer Linked Adjudication Information Management System (CLAIMS 3).

18 Kerr and Lincoln (2010), using the LCA data to produce state- and city-level dependency measures (that is, employer requests per capita) in 2001–2002 to evaluate the impact of H-1B visas on innovation, list the top 15 most dependent states and cities in their research. Zavodny (2003) estimates the number of LCA requests in computer-related occupations as a share of total IT employment by state in 2001, but does not actually provide any of the state-level data in the report.

19 There is a considerable drop-off between LCA requests filed and the number of full petitions for H-1B workers (I-129) that employers file. This difference is why the requests are a better indicator than the petitions of employer demand for H-1B workers. See the methodological appendix for details.

20 Payroll employment totals come from the Occupational Employment Survey (OES). The strength of the OES is that it is the only dataset that provides detailed occupational employment information, covering over 500 areas, including states, metropolitan statistical areas (MSAs), New England city and town areas (NECTAs) and their divisions, nonmetropolitan areas, and territories. The OES classifies workers into 821 detailed Standard Occupational Classification (SOC) occupations. This allows for analysis of detailed occupational demand. Although better sources may exist for total payroll employment, the OES is used as the denominator in all measures for comparability across measures.

Interpretation and Limitations of Labor Condition Application Data

Since 2000, the Office of Foreign Labor Certification (OFLC) has been providing every LCA request in a publicly available database of administrative records. The data are available by federal fiscal year (FY) when the request is filed, and include such information as the number of workers requested, the prospective start and end dates of employment, occupational and industry details, wages, company name and address, and the city and state where the prospective H-1B worker will be employed. Since the data reflect applications as submitted to the OFLC, they are not checked for errors prior to their release. Unfortunately, data quality issues for selected years between FY 2000 and FY 2007 limit the analysis to FY 2008 through FY 2012. Further, changes in occupational coding in FY 2009 limit the analysis of STEM applications to FY 2010 through FY 2012. Lastly, a single request can be for multiple positions to be filled by H-1B workers. Therefore, to err on the side of underestimating rather than overestimating demand, this report treats each LCA as requesting one worker, avoiding the possibility of having a small number of erroneous requests severely distort the demand for H-1B visas in a regional labor market.^a

a For complete details on working with the LCA and the creation of the intensity measures, see the methodological appendix.

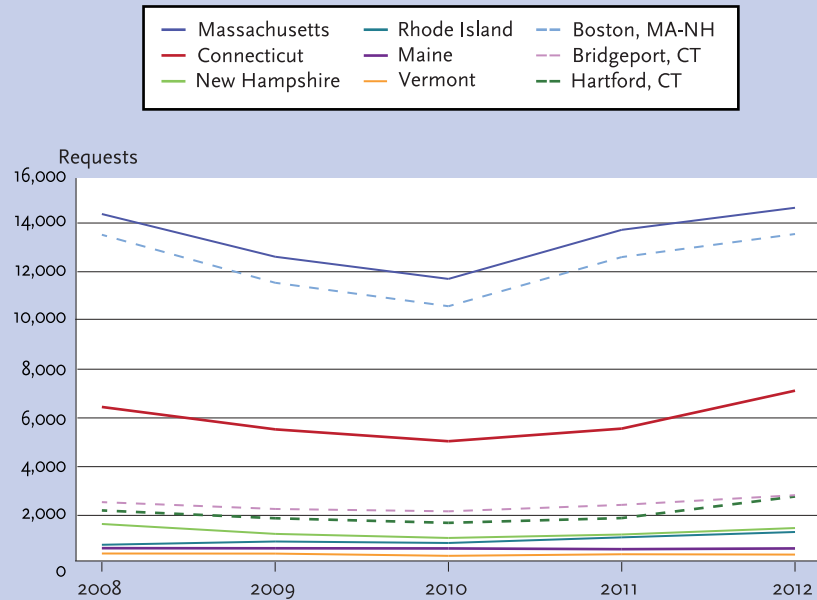
this report highlight the most relevant findings of the analysis. Complete geographic information for measures across all Census divisions, states, and metropolitan areas is available in the data appendix.

Total Demand for H-1B Visas: Low and Geographically Concentrated

The total number of LCA requests (hereafter referred to as requests) for H-1B visas moves in a cyclical pattern similar to employment. Nationally, requests before the Great Recession exceeded 370,000 before falling to just over 300,000 in 2010 and then rising again to above 370,000 in 2012. New England experienced similar patterns of demand, consistently accounting for about 7 percent of national requests (25,000 requests in the region), exceeding New England's 5 percent share of national employment.

Within New England, requests for H-1B visas are highly concentrated in Massachusetts

Figure 1. H-1B Visa Requests in the New England States and Selected Metro Areas



Source: U.S. Office of Foreign Labor Certification Labor Condition Application database.
 Notes: Request figures for state and New England metro areas cover only their geographic boundaries, some of which, such as Boston, MA-NH, cross state borders. So while Boston, MA-NH, includes requests from both Massachusetts and New Hampshire, the Massachusetts and New Hampshire request figures reflect requests for workers within each state's boundaries.

and, to a lesser extent, Connecticut (Figure 1). Massachusetts alone accounts for roughly 60 percent of the region's H-1B visa requests every year but just 47 percent of its payroll employment, while Connecticut accounts for nearly a quarter of New England's requests and employment. Most of the demand for H-1B visas comes from metropolitan areas, which account for about 97 percent of the requests both nationally and regionally.²¹ In particular, large metropolitan areas account for a significant share of requests. For example, the majority of New England's H-1B visa requests come from the Boston, MA-NH, area, which accounts for 55 percent of regional requests but just 37 percent of New England's employment.²²

21 These requests are spread across 372 metropolitan areas nationally. In New England they come from 21 NECTAs. As a point of comparison, roughly 86 percent of U.S. employment is concentrated in the metropolitan areas and 87 percent of New England's employment is in the metropolitan NECTAs.

22 Along with being the eighth largest metropolitan labor market nationwide by payroll employment, the Boston area is also one of the largest metropolitan areas by total number of requests nationwide, ranking eighth overall in 2012 in this respect as well.

In an economy employing more than 130 million workers, the number of annual H-1B visa requests is relatively small. Following the recession, the total intensity of demand for H-1B workers nationally peaked at 2.9 requests per 1,000 workers in FY 2012 (Figure 2). By comparison, the overall job vacancy rate was much higher, at nearly 27 job openings per 1,000 payroll employees in FY 2012.²³ The low demand for H-1B workers relative to job openings is consistent with the stated intent of the program: to provide opportunities for qualified foreign workers to be employed in "specialty occupations."

Although New England accounts for a relatively small share of national requests, the region's intensity of demand (3.7 requests per 1,000 workers in FY 2012) exceeds the national intensity of demand and trails only that of the largest requesting divisions, the Middle Atlantic and Pacific divisions.²⁴ The New England division's high demand comes mainly from Massachusetts and Connecticut, which consistently rank among the top states by intensity of demand for H-1B workers. As in the nation, the total intensity of demand at the state level is well below the job vacancy rate, with the job openings rate in Massachusetts (the only New England state with a job vacancy survey) at 23 openings per 1,000 payroll employees in FY 2012, compared with an intensity of demand of fewer than 5 H-1B requests per 1,000 workers.²⁵

23 The jobs vacancy rate was 26.9 job openings per 1,000 payroll employees in FY 2012. To allow for comparison of the job openings data from the U.S. Bureau of Labor Statistics Job Opening and Labor Turnover Survey (JOLTS) and the intensity of demand measures, the job openings rate here is reported as job openings per 1,000 payroll employees. Comparison between the intensity of demand measures in this report and the job openings rate from JOLTS would be imperfect, as the job openings rate is the number of job vacancies as a share of the total number of positions. The total number of positions is the total payroll employment number plus the total number of job vacancies. Additionally, the job openings data are averaged over the 2012 fiscal year (October 2011 through September 2012) for comparability, resulting in a FY 2012 job openings average of 3.59 million openings.

24 The total intensity of demand for the Middle Atlantic and Pacific in FY 2012 was 4.4 and 4.3 requests per 1,000 payroll employees, respectively. See the data appendix for measures by Census division.

25 The job openings data for Massachusetts are obtained from the Executive Office of Labor and Workforce

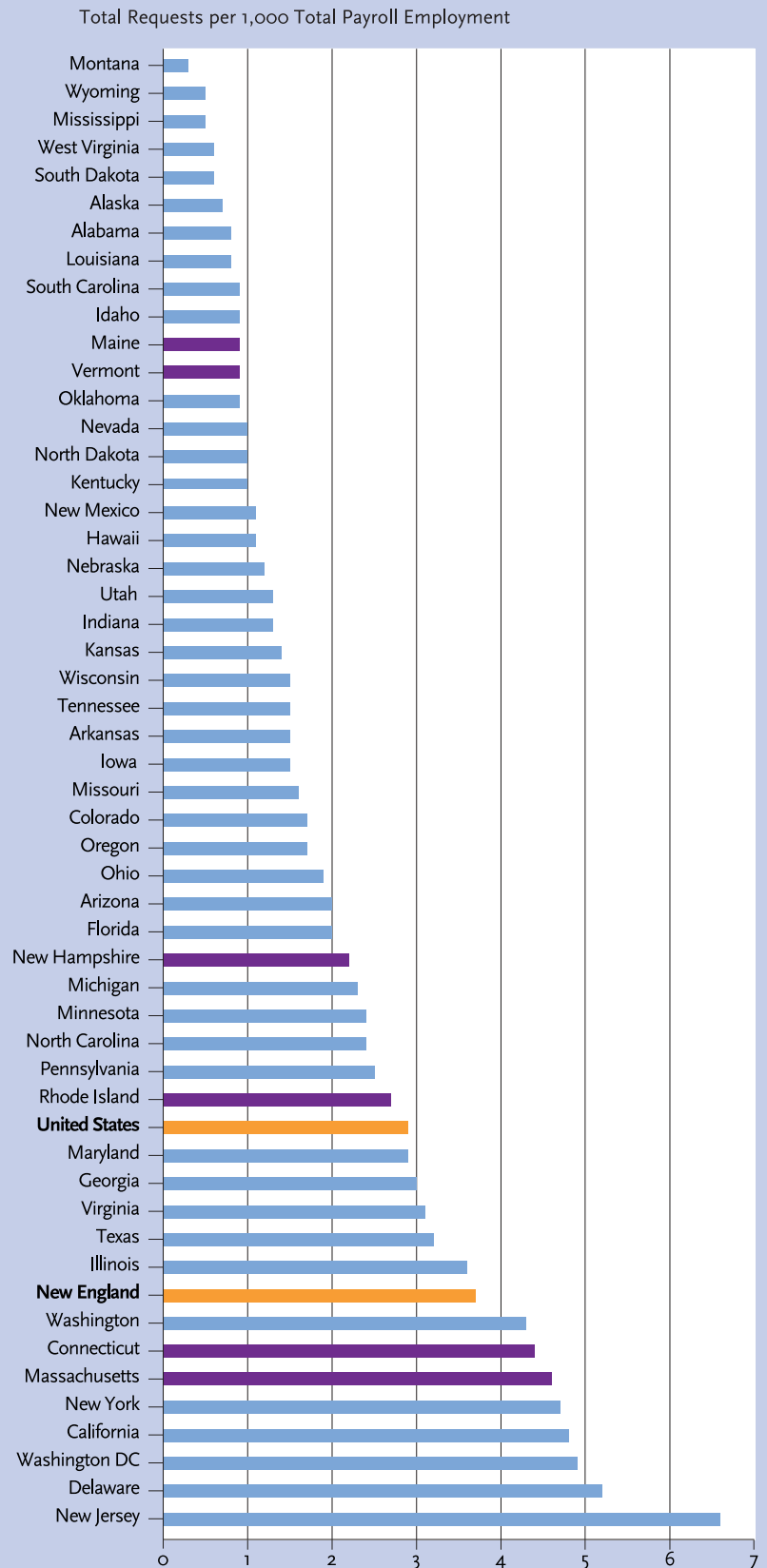
Turning to metropolitan areas, demand for H-1B workers relative to total employment varies greatly. Only 45 of 372 U.S. metro areas exceeded the national intensity of demand in 2012; eight of these were located in New England (Figure 3). Not surprisingly, the highest intensity of demand came from San Jose, CA, home to Silicon Valley, with an intensity of demand over eight times the national level. More surprising may be Columbus, IN, a labor market of just over 45,000 payroll employees, with the second highest demand intensity nationally. Such high demand in small labor markets is typically the result of high demand from a small number of firms: in the case of Columbus, IN, the H-1B requests are largely from Cummins Corporation, a manufacturer of power equipment. New England similarly has a number of small labor markets with elevated demand, such as Danbury, CT; Portsmouth, NH-ME; and Rochester-Dover, NH-ME, where a significant share of H-1B requests comes from a handful of employers, particularly firms in the computer systems design and related services industry, that rank among the top H-1B requesting firms nationwide.²⁶

Outside of New Hampshire's seacoast labor markets, the northern New England labor markets have fairly low demand for H-1B workers relative to total employment. However, this is not characteristic of northern New England only, as a number of smaller Massachusetts labor markets also have very low demand. While examining closely the total intensity of demand shows the regional variation, it provides little insight into why such variation occurs and the types of skills demanded. To understand these differences, it is more useful to focus on the STEM occupations that account for most of the requests.

Developments (EOLWD) Job Vacancy Survey for the second quarter of 2012. This measure is not directly comparable with the national job openings rate, as the survey is conducted only twice annually, making it impossible to create an estimate of job openings per fiscal year as is done in the national measure using JOLTS.

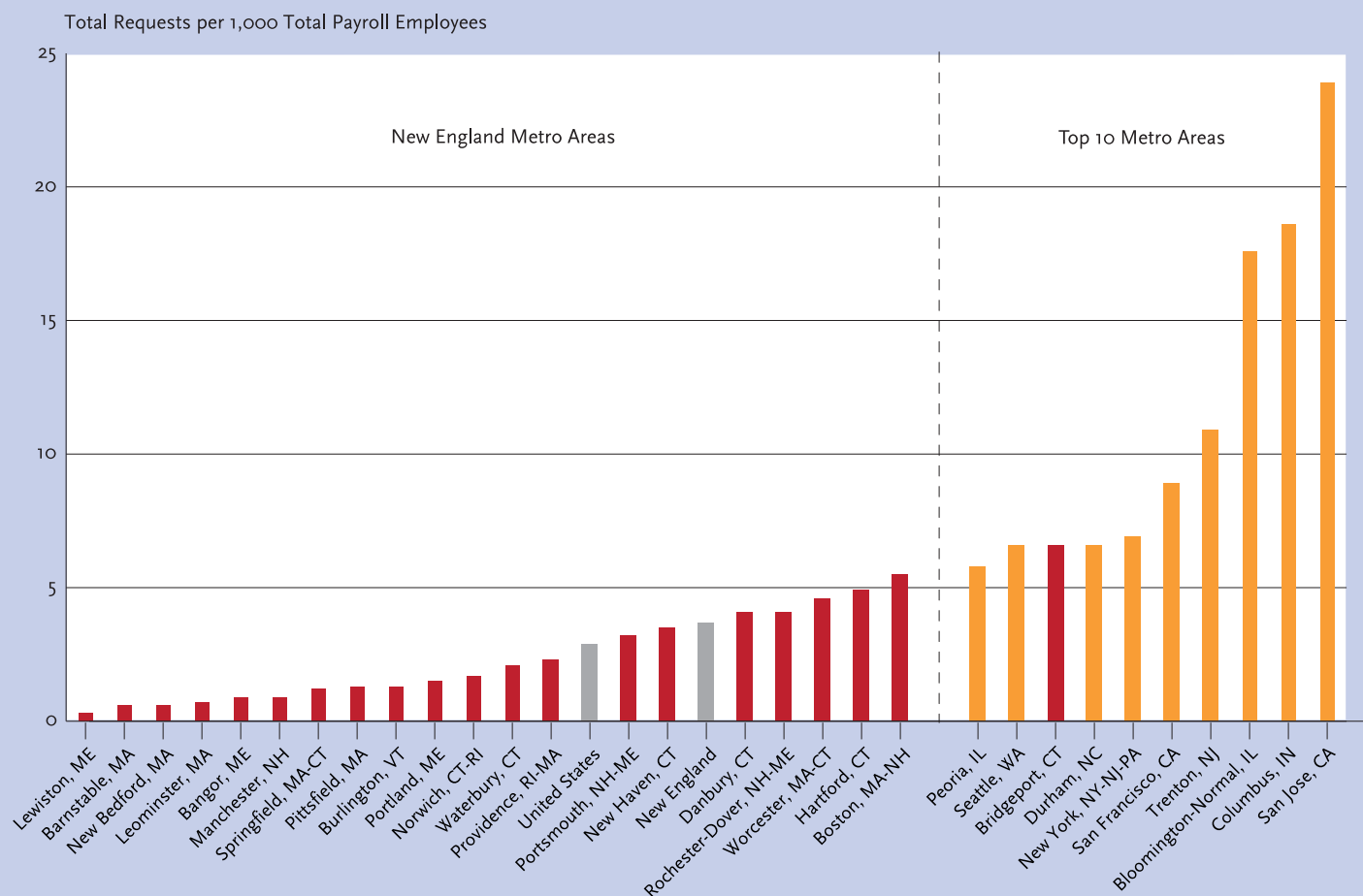
²⁶ Such computer systems design and related services firms include such employers as Wipro Limited, Infosys Limited, and Cognizant Technology Solutions, which appear on the OFLC list of top 10 employers requesting H-1B workers. See OFLC "H-1B Temporary Specialty Occupations Labor Condition Program – Selected Statistics, FY 2013."

Figure 2. Total Intensity of Demand for H-1B Visas by State, FY 2012



Source: U.S. Office of Foreign Labor Certification Labor Condition Application database and U.S. Bureau of Labor Statistics, Occupational Employment Survey.

Figure 3. Total Intensity of Demand for H-1B Visas by MSA, FY 2012



Source: U.S. Office of Foreign Labor Certification Labor Condition Application database and U.S. Bureau of Labor Statistics, Occupational Employment Survey.
Note: National and regional benchmarks are included for comparison with metropolitan areas

STEM H-1B Visa Requests: Largely for Computer Occupations

A defining feature of H-1B visa applications is their concentration in STEM fields. However, analyses of H-1B requests and workers and STEM occupations use an array of definitions. Estimates of the concentrations of H-1B workers in STEM occupations range from fewer than 65 percent to as high as 90 percent.²⁷ Instead of

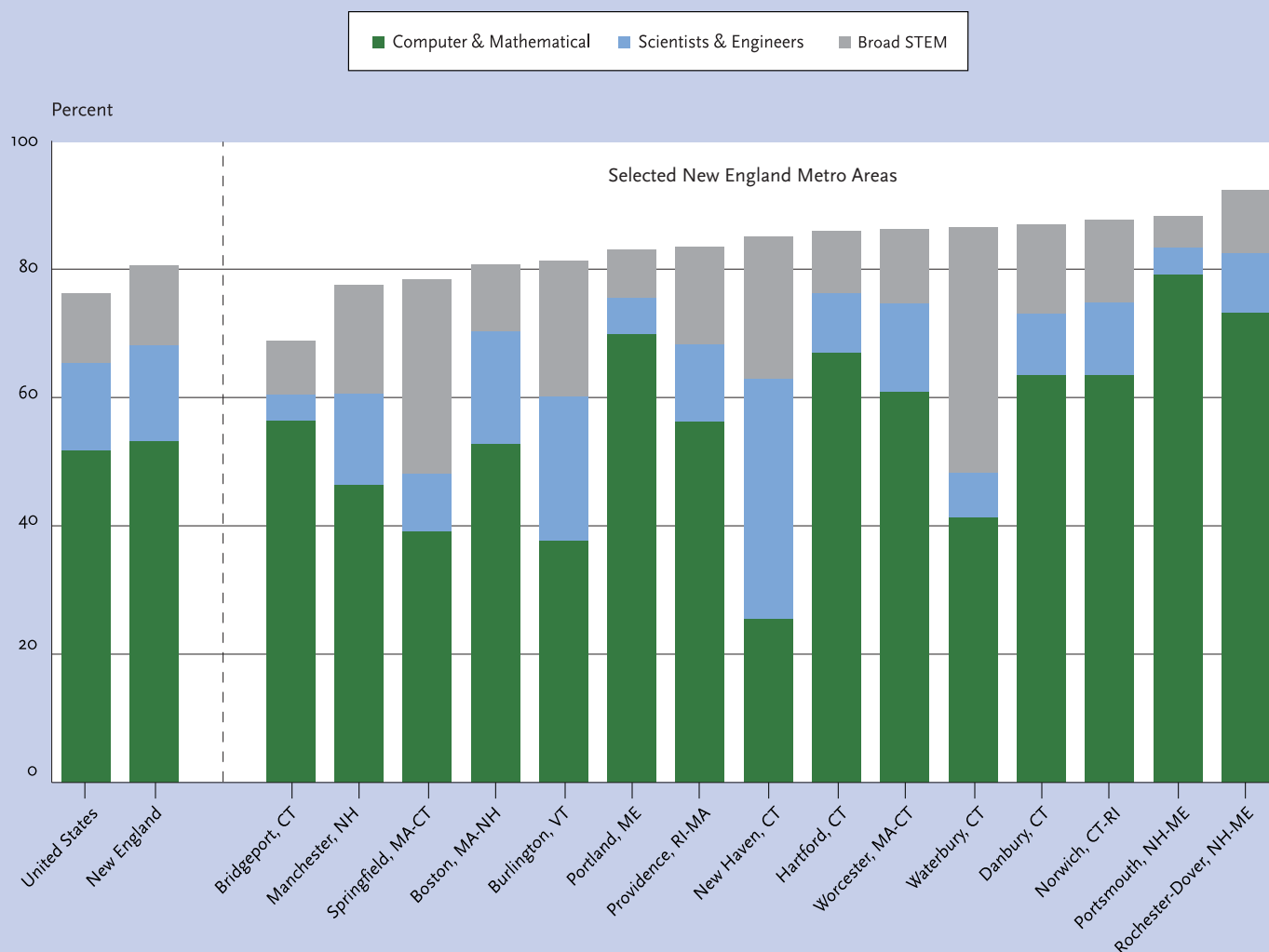
²⁷ For example, Lofstrom and Haynes (2011) estimate that close to 75 percent of all H-1B visas issued in 2009 were in STEM, broadly defined as occupations in engineering, math and sciences, health, and post-secondary education. Ruiz, Wilson, and Choudhury (2012) use the U.S. Department of Commerce's definition, which classifies 50 detailed occupations as STEM, and find that 64.3 percent of requests are for workers in STEM occupations. Rothwell and Ruiz (2013), classifying occupations as STEM if they require high levels of STEM knowledge as defined by O*Net, find that 90 percent of H-1B requests

focusing on STEM as a single employment category or skill group, this report looks at three components of STEM—computer and mathematical (C&M), scientists and engineers (S&E), and all other STEM occupations. While C&M and S&E occupations tend to make up the core of most STEM definitions, broader classifications include architects, social scientists, and healthcare practitioners and technical occupations, as well as management, sales, and post-secondary education positions in STEM-related occupations. These disparate STEM occupations will be grouped together and referred to as “Broad STEM.”²⁸

are for workers in STEM occupations.

²⁸ Given the variation in STEM definitions, any analysis of H-1B visas will be influenced by the definition used. To avoid selecting expansive or limiting definitions, this report bases the composition of STEM on recommendations from the SOC Policy Committee (SOCPC) to the Office

Figure 4. Share of Requests in STEM Occupations, FY 2010–2012



Source: U.S. Office of Foreign Labor Certification Labor Condition Application database.

Note: Broad STEM occupations include architects, social scientists, healthcare practitioners and technical occupations, and selected STEM-related management, sales, and teaching occupations. NECTAs averaging fewer than 100 total requests were removed from the chart, as a few requests or one employer can significantly skew the distribution of requests in these smaller labor markets.

The major component of demand for STEM H-1B workers is in C&M occupations, particularly computer and IT related occupations such as systems analysts and programmers (Figure 4). Both regionally and nationally, over half of the requests for H-1B workers were in C&M occupations between FY 2010 and FY 2012, with the concentration slightly larger in New England than nationally.²⁹ Even at the metropolitan level, where

the variation in the composition of requests for H-1B workers is larger, the dominance of C&M is nearly universal. In New England, C&M occupations were the most requested category across most metropolitan areas, with 10 metropolitan areas having a majority of their H-1B requests in C&M.³⁰

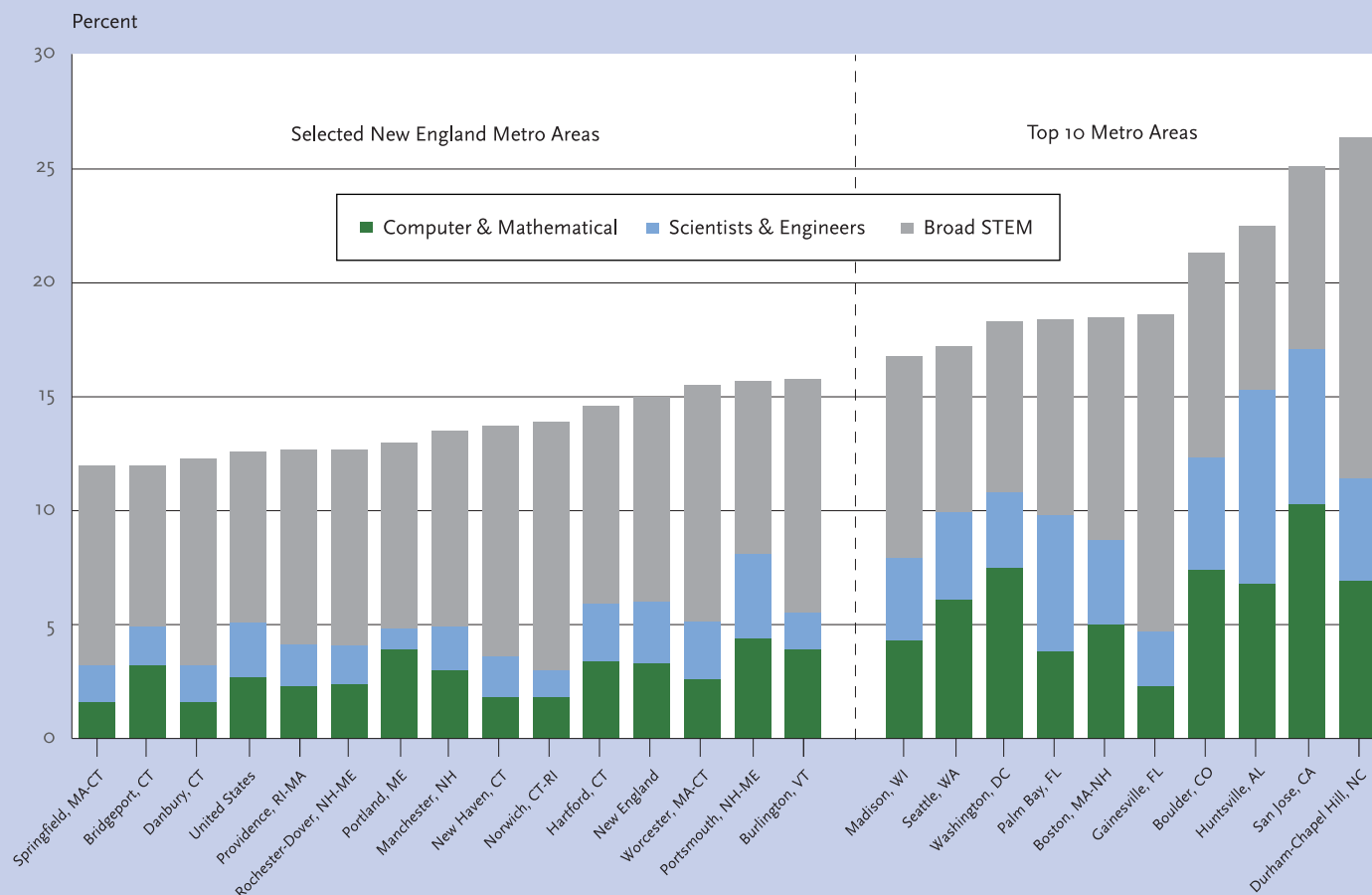
of Management and Budget. The SOCPC formed a working group of agencies and organizations involved in labor and education to review existing definitions of STEM and develop a framework for defining STEM occupations consistent with SOC classification principles. See the methodological appendix for further information on occupations in each STEM component.

²⁹ The occupational coding systems used in the LCA changed

in 2009. To be consistent in the definition of STEM employment, detailed occupational analysis is limited to 2010–2012, when SOC codes were used. Due to the resulting short time-series and suppressed employment information for detailed occupations in the Occupation Employment Survey (OES), analysis of demand for workers in detailed occupations is limited to the average over the 2010-to-2012 period. For further details see the methodological appendix.

³⁰ Across metropolitan areas nationwide, C&M was typically the largest occupational group requested, but such occupations accounted for a majority of H-1B requests in only 86 of 372 areas.

Figure 5. Share of Total Employment in STEM Occupations, 2010–2012



Source: U.S. Bureau of Labor Statistics, Occupational Employment Survey.

Note: Broad STEM occupations include architects, social scientists, healthcare practitioners and technical occupations, and selected STEM-related management, sales, and teaching occupations. STEM employment estimates could only be produced for 266 metropolitan areas, of which 13 were in New England. National and regional benchmarks are included for comparison with metropolitan areas.

STEM Employment: Boston Leads New England

While the overwhelming majority of requests for H-1B workers have been in STEM occupations, these occupations account for a much smaller share of overall employment. Nationally, over 16 million jobs, or about 12.6 percent of total employment, were in STEM occupations in 2010–2012 (Figure 5). The concentration of employment in STEM categories is much larger in New England than in the nation: roughly 1 million workers (15.0 percent of the total employment) in the region are in STEM occupations. This exceeds the STEM concentration in all other regions.³¹

³¹ With 3.3 percent of total employment in C&M occupations, New England has the highest share of all Census divisions, while its share of employment in S&E (2.7

A disproportionate share of New England's STEM employment is located in the Boston metropolitan area, which is the largest STEM cluster in the region and one of the largest nationally. While Boston accounts for 37 percent of the region's employment, over half of New England's employment in computers, mathematics, science, and engineering is located within the Boston metropolitan area.³² The other large STEM employment clusters nationwide are a mix of familiar STEM clusters in college

percent) trailed only the Pacific division. With 9.0 percent of employment in Broad STEM occupations, it far exceeded all other divisions, with the East South Central division second at 8.1 percent.

³² The Boston, MA-NH metropolitan area accounts for 56.2 percent of New England's C&M employment, 49.5 percent of S&E employment, and 39.9 percent of Broad STEM employment.

areas (Durham-Chapel Hill, NC; Boulder, CO; Gainesville, FL; and Madison, WI), in larger metropolitan areas (San Jose, CA; Washington, DC; and Seattle, WA), and in labor markets with NASA space stations (Palm Bay, FL, and Huntsville, AL).³³

New England is also home to a number of other labor markets with relatively large concentrations of STEM employment: 10 regional labor markets have STEM employment concentrations above the national level. Perhaps most strikingly, the largest STEM employment clusters in New England are spread across the region, while the demand for H-1B workers is mostly in Connecticut and Massachusetts metropolitan labor markets.

Considering that the total intensity of demand measures represent requests for the share of highly skilled guest workers in “specialty occupations” relative to an entire area’s workforce, the intensity of demand measure may understate (overstate) demand in areas with small (large) STEM employment concentrations, due to dilution by the larger number of employees in nonSTEM occupations. A more useful way to measure demand for these highly skilled workers may be to consider the demand within STEM components.

Intensity of Demand for STEM H-1B Workers: Most Significant for IT

As stated above, the intensity of demand for STEM workers exceeds the overall intensity of demand for highly skilled guest workers. Looking by component of STEM fields reveals that the demand for C&M H-1B workers amounts to a sizeable share of the C&M workforce both nationally and regionally. Comparatively, demand for S&E H-1B workers is fairly modest, while demand for workers in broader STEM occupations closely matches the total demand intensity for all occupations. STEM intensity of demand, like total intensity of demand, is greatest in a

handful of labor markets both nationally and regionally, particularly those in Connecticut and Massachusetts.

The national intensity of demand for C&M workers in 2010–2012 was 50.7 requests per 1,000 jobs, nearly 20 times the total intensity of demand (Figure 6). New England’s intensity of demand for C&M H-1B workers was slightly higher, and over 16 times the region’s total intensity of demand for H-1B workers. Put another way, demand for C&M H-1B workers is equivalent to roughly 5 percent of C&M payrolls both nationally and regionally.

In a small number of labor markets, demand for C&M H-1B workers amounts to a much higher share of C&M employment.³⁴ Two smaller labor markets, Columbus, IN, and Bloomington-Normal, IL, have the highest intensity of demand for C&M H-1B workers, with demand roughly five times the national level and equivalent to 25 percent of their respective C&M workforces. While both have a single locally headquartered employer that accounts for large numbers of such requests, a second source of demand for C&M H-1B workers comes from a group of firms in the computer systems design and related services (CSD) industry that rank among the top H-1B-requesting firms nationwide.³⁵ In the larger labor markets, such as Trenton, NJ, and San Jose, CA, C&M demand comes from a more diverse pool of employers but is still considerable.

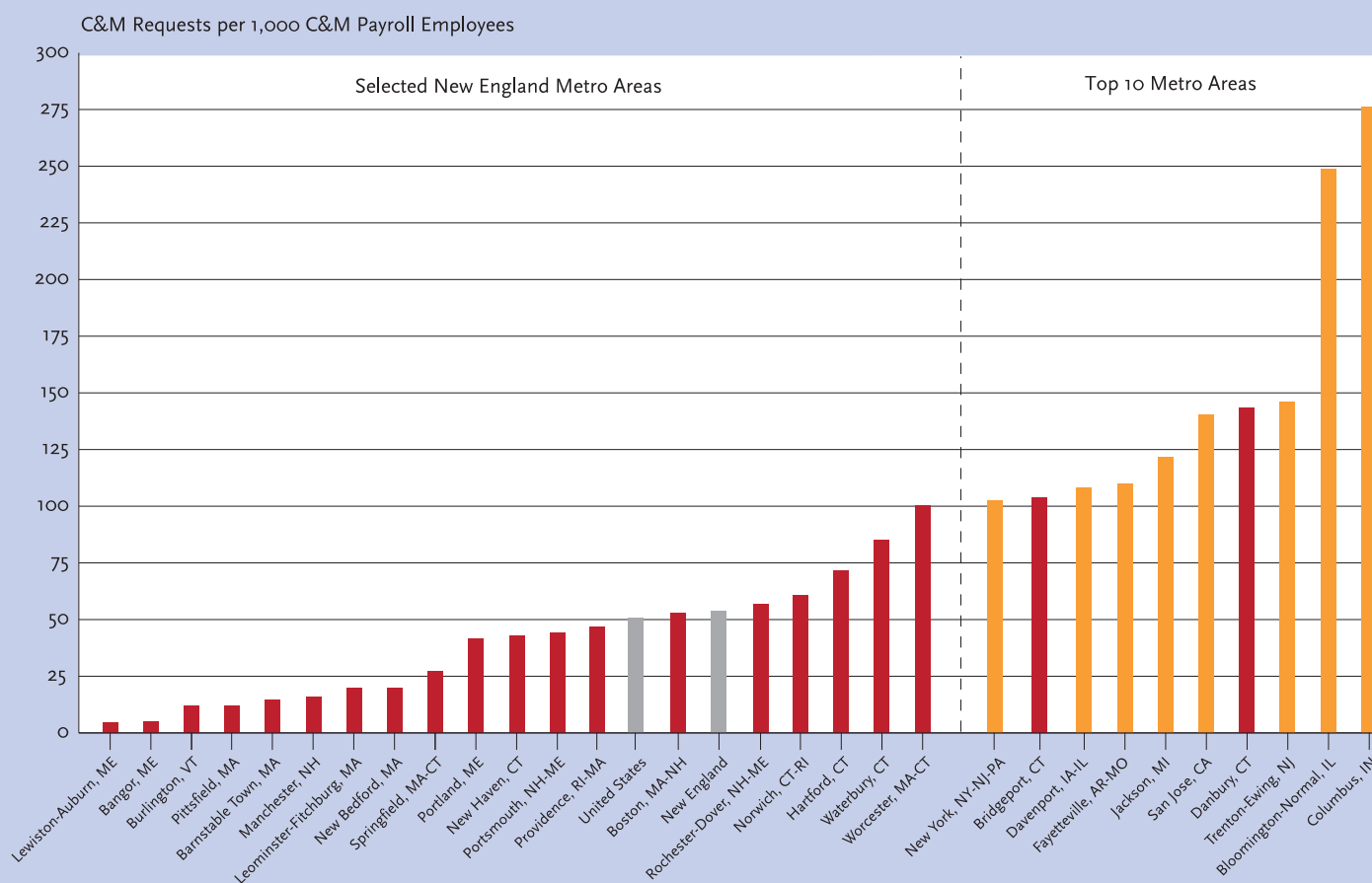
Danbury, CT—one of New England’s smaller labor markets—had the highest intensity of demand for C&M workers in the region (15 percent of its C&M workforce), largely due to a few CSD employers

34 Only 41 of 360 metropolitan areas exceeded the national intensity of demand for such workers.

35 The large requesting institutions were Cummins in Columbus, IN, and HTC Global Services in Bloomington-Normal, IL. Additional, smaller metro areas to rank among the top 10 were Danbury, CT (fourth), and Jackson, MI (sixth), where computer systems design firms accounted for the largest number of requests for C&M workers. Even in Davenport-Moline-Rock Island, IA-IL, a moderately sized labor market of 177,000 workers, the high level of demand was largely due to the presence of the world headquarters of the global IT service and outsourcing firm Yash Technologies in the area, accounting for half of all C&M requests.

33 The role of NASA in Palm Bay-Melbourne-Titusville, FL (John F. Kennedy Space Station), and Huntsville, AL (Marshall Space Flight Center), and NASA’s supporting industries in these areas has led to a large concentration of STEM occupations in the areas, particularly S&E and STEM-related managers and sales positions.

Figure 6. Intensity of Demand for Computer & Mathematics H-1B Workers, FY 2010–2012



Source: U.S. Office of Foreign Labor Certification Labor Condition Application database and U.S. Bureau of Labor Statistics, Occupational Employment Survey.
Note: National and regional benchmarks are included for comparison with metropolitan areas.

in the region requesting C&M workers. In contrast, the region's largest STEM labor market (Boston) had an intensity of demand for C&M H-1B workers comparable to the national level. In fact, Connecticut's metropolitan labor markets account for most of the high-demand regional labor markets in New England for C&M H-1B workers.³⁶ The lowest levels of C&M demand in the region relative to employment came from labor markets in northern New England and smaller Massachusetts labor markets.

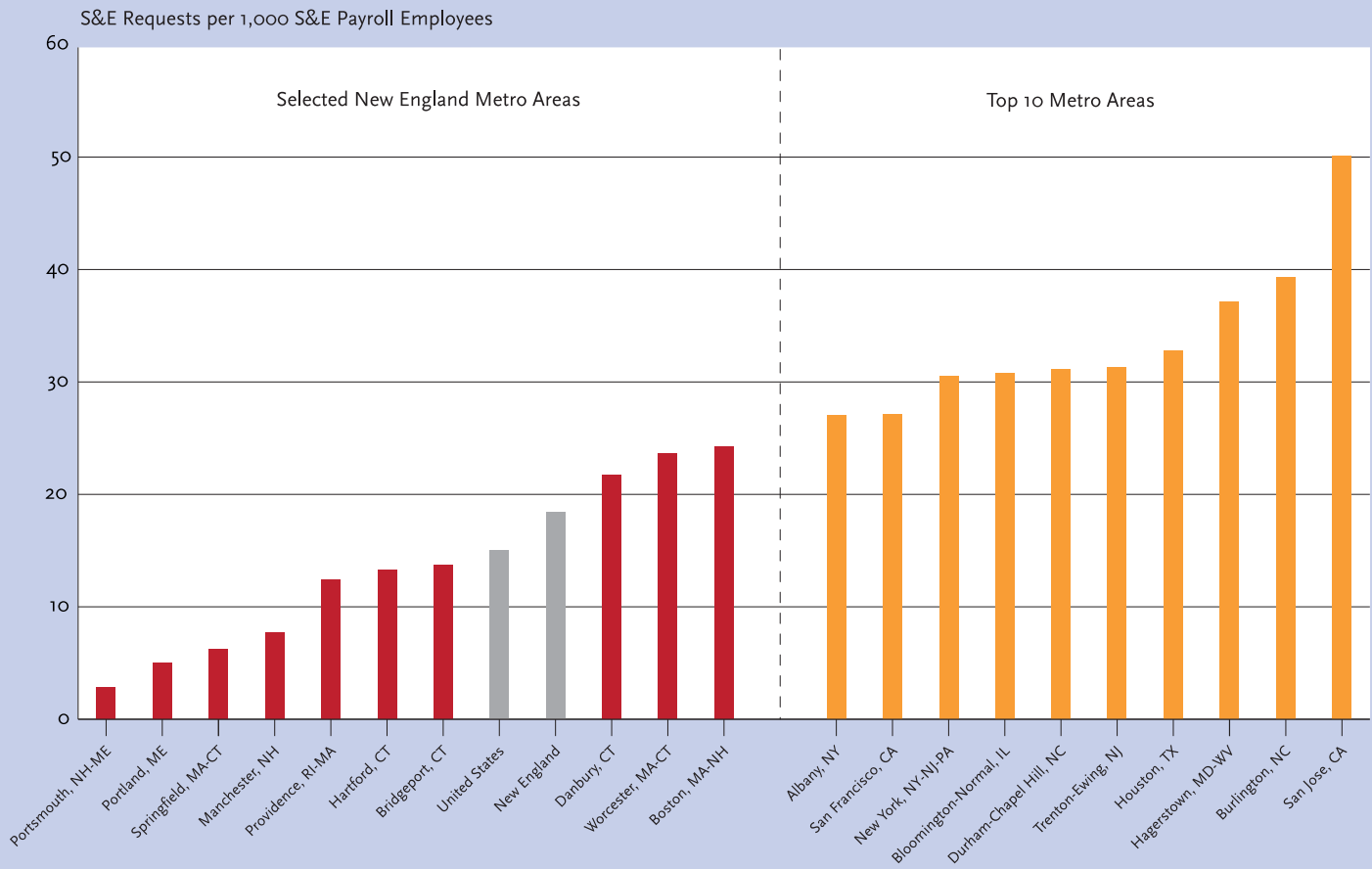
Demand for S&E H-1B workers relative

³⁶ Five of Connecticut's six metropolitan areas exceeded national and regional demand intensities for C&M workers. The six Connecticut NECTAs are Bridgeport, Danbury, Hartford, New Haven, Norwich, and Waterbury. Only New Haven does not exceed the national intensity of demand for C&M H-1B workers. The five NECTAs that do accounted for over 93 percent of Connecticut's requests for such H-1B workers and over 83 percent of the state's C&M workforce.

to S&E employment also far exceeded overall demand for H-1B workers relative to total employment, but was well below the demand intensity for C&M workers (Figure 7).³⁷ The highest intensity of demand for S&E H-1B visas (50.1 requests per 1,000 S&E workers in

³⁷ Science and engineering is the most restrictive definition used in the analysis. Engineers are part of the architecture and engineering occupational group, while scientists are part of the life, physical, and social sciences occupational group. Unlike C&M occupations, which constitute their own major occupational group, the employment information for scientists and engineers can only be obtained from the most detailed occupational codes. At the metropolitan level, employment information for such detailed codes is often suppressed for smaller geographic areas or areas where a small group of employers account for most of the employment in such occupations. Therefore, accurate measures could not be produced for a number of metropolitan areas. In addition, areas with very few requests were dropped from the analysis if a large number of requests had no corresponding employment match. This occurred most often in small labor markets, such as Burlington, VT. As a result, measures could only be produced for 164 metropolitan labor markets. See the methodological appendix for further details.

Figure 7. Intensity of Demand for Science & Engineering H-1B Workers, FY 2010–2012



Source: U.S. Office of Foreign Labor Certification Labor Condition Application database and U.S. Bureau of Labor Statistics, Occupational Employment Survey.
 Note: The breakdown of demand measures for more detailed components of STEM is limited at the metropolitan level due to missing information on occupational-level employment for selected detailed occupations as well as large shares of requests in such occupations. Intensity of demand for S&E could only be produced for 164 metropolitan areas, of which only 10 were in New England. National and regional benchmarks are included for comparison with metropolitan areas.

Silicon Valley) is comparable to the national demand intensity for C&M H-1B workers. Unlike the demand for C&M H-1B workers, demand for S&E H-1B workers in New England is largest in the Massachusetts labor markets of Worcester and Boston.³⁸

In contrast, national demand for Broad STEM H-1B workers relative to Broad STEM employment is small (Table 1). In New England, the intensity of demand for Broad STEM H-1B workers is greater than that of the nation due to the region's many higher education and healthcare employers that request workers to fill STEM-related post-secondary and healthcare practitioner positions. However, nationally the highest

intensity of demand for Broad STEM workers occurs in places where demand for STEM-related management and sales positions is also significant, as in San Jose, CA.

Combining the three components of STEM to look at the overall demand for STEM H-1B employees yields an intensity of demand for STEM H-1B workers of 17.9 requests per 1,000 STEM workers in New England, slightly higher than in the nation (Table 1). A large number of requests for C&M H-1B workers is the major factor in total STEM intensity, but strong demand for S&E and Broad STEM workers in the highest-intensity labor markets also helps to rank the region's labor markets among the most demand-intensive for STEM H-1B workers nationally.

Unfortunately, it is not possible to infer the extent to which C&M demand is

³⁸ The intensity of demand for S&E H-1B workers in Boston, MA, and Worcester, MA, ranked 14th and 15th, respectively, among 164 labor markets nationwide.

Table 1. Top Metropolitan Areas by Intensity of Demand for STEM Occupations, FY 2010–2012

	Broad STEM		All STEM	
	Share	Rank	Share	Rank
United States	3.8	—	15.8	—
Bloomington-Normal, IL	4.3	28	115.2	1
San Jose, CA	9.8	1	74.3	2
Trenton-Ewing, NJ	5.8	10	53.7	3
San Francisco, CA	5.0	18	38.5	4
Fayetteville, AR-MO	2.2	99	37.7	5
New York, NY-NJ-PA	7.9	2	34.8	6
Bridgeport, CT	6.9	6	33.4	7
Seattle, WA	5.0	17	29.8	8
Atlanta, GA	3.2	51	27.2	9
Danbury, CT	5.5	12	25.6	10
New England	4.6	2	17.9	3
Bridgeport, CT	6.9	6	33.4	7
Danbury, CT	5.5	12	25.6	10
Worcester, MA-CT	4.7	21	23.7	13
Boston, MA-NH	5.4	14	22.0	18
Hartford, CT	4.1	31	21.6	20
Portsmouth, NH-ME	1.6	142	13.7	44
Providence, RI-MA	3.4	46	12.6	52
Portland, ME	1.3	154	9.5	70
Springfield, MA-CT	3.7	38	7.1	99
Manchester, NH	2.0	117	5.8	122

Source: U.S. Office of Foreign Labor Certification LCA database and U.S. Bureau of Labor Statistics, Occupational Employment Survey.
 Note: Ranks of metropolitan areas are out of 164 areas. New England's ranking is out of nine Census divisions. See the online data appendix at www.bostonfed.org/neppc for a full list of intensity measures by STEM component for Census divisions, states, and metropolitan areas.

signaling labor tightness and a shortage of appropriately qualified workers, as employers are not required to attest to attempting to hire a U.S. worker prior to requesting an H-1B worker. Thus, these measures of demand may reflect an employer requesting H-1B workers for a variety of reasons. In the single instance in which we can contrast the intensity measure with a comparable measure of labor market tightness, the intensity of demand for C&M workers in FY 2012 (59.0 requests per 1,000 workers) was noticeably higher than the job opening rate for C&M occupations in Massachusetts in 2012 (39.7 job openings

per 1,000 workers).³⁹ So, while the number of unfilled C&M jobs is relatively high, the level of demand for C&M H-1B workers exceeds the level of demand that could be explained by labor market tightness alone. Information about the types of employers who apply for H-1B workers can help to shed light on how H-1B workers are employed.

Firm-Level Demand in New England: Outsourcers and Regional Employers

Looking by employer at H-1B approvals, the GAO (2011) found that almost 30 percent of all H-1B workers were employed by fewer than 1 percent of all firms approved for an H-1B worker.⁴⁰ Surveying firms about the program, the GAO also found that most large employers reported being able to hire preferred candidates even when H-1B requests were denied, because they were “skilled at navigating the immigration system,” largely through use of L-1 or OPT visas.⁴¹ However, smaller employers had limited opportunity to pursue the alternatives used by larger firms, negatively impacting the projects of these firms. Understanding the types of firms that request and receive a significant share of H-1B visas can help to clarify the extent to

39 The job openings rate in Massachusetts is the number of C&M job openings in second quarter 2012 (5,218 openings according to the Massachusetts Job Vacancy Survey) per 1,000 payroll employees in C&M in 2012 (131,277 employees in the Occupational Employment Survey). Of note, the intensity of demand for C&M H-1B workers in Massachusetts for FY 2010–2012 was 52.4 requests per 1,000 payroll employees. In the Massachusetts Job Vacancy Survey for the Second Quarter of 2012, the C&M job vacancy rate was the second highest among all major occupational groups, trailing only that of Food Preparation and Serving Related Occupations.

40 The GAO report also found that 68 percent of employers were approved for one H-1B worker and about 99 percent of all employers were approved for 100 workers or fewer.

41 The L-1 visa allows a U.S. employer to transfer an employee from one of its affiliated foreign offices to one of its offices in the United States. There are two classes of L-1 visas, one allowing for the transfer of executives and managers (L-1A) and one allowing for the transfer of an employee with specialized knowledge relating to the organization's interest (L-1B). The Optional Practical Training (OPT) visa allows a foreigner in the United States on a student visa (F-1) to work up to a total of 12 months in full-time practical training that applies to his or her major field of study. An F-1 student may be authorized to participate in pre-completion OPT after he or she has been enrolled for one full academic year and a post-completion OPT upon completion of his or her degree. There is an additional 17-month extension for a bachelor's, master's, or doctoral degree in a science, technology, engineering, or mathematics (STEM) program.

which these firms influence regional measures of demand for H-1B workers.

Discussion of H-1B visa policy tends to focus on prominent technology firms such as Microsoft or IBM, but in reality the top employers demanding and receiving H-1B visas also include less-mentioned IT firms from the computer systems design and related services (CSD) industry, such as Infosys, Tata Consultancy, and Wipro.⁴² The top-requesting employers of H-1B employees to work in New England are also large, national, requesting CSD firms (Table 2). Infosys, Wipro, and Patni Americas/iGate filed the most requests for H-1B workers in New England between FY 2010 and FY 2012.⁴³ In fact, 10 of the 20 top-requesting employers in the region were CSD firms of various types. In addition to top national requesting firms with very small employment levels in the region (Infosys, Wipro, Larsen & Tourbro, and Cognizant, for example), they included top national requesting firms with more substantial employment in the region (for example, Patni Americas/iGate and Tata Consultancy), small to mid-sized regional-based firms (Avco Consulting and eClinicalWorks), and large employers with a large regional presence (EMC and IBM). Combined, the top-requesting CSD firms accounted for over 13 percent of all requests in New England.⁴⁴ However, as IT

firms, these employers made nearly all of their requests for workers in C&M occupations, representing just over a quarter of all C&M requests in New England.⁴⁵

Outside of CSD firms there are a number of New England-based firms requesting a large number of H-1B workers, such as universities (Yale, Harvard, and MIT), that are exempt from the H-1B cap, hospitals (Massachusetts General, Brigham and Women's, and Children's Hospital), a software publisher (The MathWorks), and a financial institution (Fidelity). The top-requesting employers also include a few large national consulting firms (Deloitte and Accenture) with notable employment in the region. This group of nonCSD firms accounts for slightly over 9 percent of all requests for H-1B workers in New England. The industrial diversity of these firms results in a mix of broad occupational demand, with requests for S&E H-1B workers accounting for the largest share (43.2 percent).

The predominance of CSD firms among the highest-requesting employers, particularly those with little to no physical presence in New England, highlights a concern often raised about the program: heavy users of the H-1B visa program are outsourcing or staffing firms, particularly in IT. For example, the GAO (2011) found "among the top H-1B hiring firms are employers that function

42 For brevity, we focus on the top firms requesting visas for H-1B workers to work in New England. In the data appendix we provide a table of the top 20 employers by requests nationally. The top five are Infosys, Deloitte, Tata, Wipro, and Microsoft. Other reports find a similar composition of top-requesting employers nationally. Ruiz et al. (2012) find the top-requesting employers in FY 2010–2011 to be Microsoft, Tata, Deloitte, Wipro, and Cognizant. Hira (2007) finds the top five requesting employers in FY 2006 to be Infosys, Wipro, Cognizant, Patni, and Mphasis. Although we do not analyze H-1B approvals in this report, others have found that these less frequently discussed IT firms account for a significant share of H-1B approvals. For example, the *Boston Globe's* analysis for FY 2012 approvals found that 20 percent of the 134,780 H-1B petitions approved went to these four firms: Cognizant Technology Solutions, Tata Consultancy Services, Infosys, and Wipro. *Boston Globe*, "Outsourced, at Home" By Farah Stockman, March 31, 2013.

43 In January 2011, iGate acquired Patni, and the firm is therefore called iGate/Patni in this report. The company bases some of its U.S. operations in Cambridge, MA.

44 The predominance of CSD firms requesting H-1B workers in both New England and the United States is not limited to the largest-requesting employers. In 2010–2012, CSD

employers accounted for 38.6 percent of H-1B requests in the United States and 41.2 percent in New England. Similar to the largest-requesting CSD firms, over 90 percent of CSD requests were for C&M, accounting for about 70 percent of total C&M demand both nationally and regionally. In comparison, the second closest industries were the cap-exempt colleges, universities, and professional schools in both New England (7.8 percent) and the United States (6.7 percent). The other top industries by share of requests in New England were: general medical and surgical hospitals (5.3 percent), management, scientific, and technical consulting (4.9 percent), and scientific research and development (4.3 percent).

45 The U.S. Census Bureau defines industries in computer systems design and related services as those primarily engaged in providing expertise in the field of information technology through one or more of the following activities: (1) writing, modifying, testing, and supporting software to meet the needs of a particular customer; (2) planning and designing computer systems that integrate computer hardware, software, and communication technologies; (3) on-site management and operation of clients' computer systems and/or data processing facilities; and (4) other professional and technical computer-related advice and services.

as ‘staffing companies,’ (that is, employers that apply for H-1B workers but ultimately place these workers at the worksites of other employers as part of their business model, many of which also outsource work overseas).⁴⁶ Research looking at the largest H-1B and L-1 requesting and recipient firms finds that a majority of such employers specialize in offshore outsourcing and rarely sponsor H-1B workers for permanent residency.⁴⁷ Employers requesting H-1B visas for this purpose would not be doing so in response to regional labor market conditions but instead to provide a temporary source of labor for shifting work to another location, often overseas.

In New England, a number of outsourcing firms have very few employees in the region but request a large number of H-1B visas, particularly in a number of the high-demand-intensity labor markets. By reviewing the services and business activities of the top H-1B-requesting firms nationally and regionally, we identified 20 employers where outsourcing is a significant component of business activity.⁴⁸ Such firms accounted for 13.1 percent of New England’s requests, exceeding their share of requests

nationally (Figure 8).⁴⁹ The role of outsourcers varies considerably across the region’s labor markets, ranging from no requests in the New Bedford, MA, area to nearly a third of requests in Hartford, CT, coming from such employers. In particular, a number of the labor markets in Connecticut with high intensity of demand for H-1B workers derive large shares of requests from these firms. Conversely, the Boston and Worcester labor markets draw fewer than 10 percent of H-1B requests from these potential offshore outsourcing firms, despite having some of the highest demand intensity for H-1B workers in the region. These labor markets have a more diverse pool of H-1B applicants, including a preponderance of employers with a substantial local presence.⁵⁰

With requests to fill C&M positions representing a majority of outsourcers’ demand for H-1B workers, such firms account for a notable portion of the region’s intensity of demand for C&M H-1B visas. For example, looking only at requests from nonoutsourcing firms, the intensity of demand for C&M H-1B visas in New England is 41.5 requests per 1,000 payroll employees, considerably lower than the 53.9 requests per 1,000 workers for all firms requesting C&M H-1B visas. In Massachusetts, the demand for C&M H-1B visas from nonoutsourcing firms (45.3 requests per 1,000 payroll employees in 2012) is much closer to the state’s job opening rate for such workers (39.7 job openings per 1,000 workers).

As noted, this report measures demand by the number of H-1B visa applications, so as to minimize the likelihood of introducing errors due to faulty reporting of the

46 The GAO also found that 10 of the top 85 H-1B-hiring employers in FY 2009 participate in “staffing arrangements, of which at least 6 have headquarters or operations located in India.”

47 See Hira (2007, 2010, and 2013). Notably, Hira (2007) found that 15 out of 20 of the largest H-1B employers in FY 2006 specialize in offshore outsourcing. The assessment of these firms’ offshoring practices is based on Hira’s analysis of the firms’ business practices and not based on any readily applicable methodology.

48 Unfortunately, it is not possible to identify all outsourcing firms by their industry or other information in the LCA data; instead this requires detailed research into the business practices of each requesting employer. All 20 firms identified as outsourcers were primarily in the CSD industry, provided IT and business process outsourcing (BPO) services, obtained a large portion of annual revenues from such services, requested workers for locations in multiple states and Census divisions, and requested H-1B visas mostly in computer and mathematical occupations. Management, scientific, and technical consulting firms were not included in the list of outsourcing firms, for consistency. Some, such as Deloitte and Accenture, could be classified under parts of the aforementioned criteria, but tended to engage in a range of activities, requested a different mix of H-1B workers, or provided limited information, constraining our ability to confidently assess the extent to which outsourcing was a major component of their business activity.

49 The 20 firms identified as outsourcers are: Capgemini, Cognizant, CSC Covansys, Dotcom Team, Fujitsu (Consulting), HCL America, Hexaware Technologies, IBM, Infosys, KPIT Infosystems, Larsen & Toubro Infotech, Mphasis, Patni Americas/iGate, Satyam Computer Services, Synechron, Syntel, Tata Consultancy, Tech Mahindra (Americas), UST Global, and Wipro.

50 Requests from outsourcers in Worcester, MA, exclude a firm that could potentially be identified as such. Avco Consulting, based in Worcester, MA, is active in a number of outsourcing services and employs only a handful of employees in the area. However, all H-1B requests are for this one location, a situation that differs from the case of the 20 firms identified as outsourcers; those firms request workers for locations in multiple states and regions. Therefore, this firm was not listed as an outsourcer.

Table 2. Top 20 Firms by Requests for H-1B Workers to Work in New England, 2010–2012

Employer Name	Industry	Primary Location of Requesting Firm	Average Annual Requests	Firm's Employment in New England
Infosys	Computer Systems Design and Related Services	Plano, TX	635	<100
Wipro	Computer Systems Design and Related Services	East Brunswick, NJ	520	<100
Patni Americas/iGate	Computer Systems Design and Related Services	Cambridge, MA	333	100–249
Yale University	Colleges, Universities, and Professional Schools	New Haven, CT	306	5,000–9,999
Larsen & Toubro Infotech	Computer Systems Design and Related Services	Edison, NJ	298	<100
Deloitte	Management, Scientific, and Technical Consulting	Philadelphia, PA	286	1,000–4,999
Massachusetts General Hospital	General Medical and Surgical Hospitals	Boston, MA	244	10,000+
Cognizant Technology Solutions	Computer Systems Design and Related Services	Teaneck, NJ	229	<100
Harvard University	Colleges, Universities, and Professional Schools	Cambridge, MA	221	10,000+
Tata Consultancy	Computer Systems Design and Related Services	Rockville, MD	220	250–499
EMC Corporation	Computer Systems Design and Related Services	Hopkinton, MA	215	5,000–9,999
IBM Corporation	Computer Systems Design and Related Services	Research Triangle Park, NC	194	10,000+
Brigham and Women's Hospital	General Medical and Surgical Hospitals	Boston, MA	191	10,000+
The Mathworks, Inc.	Software Publishers	Natick, MA	178	1,000–4,999
Avco Consulting	Computer Systems Design and Related Services	Worcester, MA	170	<100
Children's Hospital Corporation	Specialty Hospitals	Boston, MA	162	5,000–9,999
Accenture	Management, Scientific, and Technical Consulting	Chicago, IL	157	500–999
eClinicalWorks	Computer Systems Design and Related Services	Westborough, MA	145	500–999
Massachusetts Institute of Technology	Colleges, Universities, and Professional Schools	Cambridge, MA	142	5,000–9,999
Fidelity Investments	Other Financial Investment Activities	Merrimack, NH	140	5,000–9,999

Source: U.S. Office of Foreign Labor Certification LCA database, and CareerOneStop Employer Locator available through the U.S. Department of Labor. Employment and Training Administration based on proprietary data purchased from Infogroup. Note: Requests are average annual requests for FY 2010–2012. The primary location of requests is based on the most common location from which the firm was listed as requesting visas in the LCA. This does not necessarily indicate that the firm is headquartered there. All requests listed in this table are for H-1B workers in New England. Industry titles are based on four-digit NAICS codes. Employment by location for employers is provided with a range. The values here are the sum of employment ranges for each firm in the six New England states, standardized to the employment ranges provided by the U.S. Department of Labor. See the online data appendix at www.bostonfed.org/neppc for additional information about requests of the top employers regionally and nationally.

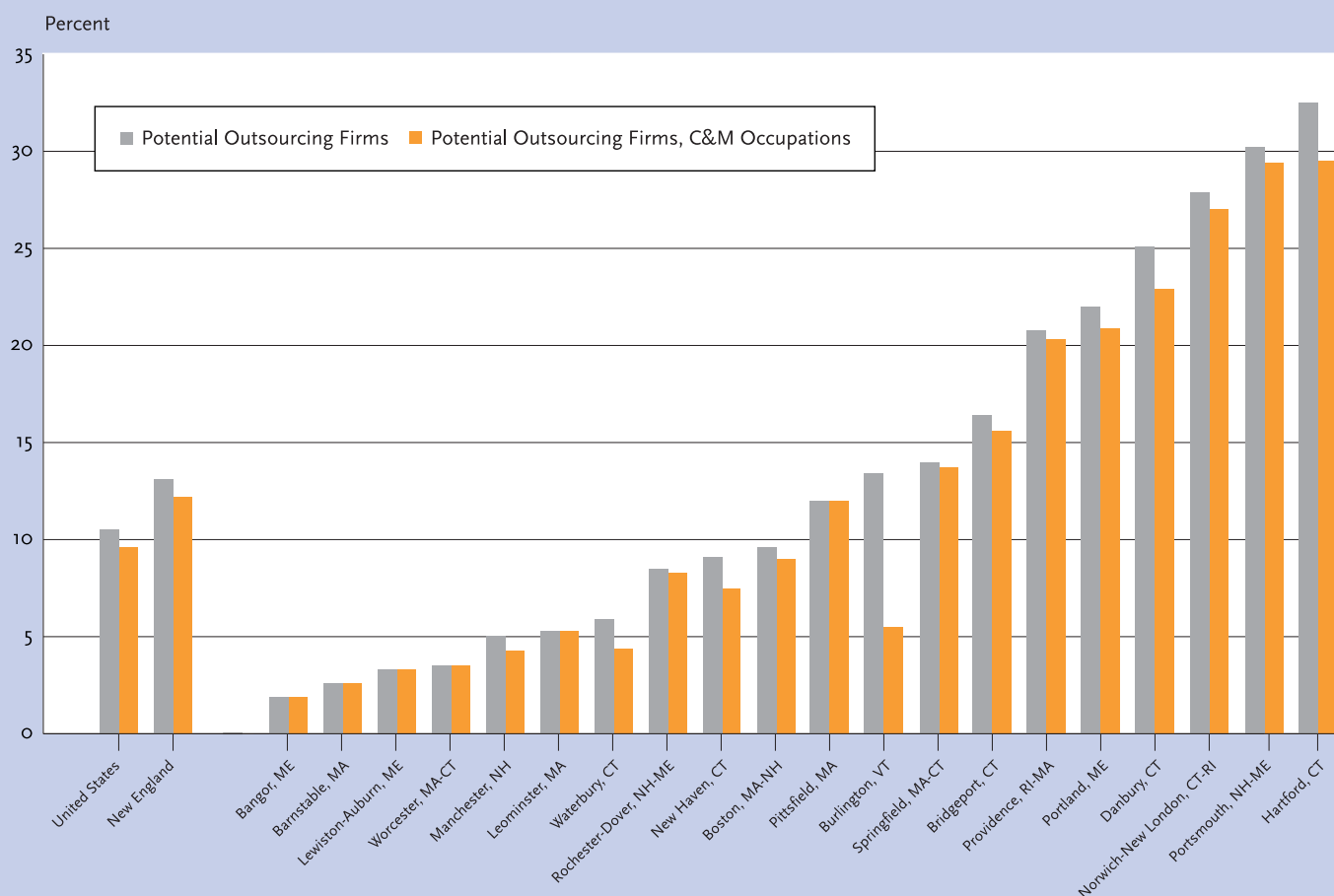
number of positions per application (See “Interpretation and Limitations of Labor Condition Application Data”). The resulting estimates of demand likely understate the role of outsourcers, because outsourcers tend to file requests for multiple positions.⁵¹ As a share of positions requested, the outsourcing firms account for nearly 50 percent of all H-1B visas requested, far higher than their 13.1 percent share of H-1B applications in New England. Other analyses find that outsourcing firms account for nearly 30 percent of all

H-1B approvals nationwide.⁵² It appears that such firms not only request a large number of H-1B visas but also apply for a substantial number of positions to increase their odds of being chosen in the lottery. The presence of larger national firms that are adept at navigating the application and lottery process may be crowding out smaller firms in the competition for the limited number of H-1B visas, both in New England and in other parts of the nation.

51 For example, between FY 2010 and 2012, these 20 outsourcing firms averaged 8.1 positions per request nationally, while all other employers averaged 1.5 positions per request. In New England the difference was slightly larger, with outsourcers averaging 8.5 positions per request, while all other firms averaged 1.4 positions per request.

52 Hira (2013) categorized the top 10 firms for I-129 approvals in FY 2012 as offshore outsourcing firms and found they accounted for 40,170 H-1B approvals. The four firms identified in a *Boston Globe* article as recipients of 20 percent of H-1B approvals in 2012 (see footnote 42) are among Hira’s (2013) top 10 firms. Unfortunately, the FY 2012 I-129 approvals data provide no geographic information on the work location of approved H-1B visa workers and cannot help in understanding the role of such firms at the regional level.

Figure 8. Share of Total H-1B Visa Requests From Potential Offshore Outsourcing Firms, FY 2010–2012



Source: U.S. Office of Foreign Labor Certification Labor Condition Application database.

Note: The 20 firms identified as outsourcers were primarily in the CSD industry, listed IT and business process outsourcing (BPO) as a service offering, obtained a large portion of annual revenues from such services, requested H-1B visas in multiple states and Census divisions, and requested most of their H-1B visas in computer and mathematical occupations.

Conclusion

Although New England accounts for a small share of the national requests for H-1B visas, it has some of the highest demand for such visas in proportion to total employment, due to significant demand from a few metropolitan labor markets in Connecticut and Massachusetts. Computer occupations, generally in IT, account for the majority of requests for H-1B visas. The region's STEM employment hub, Boston, plays a significant role in the regional demand for all types of STEM H-1B workers, but the highest intensity of demand for such workers is actually for computer occupations in Connecticut labor markets, particularly Danbury and Bridgeport. The significant use of H-1B workers for IT jobs may be a signal of the difficulties New England employers have in filling such vacancies without hiring foreign IT workers. However, a lack of suitably skilled domestic IT workers cannot fully explain the demand for H-1B workers in the region, as many of the New England requests come from outsourcing firms that do not have a large base of employment in the region.

By looking at H-1B demand across labor markets, occupations, and employers, this report provides new insight into a number of questions about the effects of the H-1B visa program at the regional level: where these workers are most demanded, what types of workers are most requested, and who employs such workers. And while the analysis does not definitively answer the question of why these workers are demanded, it indicates that the demand for H-1B workers is not solely to address a STEM-skills shortage, as proponents claim. Nor is it principally to outsource work to less costly locations, as opponents assert. In effect, employer demand shows there are various intended uses of the H-1B visas.

Based on these findings, the establishment of a clearly defined policy goal that provides a context for the policy discussion is an essential first step to developing coherent criteria for admitting highly skilled guest workers. The current objective of providing temporary employment of foreign guest workers in "specialty occupations" creates

ambiguity that enables employers to seek such workers for a number of potential reasons, and clouds policy discussions. If the objective of such a program is to attract the best and brightest in order to enable the United States to compete successfully in global markets, perhaps a merit-based program that rates employment-based applicants on desired skills, such as level of education, field of study, or years of experience, would be more effective. Or if the goal is to address shortages of skilled labor in highly specialized fields, then a policy that allows for fluctuations in the visa cap based on economic criteria, such as persistent job vacancies or unemployment rates, may be best.

With a clearly defined policy goal that links to the national interest, relevant criteria for evaluating the program could be developed, and data could be collected and assessed to ensure the program is meeting its stated goal, the absence of which is a major shortcoming of the current H-1B visa program. Having a reformed H-1B visa program that is aligned with a clear policy goal would improve the functioning of labor markets throughout the nation, including in New England. The result would be a more transparent system for admitting and allocating guest workers that employers and the general public would better understand and, therefore, be more inclined to support.

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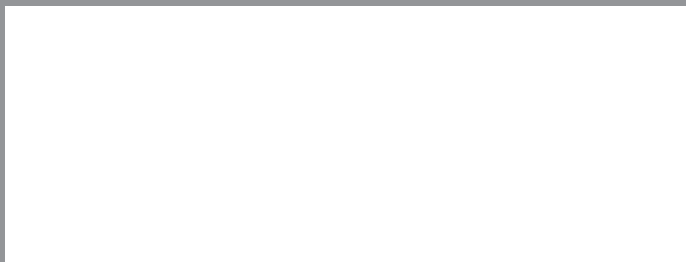
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Robert Clifford is a Senior Policy Analyst with the New England Public Policy Center. Robert's research focuses on regional labor market and demographic trends and challenges and on issues of housing affordability. He was the lead researcher and author of in-depth profiles of labor markets in Massachusetts regions, reports that were prepared in collaboration with the Commonwealth Corporation in 2011 and 2012. Robert routinely presents to policymakers and the media about his research findings and on regional economic conditions. He is the editor of the Federal Reserve Bank of Boston's regional economic data resource, *New England Economic Indicators*. Raised in New Hampshire, Robert holds a master's degree in economics from the University of New Hampshire and a BA in economics from Keene State College.



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