

# The Search for Skills: Demand for H-1B Immigrant Workers in U.S. Metropolitan Areas

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## Findings

An analysis of the geography of H-1B visa requests—particularly in the metropolitan areas with the highest demand between 2001 and 2011—reveals that:

- **Demand for H-1B workers has fluctuated with economic and political cycles over the last decade and reflects a wide range of employers' needs for high-skilled temporary workers.** Employer requests have exceeded the number of visas issued every year except from 2001 to 2003 when the annual cap was temporarily raised from 65,000 to 195,000. Employers requesting the most H-1B visas are large companies subject to the cap specializing in information technology, consulting, and electronics manufacturing. Science, technology, engineering, and mathematics (STEM) occupations account for almost two-thirds of requests for H-1B workers; healthcare, finance, business, and life sciences occupations are also in high demand. Over the last decade the federal government has distributed about \$1 billion from H-1B visa fees to fund programs to address skills shortages in the U.S. workforce.
- **One hundred and six metropolitan areas had at least 250 requests for H-1B workers in the 2010–2011 period, accounting for 91 percent of all requests but only 67 percent of the national workforce.** Considerable variation exists among these metro areas in the number of workers requested and the ratio of requests to the size of the total metro workforce. On average, there were 3.3 requests for H-1Bs per 1,000 workers in these 106 metro areas, compared to 2.4 for the nation as a whole.
- **Metropolitan areas vary by the number of employers using the H-1B program and the cap status of the employers.** Demand in corporate metro areas (such as Columbus, IN and Seattle, WA) comes predominantly from private employers subject to the annual visa cap, while in research metro areas (such as Durham, NC and Ann Arbor, MI), the demand is driven by universities and other research institutions exempted from the cap. In mixed metro areas (such as Atlanta, GA and Trenton, NJ), a variety of employers are demanding temporary high-skilled foreign workers.
- **In 92 of the 106 high demand metropolitan areas, STEM occupations accounted for more than half of all requests.** Computer occupations were the most highly requested occupation group in all but 11 metros of the 106 high-demand metros, where engineering, healthcare practitioners, and postsecondary teachers were more requested. Metropolitan areas also vary on occupational concentration, ranging from 74 occupation groups requested in the New York metro area, to 15 groups requested in Bloomington, IL.
- **H-1B visa fees designated for skills training and STEM education have not been proportionately distributed to metro areas requesting the highest number of H-1B workers.** Metropolitan areas with a high demand for H-1B workers are only receiving \$3.09 on average per working age person 16 years or older of the technical skills training grants compared to \$15.26 for metros that have a lower demand for H-1Bs from 2001–2011. STEM education funds are similarly distributed with the high H-1B metros receiving only \$1.00 per working age person 16 years or older compared to \$14.10 in the low H-1B metros.

The U.S. government should develop an independent standing commission on labor and immigration removed from politics that can adjust the cap for H-1B visa applicants based on local employer skills needs and regional economic indicators. The federal government should also channel H-1B visa fees to skills training in areas that are currently being filled by H-1B workers at the metropolitan level.

“A global view of high-skilled labor complemented by metropolitan skills training will enable U.S. companies to obtain the workforce they need to keep America competitive now and in the future.”

## Introduction

A skilled workforce is an essential foundation for economic growth and a key input to the knowledge economy. How nations obtain the skills they need—whether they produce a skilled labor force through their educational system or obtain workers from across international borders—has been a centerpiece of policy debates across the globe.

To be competitive in the global economy, nations—and specifically, their regional economies—must possess high-skilled labor forces with strong capabilities in science, technology, engineering, and mathematics (STEM), a key input for innovation and economic growth.<sup>1</sup> The years of education demanded by the average U.S. job is growing, especially in industries like health care, education, and professional services.<sup>2</sup> There have also been many reports highlighting the demand of U.S. employers for “deep analytical” skills that require postsecondary, master’s, and doctoral-level training.<sup>3</sup>

Yet, the global supply of these skills is limited and the demand for highly skilled workers is unevenly distributed and poorly matched geographically to the supply. Despite the fact that demand for highly skilled workers is ubiquitous across advanced economies, specialized skills tend to concentrate in specific regions of the world. More than half (56 percent) of the world’s engineering bachelor’s degrees are earned in Asia, with another 17 percent in Europe and just 4 percent in the United States.

China alone accounts for a third of the world’s undergraduate engineering degrees, and has experienced dramatic growth from 280,000 degrees awarded in 2000 to 1 million in 2008.<sup>5</sup> Even smaller Asian nations outpace the United States on this measure: the combined natural sciences and engineering degrees earned in South Korea, Taiwan, and Japan exceeded those earned in the United States, even though America’s population is much larger.<sup>6</sup>

Despite these disadvantages, the United States still has the comparative advantage of being the global hub of academic training with about 723,000 international students who make up 3.5 percent of U.S. higher education enrollment.<sup>7</sup> The United States also has the largest stock of immigrants in the world (42 million).<sup>8</sup> Thirty percent of working-age immigrants—about 8.8 million people—have at least a bachelor’s degree.<sup>9</sup>

Notwithstanding this highly skilled foreign-born population, the legal hurdles to retaining these workers combined with global competition for them have led U.S. employers to report significant difficulty in finding resident workers to fill STEM and other specialty occupations.<sup>10</sup> While there is considerable debate over potential skills shortages, the ability of the U.S. educational system to supply skilled workers is paramount to maintaining global competitiveness.<sup>11</sup> This concern is even more pronounced in some regional labor markets.<sup>12</sup>

The mismatch between demand and supply of high-skilled workers points to a need for understanding the geographical distribution of the demand for foreign skills at the U.S. metropolitan level. Metropolitan areas are the locus of regional innovation clusters that utilize high-skilled labor, especially in STEM fields.<sup>13</sup> Clusters of innovation have a regional advantage of being located near academic research institutions, R&D activity, venture capital and angel investor funding, a network of suppliers, and a critical mass of highly specialized labor force.<sup>14</sup> From large regions such as Silicon Valley in Northern California to smaller metropolitan areas like Research Triangle Park in Durham, NC, regional innovation clusters have been fueling the global economy with new ideas and products. Regional innovation clusters, together with corporate and research hubs, rely heavily on the flow of people from the global sea of talent to fuel their metropolitan engines for growth. These U.S. metros rely heavily on the H-1B visa program, begun in 1990 to provide a means for employers to hire temporary high-skilled foreign workers in specialty occupations.

The majority of analytical work on H-1B visa usage to date has been done at the national level with little discussion of local labor market demand or the extent to which metropolitan employers fill their skills needs with foreign workers.<sup>15</sup> Like the issue itself, most research on the topic is highly polarized. The proponents of increasing H-1B visas argue that the nature of today’s global economy makes skilled labor highly mobile and scarce, and push for the need to liberalize immigration policy. They argue that skilled workers are more mobile than in the past due to changes in communication and technology, have more job choices, and can change jobs across countries more easily.<sup>16</sup> Critics of the H-1B program argue against any increase in the number of high-skilled foreign workers entering the country in the interest of protecting American jobs for existing U.S. workers. These arguments rest on the

understanding that there are no real labor shortages and employers merely take advantage of the visa system by preferring foreign labor for its low cost and exploitability.<sup>17</sup> In this scenario, temporary workers depress wages of all skills levels in the domestic labor market.<sup>18</sup>

While the debate over labor competition between native and foreign workers continues, the challenge for policymakers is to figure out how best to meet the demands of employers for high-skilled workers. This study recognizes the concerns and limitations of both sides of this debate, but provides a new way of looking at the high-skilled immigration issue by examining the demand for H-1B workers in U.S. regional economies. This demand is not necessarily evidence of a high-skilled labor shortage among native workers. Rather, it may reflect employers' preference to hire foreign workers. Nevertheless it is important to recognize that demand is not uniform across the United States. An understanding of the location of demand for skills at the metropolitan level will help stakeholders and policymakers recognize how employers within metro areas utilize foreign skills, and how the federal government can either facilitate or hinder this relationship. This analysis also identifies the specific occupational skills that federal, state, and metropolitan actors should build to support economic growth.

This study aims to provide state and metropolitan leaders in government, business, education, and workforce development with the information they need to respond to regional skills deficits. In turn, these leaders will be better equipped to work with the federal government to address changes to immigration and education policy so that the United States and its metro areas can build and maintain a globally competitive skills base.

Accordingly, this study begins with background on the H-1B visa program, including its intent, rules, and implementation. Next, the paper provides an overview of the key terms, data, and methods employed in this analysis (with further detail in Appendix A). Then the next section presents the results of the analysis—total H-1B requests, intensity, employers, occupations, and funding streams—first at the national level and then with metropolitan variation. Finally, the report concludes with a discussion of how these trends link to policy and what changes leaders at the national, state, and local levels can make to meet the demand for a high-skilled workforce.

## Background

Beginning as part of the Immigration Act of 1990, the H-1B visa program allows employers to hire foreigners to work in specialty occupations on a temporary basis. Specialty occupations are defined as “requiring theoretical and practical application of a body of highly specialized knowledge and the attainment of a bachelor’s degree or higher (or its equivalent) in the field of specialty.”<sup>19</sup> With the exception of fashion models, all H-1B visa recipients are required to have at least a bachelor’s degree or equivalent experience.<sup>20</sup> Visas are granted in three-year increments with the option to extend up to six years.<sup>21</sup> Referred to as a “dual intent” program, the H-1B visa allows foreigners to work temporarily on a nonimmigrant visa and at the same time, with employer sponsorship, apply for permanent residency.<sup>22</sup> However, there is a considerable backlog in green card applications due to per-country limits, particularly for Indian and Chinese nationals who make up the majority of H-1B workers and are unable to leave their sponsoring employer in the interim.<sup>23</sup> There are other classes of high-skilled temporary worker visas such as the L-1 and L-1B for intra-company transfers and the O visa for extraordinary ability. However, this discussion and analysis is limited to the H-1B visa program which represented approximately one percent of all nonimmigrant visa admissions into the United States in 2010.<sup>24</sup>

There is a cap on the number of H-1B visas that can be issued each fiscal year (see box on “H-1B Capped versus Uncapped Employers”). When the program began in 1990, the cap was set to 65,000. During the period of economic growth and low unemployment in the 1990s, it was raised several times (to a maximum of 195,000 for fiscal years 2001 through 2003), but since 2004 has remained at 65,000 with an additional 20,000 visas for workers with advanced degrees from U.S. institutions added in 2006.<sup>25</sup>

## H-1B Capped versus Uncapped Employers

The H-1B application system splits H-1B employers in two categories: academic or research institutions, and private firms. This distinction is important because it defines whether or not the employer is subject to the congressionally set cap on the number of H-1B visas that can be granted during the fiscal year. The cap has varied over the course of the program, but is currently set at 65,000 with an additional 20,000 spots for foreigners with a graduate degree from a U.S. academic institution, totaling 85,000 for the year.

Employers that are exempted from the numerical cap are defined by the American Competitiveness in the Twenty-First Century Act of 2000 as “an institution of higher education or related nonprofit entity, nonprofit research or governmental research entity.” Based on data derived from LCA applications, a conservative estimate of the applications submitted by uncapped employers is about 10 percent of total applications submitted. For additional details, see Appendix A.

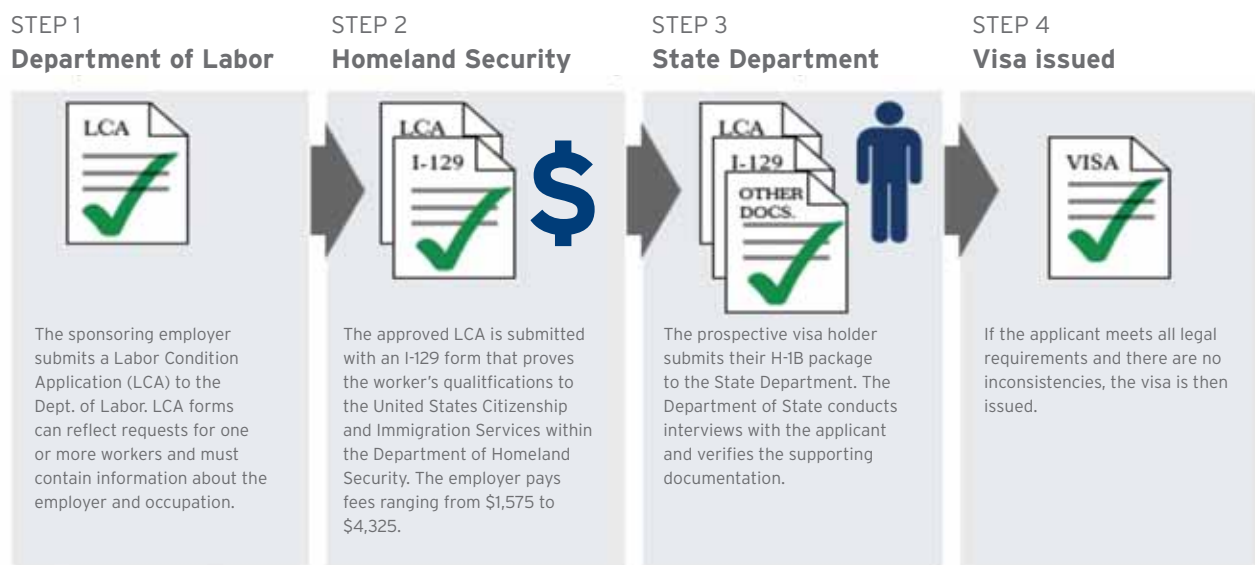
Each initial petition counts against the cap, but renewals do not.

The process of applying for an H-1B visa involves several steps, the first of which is submitting the Labor Condition Application (LCA) to the Department of Labor (see Figure 1).<sup>26</sup> The information from these LCA forms comprises the primary dataset analyzed in this paper. LCA forms can reflect requests for one or more workers and must contain information about the employer and the occupation. In order for LCAs to be approved, salaries for H-1B workers must be certified at or above measured levels for the occupation in nationally recognized surveys.<sup>27</sup> This regulation was put into place to prevent the visa program from depressing wages. However, employers who submit H-1B applications are not required to perform labor market tests to ensure there are no available native-born workers, but only

submit an attestation that no U.S. worker has been displaced at their company as a result.<sup>28</sup> This oversight process facilitates the speed at which requests are approved, but relies on post-admission site visits to prevent fraud and abuse.<sup>29</sup>

Once the LCA has been approved by the Department of Labor, it is sent to the United States Citizenship and Immigration Services (USCIS) within the Department of Homeland Security, along with the I-129 form that proves the worker’s qualifications and the required visa fees. USCIS grants I-129 approvals in the order that they are received up to the day that the cap is reached for employers subject to the cap. At the final stage, the prospective visa holder submits their H-1B package including their I-129 receipt number and supporting documentation to the Department of State. The Department of State conducts interviews with the H-1B applicant and verifies that the required documentation is

**Figure 1. The H-1B Visa Process**



consistent. If the applicant meets all legal requirements, the Department of State then issues the visa.

After the H-1B visa is issued, USCIS plays a major role in monitoring for fraud through random employer site visits.

In recent years, due to the nature of demand for high-skilled workers, visa holders have clustered in STEM fields and come mostly from countries in Asia.<sup>31</sup> According to the U.S. Department of Homeland Security's most recent report, India had the highest number of H-1B recipients in 2011, comprising 58 percent of all approved petitions. Those born in China received 8.8 percent, followed by Canada at 3.5 percent.<sup>32</sup> These patterns have persisted throughout the past decade.

The American Competitiveness and Workforce Improvement Act of 1998 required that employers who request temporary visas for highly skilled workers pay a fee that is used to fund programs to address skills shortages in the U.S. workforce.<sup>33</sup> These skills shortages are defined by occupations where the demand for skilled workers by employers is larger than the number of available workers who are qualified to do these jobs.<sup>34</sup> Currently, fees are between \$1,575 and \$4,325 depending on employer size and composition. Employers also have the option of paying an additional \$1,225 fee to expedite processing time (see box "H-1B Visa Application Fees").<sup>35</sup> From 2001-2011, the government has collected over \$1 billion in visa fees to put toward these programs.<sup>36</sup> The funds are split between two major programs, the Department of Labor's Employment and Training Administration (ETA) and the National Science Foundation (NSF), with the intention of closing the gap between what employers need and what the labor force can provide.

## Data and Methods

This section explains the main data sources, key terms, and methods used in this report. Further details are available in Appendix A.

### Labor Condition Application Data

The primary data source for this study is the Labor Condition Application (LCA) data from the U.S. Department of Labor. These data come from forms submitted by employers requesting an H-1B worker and include information on certification status of the LCA, employer name and location, and beneficiary information, including their job title and work location. The analysis employs an average of data from 2010 and 2011 to provide smoothing for annual variation while utilizing the most current data available. LCA data from fiscal years 2001, 2003, 2005, 2008, 2010, and 2011 are used to show trends over time. These years were selected to provide a representative sample of the data over the last decade.

### Interpretation and Limitations of the LCA Data

The LCA data are limited by several constraints. The first and most significant is that the LCA database contains records for every request submitted, but it does not contain the final outcome of each LCA.<sup>37</sup> The certification status of each LCA is available, but this is an intermediate step in the process towards admission, not the final decision. Secondly, an LCA is submitted for every H-1B request, whether new

## H-1B Visa Application Fees

Base filing fee:  
\$325

American Competitiveness and Workforce Improvement Act of 1998 fee:  
\$750 for employers with 1 to 25 full-time employees, unless exempt  
\$1,500 for employers with 26 or more full-time equivalent employees, unless exempt

Fraud prevention and detection fee:  
\$500 to be submitted with a request for initial H-1B status or with a request for a beneficiary already in H-1B status to change employers (does not apply to Chile/Singapore H-1B1 petitions)

Public Law 111-230:  
\$2,000 to be submitted by a petitioner which employs 50 or more employees in the United States where more than 50 percent of its employees in the U.S. are in H-1B or L-1 nonimmigrant status

Premium processing fee:  
\$1,225 for employers seeking expedited processing

*Source: U.S. Department of Homeland Security*

or a renewal, and each LCA can contain multiple H-1B workers. To maintain a conservative estimate of demand, this study counts each LCA as one request, and uses all LCAs as a measure of 'demand'. Two additional limitations of the data are that it does not identify which employers are exempt from the numerical cap, and that detailed occupational codes are not provided in years prior to 2010. For more detail on these limitations, see Appendix A.

Despite these constraints, the LCA data remain the best available measure of the total demand for H-1B temporary workers. The act of filing an LCA for a worker accurately measures the employers' demand for H-1B labor, regardless of whether this request is new or a renewal, or of the outcome of the LCA. Therefore, the database describes the flow of H-1B demand. It cannot be compared to a stock measure of the H-1B population, as no such count exists.

### ***Restricting and Finalizing the Sample***

The original data included LCAs for work locations in all 50 states, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands. Petitions outside the 50 states and the District of Columbia were eliminated. Additionally, the LCA data contain all submitted requests, some of which were withdrawn by employers at various stages of the certification process, or held for various reasons regarding the validity of the application. These LCAs were eliminated because they were stopped in an intermediate stage of review, and the analysis is limited to those that went through the full review process and were either certified or denied.

The inquiry further restricted the sample of metropolitan areas used in detailed analyses based on the 2010-2011 average of total LCAs requested. Many metropolitan areas had very few LCA requests, and it is neither possible nor meaningful to attempt a detailed analysis of such a small sample. For example, 73 metropolitan areas had a 2010-2011 average of 25 or fewer LCAs. In order to restrict the analytical sample to metropolitan areas with large numbers of LCA requests, the study uses those areas with 250 or more LCAs. This threshold was chosen after using Jenks optimization to find a

## Key Terms

**H-1B demand** is measured by the total number of LCAs submitted in various categories (e.g., employer, occupation, metropolitan area). This measure does not account for the difference between LCAs and admissions since the demand is substantially higher than the true number of H-1Bs admitted in a given year due to the review process and cap limit. This paper uses the terms "demand" and "requests" interchangeably to refer to the number of LCAs submitted by employers for H-1B workers.

**H-1B demand intensity** is measured by the number of LCAs per 1,000 employed workers in the same category. For example, at the metropolitan area level, the demand intensity of 14.60 is calculated by dividing the number of LCAs requested to work in the Columbus, IN Metropolitan Area by the total number of jobs (in thousands) in the metropolitan area. Similarly, the national intensity of computer occupations is 4.80, calculated by dividing the number of LCAs for computer occupations by the number of computer occupation jobs (in thousands) in the United States.

**High H-1B demand metropolitan areas** are the 106 metro areas that are the focus of this analysis. These metros are defined by having an average of at least 250 LCAs in the 2010-2011 period.

**Labor Condition Application (LCA)** is a document that employers formally submit to the Department of Labor's Office of Foreign Labor Certification to request hiring or renewing a temporary worker on an H-1B visa. The LCA is the first step of the visa application process; it must be followed by an I-129 petition along with visa fees, and does not guarantee approval or visa issuance.

**Science, technology, engineering and mathematics (STEM)** occupations are identified by the six-digit SOC code provided in the LCA. This analysis uses the definition of STEM published by the Department of Commerce, which includes 50 detailed occupations across these fields. (See Economics and Statistics Administration, U.S. Department of Commerce. "STEM: Good Jobs Now and for the Future." [www.esa.doc.gov/sites/default/.../documents/stemfinaljuly14\\_1.pdf](http://www.esa.doc.gov/sites/default/.../documents/stemfinaljuly14_1.pdf).)



natural break in the distribution. This process yields a final list of 106 metropolitan areas with 'high H-1B demand' to be used in all analyses and rankings. These 106 metro areas contain 91 percent of all LCAs over the averaged 2010-2011 period.

## Findings

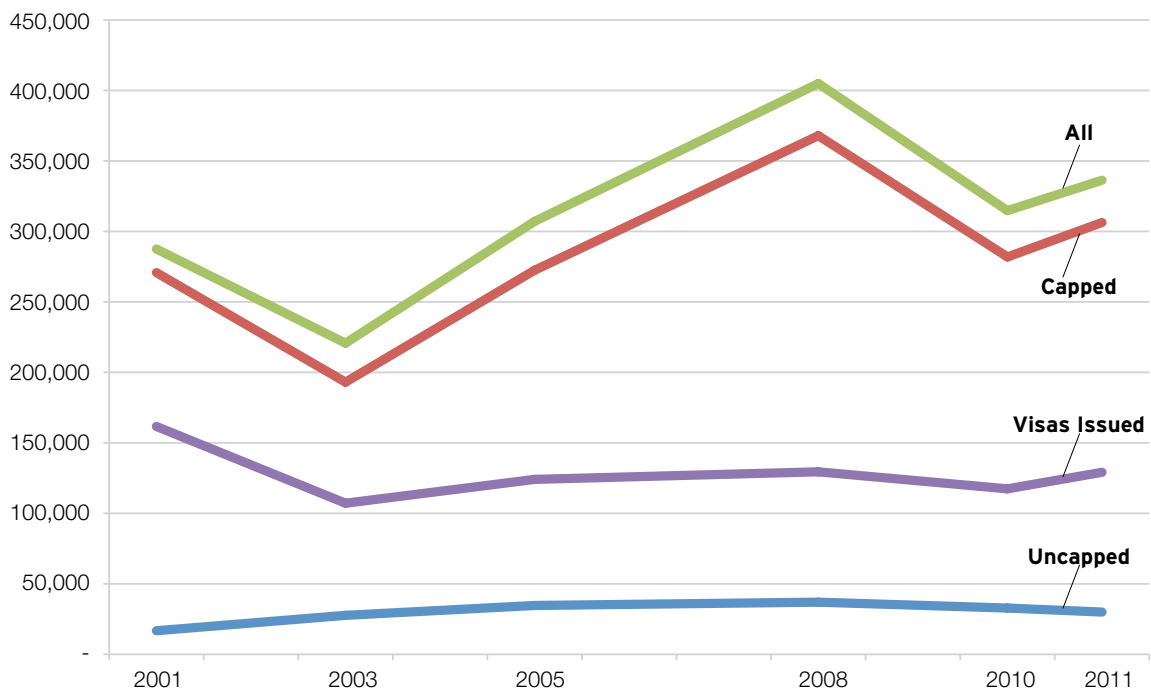
### 1. Demand for H-1B workers has fluctuated with economic and political cycles over the last decade and reflects a wide range of employers' needs for high-skilled temporary workers.

Over the last 10 years the demand for H-1B visas has fluctuated in response to both economic and political conditions. The trend at the national level has been one of growth, with the exception of significant declines after the collapse of the dot-com bubble in 2001, September 11, 2001, and the Great Recession starting in 2007. Annual H-1B visa requests for new and renewed petitions averaged 311,889 from 2001 to 2011, fluctuating from a 2003 low of 220,731 to a 2008 high of 404,907 (See Figure 2). Most of the fluctuation in demand comes from capped requests, which ebb and flow with the business cycle, while demand from uncapped employers has remained steadier.

On average in the 2010-2011 period, there were 325,522 requests filed by U.S. employers. Based on the conservative estimate used in this study, uncapped institutions accounted for approximately 10 percent of these requests.

The only years when the demand for H-1B workers did not exceed the number of available new visas were 2001 through 2003 when the cap was temporarily raised to 195,000.<sup>38</sup> In 2001, 287,519 applications for H-1B visas were made by employers and 161,643 H-1B visas were issued, which means that about 56 percent of initial applications led to a visa being issued.<sup>39</sup> On the other hand, in 2008, when the cap was 85,000, there were 404,907 applications filed with 129,464 visas issued, a 32 percent

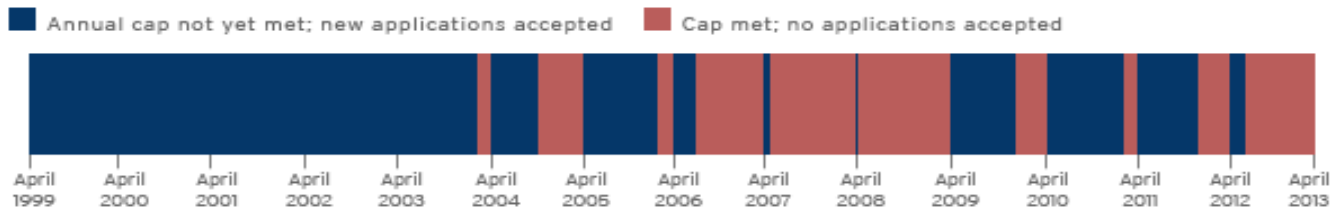
**Figure 2. Demand and Visa Issuance for H-1B Workers in the United States by Cap Status, 2001-2011**



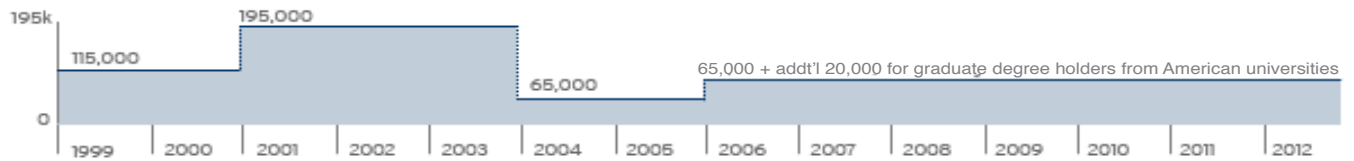
Source: LCA database, Department of Labor. Visa issuance data from the Department of State.

**Figure 3. H-1B Visa Annual Cap and Waiting Period for Employers, 1999-2013**

*H-1B availability windows*



*Annual cap on H-1B visas*



Source: USCIS

issuance rate. This lower H-1B visa issuance rate has persisted since 2004 when the cap was lowered to 65,000 from 195,000.<sup>40</sup>

The current lower H-1B visa issuance rate has resulted in longer waiting periods for employers. Every year, the federal government begins accepting applications for the next fiscal year on the first business day of April. Depending on the year, H-1B visas subject to the cap can run out in a manner of hours, days, weeks or months.<sup>41</sup> When the cap was higher (2001-2003), employers subject to the cap had a much larger number of days that they could apply for an H-1B visa (Figure 3).

Since the cap reverted to 65,000 in 2004, available H-1B visas have been exhausted much faster. This means that employers subject to the cap have had to wait as long as 364 days to file new applications (between FY2007 and FY2008). This uncertainty in visa issuance and waiting periods may impose additional costs upon employers requesting visas. After a decrease during the Great Recession (FY2009 and FY2010), the waiting period to file applications has been on the upswing (Figure 3).<sup>42</sup>

**Employer trends**

On average in 2010 and 2011, around 70,000 employers filed labor condition applications (LCAs) for H-1B workers.<sup>43</sup> Almost half of these employers, however, requested only one worker, and 94 percent requested fewer than 10. By contrast, a small number of employers were very heavy users of the program. Fifteen employers filed over 1,000 LCAs each, with another 16 employers filing between 500 and 1,000 LCAs.

The 100 highest requesting employers in 2010-2011 account for 20 percent of national demand. Two-thirds of these employers are headquartered in the United States, and their LCAs account for 60 percent of requests from these 100 employers. Twenty-seven of these employers were classified as Fortune 500 in 2011, and those requests make up one-third of this group. The employers requesting the most H-1Bs are large private companies specializing in information technology, consulting, and electronics manufacturing. The top 25 employers requesting H-1B workers account for 12 percent of all applications and are composed of an even mix of American and non-American companies (Table 1).

The U.S. companies range from technology firms such as Microsoft, Intel, Oracle, and Google, to financial services companies such as JPMorgan Chase and Goldman Sachs, to consulting firms such as Cognizant. Deloitte and IBM are heavily involved in providing IT professional services, and one of America's largest retail pharmacies, CVS, is also among the top 25 H-1B requesters.

The other half of H-1B requests by the top 25 employers come from companies headquartered outside the United States. These include companies like Tata, Wipro, Accenture, and IBM India, which



**Table 1. Top Employers Requesting H-1B Workers, 2010-2011 Average**

| Employer Name                           | 2010-2011 Average | Share        |
|---|-------------------|--------------|
| <b>1 Microsoft Corporation</b>          | <b>4,109</b>      | <b>1.26%</b> |
| 2 Tata Consultancy Services Limited     | 3,179             | 0.98%        |
| <b>3 Deloitte Consulting</b>            | <b>2,981</b>      | <b>0.92%</b> |
| 4 Wipro Limited                         | 2,944             | 0.90%        |
| <b>5 Cognizant Technology Solutions</b> | <b>2,017</b>      | <b>0.62%</b> |
| 6 Larsen & Toubro Limited               | 1,888             | 0.58%        |
| 7 IBM India                             | 1,873             | 0.58%        |
| 8 Infosys Limited                       | 1,842             | 0.57%        |
| <b>9 Intel Corporation</b>              | <b>1,510</b>      | <b>0.46%</b> |
| <b>10 IBM Corporation</b>               | <b>1,468</b>      | <b>0.45%</b> |
| <b>11 Oracle USA</b>                    | <b>1,413</b>      | <b>0.43%</b> |
| 12 Fujitsu America                      | 1,372             | 0.42%        |
| 13 Patni Americas                       | 1,261             | 0.39%        |
| 14 Accenture                            | 1,180             | 0.36%        |
| <b>15 UST Global</b>                    | <b>1,133</b>      | <b>0.35%</b> |
| 16 Ernst & Young                        | 1,114             | 0.34%        |
| <b>17 Qualcomm Incorporated</b>         | <b>1,017</b>      | <b>0.31%</b> |
| <b>18 Deloitte &amp; Touche</b>         | <b>1,016</b>      | <b>0.31%</b> |
| <b>19 Google</b>                        | <b>1,009</b>      | <b>0.31%</b> |
| 20 Satyam Computer Services             | 998               | 0.31%        |
| 21 HCL America                          | 977               | 0.30%        |
| 22 Capgemini US                         | 875               | 0.27%        |
| <b>23 CVS RX Services</b>               | <b>688</b>        | <b>0.21%</b> |
| <b>24 Goldman Sachs &amp; Co.</b>       | <b>656</b>        | <b>0.20%</b> |
| <b>25 JPMorgan Chase &amp; Co.</b>      | <b>645</b>        | <b>0.20%</b> |

*Bold font indicates companies with global headquarters in the United States.*

*Source: LCA database, Department of Labor*

provide IT professional and technical services to American companies. The Japanese company Fujitsu produces both computer hardware and also provides IT professional services.

Requests for H-1Bs by uncapped institutions accounted for about 10 percent of all applications in 2010-2011. The top uncapped employers are the nation's largest research institutions and universities from across the country, including the University of Michigan, the University of Texas at Austin, the National Institutes of Health, and the Johns Hopkins University.

### **Occupational Trends**

In the 2010-2011 period, STEM occupations accounted for 64 percent of all H-1B requests, despite only accounting for 5.4 percent of national employment in 2010. Sixty-six percent of requests from capped employers were for STEM occupations, while uncapped employers' requests were 49 percent STEM. Yet the orientation of H-1B requests toward occupations requiring STEM competencies may be even higher. The U.S. Department of Commerce's conservative definition of STEM used for this report does not include many professions that are likely to require specialty math and science knowledge, such as financial analysts and physicians. For example, demand from uncapped employers is concentrated heavily in medicine and post-secondary teaching, neither of which is considered STEM, despite often requiring specialized science education.

**Table 2. Top Occupation Groups by Cap Status of Employer, 2010-2011 Average**

| Cap Status             | Minor Occupation Group   | 2010-2011 Average | Share |
|------------------------|--|-------------------|-------|
| Uncapped Employers     | Life Scientists  | 8,749             | 27.9% |
|                        | Postsecondary Teachers   | 7,233             | 23.0% |
|                        | Health Diagnosing and Treating Practitioners                         | 4,352             | 13.9% |
|                        | Physical Scientists  | 2,274             | 7.2%  |
|                        | Computer Occupations   | 1,725             | 5.5%  |
|                        | Life, Physical, and Social Science Technicians                       | 1,560             | 5.0%  |
|                        | Engineers  | 1,544             | 4.9%  |
|                        | Mathematical Science Occupations                                     | 670               | 2.1%  |
|                        | Social Scientists and Related Workers                                | 427               | 1.4%  |
|                        | Other Healthcare Practitioners and Technical Occupations             | 350               | 1.1%  |
| <b>All Occupations</b> |  | <b>31,414</b>     |       |
| Capped Employers       | Computer Occupations   | 150,625           | 51.2% |
|                        | Engineers  | 25,273            | 8.6%  |
|                        | Financial Specialists  | 18,271            | 6.2%  |
|                        | Health Diagnosing and Treating Practitioners                         | 16,437            | 5.6%  |
|                        | Business Operations Specialists                                      | 12,831            | 4.4%  |
|                        | Social Scientists and Related Workers                                | 7,292             | 2.5%  |
|                        | Operations Specialties Managers                                      | 7,080             | 2.4%  |
|                        | Other Management Occupations   | 6,681             | 2.3%  |
|                        | Preschool, Primary, Secondary, and Special Education School Teachers | 6,099             | 2.1%  |
|                        | Art and Design Workers   | 5,122             | 1.7%  |
| <b>All Occupations</b> |  | <b>294,108</b>    |       |

Source: LCA database, Department of Labor

Capped and uncapped employers use the H-1B program to fill different kinds of jobs. Despite accounting for only 10 percent of requests on average for the 2010-2011 period, uncapped employers are responsible for 72 percent of the demand for life scientists and 80 percent of the demand for biological scientists, specifically. On the other hand, capped employers make up 98 percent of all H-1B demand for computer occupations as a group, and 99 percent of all requests for computer programmers, the most highly requested occupation group and detailed occupation nationally. In addition to life scientists, uncapped employers have a high demand for other types of scientists, healthcare workers, and educators (Table 2).

Across both employer types, computer occupations are the most requested minor group, accounting for almost three-quarters of STEM requests, and half of all requests. Engineering occupations and life scientists are the next most requested STEM groups, together accounting for 12 percent of all requests. Among uncapped employers, life scientists, health diagnosing and treating practitioners, and post-secondary teachers are in high demand—together accounting for almost two-thirds of uncapped requests.

Overall, the occupational breakdown of H-1B requests reveals that demand is heavily concentrated in computer and engineering professions. These two minor groups had the most H-1B requests, and respectively accounted for 47 percent and 8 percent of all requests nationally. Demand intensity, as measured by requests per 1,000 workers in the same field, helps to highlight the relative demand for H-1Bs in these occupational groups. By this measure, mathematical science occupations, a group which includes jobs like operations research analysts, statisticians, and actuaries, has the highest intensity at 54.70 requests per 1,000 workers nationally. Life scientists and computer occupations are the next highest minor groups by intensity at the national level, with 48.04 and 47.98 requests per 1,000 workers, respectively (Table 3).

**Table 3. Minor Occupation Groups by National Average, Intensity, and Share, 2010-2011 Average**

| Rank                   | Minor Occupation Group   | 2010-2011 Average | Intensity   | Share |
|------------------------|--|-------------------|-------------|-------|
| 1                      | Computer Occupations   | 152,350           | 47.98       | 46.8% |
| 2                      | Engineers  | 26,817            | 18.44       | 8.2%  |
| 3                      | Health Diagnosing and Treating Practitioners                             | 20,789            | 4.65        | 6.4%  |
| 4                      | Financial Specialists  | 18,482            | 7.87        | 5.7%  |
| 5                      | Business Operations Specialists  | 12,991            | 3.47        | 4.0%  |
| 6                      | Life Scientists  | 12,072            | 48.04       | 3.7%  |
| 7                      | Social Scientists and Related Workers                                    | 7,719             | 33.70       | 2.4%  |
| 8                      | Postsecondary Teachers   | 7,700             | 5.40        | 2.4%  |
| 9                      | Operations Specialties Managers  | 7,177             | 5.01        | 2.2%  |
| 10                     | Other Management Occupations   | 7,025             | 3.56        | 2.2%  |
| 11                     | Preschool, Primary, Secondary, and Special Education School Teachers     | 6,222             | 1.44        | 1.9%  |
| 12                     | Mathematical Science Occupations   | 5,932             | 54.70       | 1.8%  |
| 13                     | Physical Scientists  | 5,191             | 19.96       | 1.6%  |
| 14                     | Art and Design Workers   | 5,151             | 10.65       | 1.6%  |
| 15                     | Advertising, Marketing, Promotions, Public Relations, and Sales Managers | 4,727             | 8.30        | 1.5%  |
| 16                     | Media and Communication Workers  | 3,063             | 5.39        | 0.9%  |
| 17                     | Top Executives   | 2,868             | 1.40        | 0.9%  |
| 18                     | Life, Physical, and Social Science Technicians                           | 2,391             | 7.38        | 0.7%  |
| 19                     | Other Sales and Related Workers  | 1,815             | 2.31        | 0.6%  |
| 20                     | Health Technologists and Technicians                                     | 1,575             | 0.58        | 0.5%  |
| <b>All Occupations</b> |  | <b>325,522</b>    | <b>2.56</b> |       |

Source: LCA database, Department of Labor

### Funding streams

Over the last decade the federal government has distributed about \$1 billion from employers' visa fees to fund programs to address skills shortages in the U.S. workforce. About half of the funds go to the Department of Labor's Employment and Training Administration (ETA). For the 2001 to 2011 period, \$628 million dollars have been distributed by the ETA. The skill areas that these programs address are designed to reflect industry needs, and have done so to some extent. When the program began in 2000, most of the training programs were centered on computer science and engineering fields to address the IT skill gap in the American workforce during the dot-com boom. Over time, the program has expanded to include more health and science programs to address the increased need for health-care professionals.

Though H-1B jobs by definition require at least a bachelor's degree, or equivalent, the training programs that are funded by H-1B fees are not exclusively for highly skilled workers. This is in part due to the limited time period of the grant programs; lower-skilled workers can increase their relative skill levels more quickly.<sup>44</sup> In 2001, 31 percent of skill grant training participants had an educational attainment of high school level or below before entering the program, while the remaining 69 percent had at least some college.<sup>45</sup> Funds are also allocated to the National Science Foundation (NSF) to improve STEM education and have totaled approximately \$372 million over 2001 -2011. The NSF distributes this money mostly through grants to universities used to fund scholarships for low-income college students who are committed to pursuing degrees in STEM fields. A smaller portion of the funds are used for K-12 programs designed to get young students interested in STEM in order to address skill gaps in the longer term.<sup>46</sup>

**2. One hundred and six metropolitan areas had at least 250 requests for H-1B workers in the 2010-2011 period, accounting for 91 percent of all requests but only 67 percent of the national workforce.**

A look beneath the national aggregates reveals that H-1B demand, although geographically wide-spread, clusters heavily in certain metropolitan areas. Employers in every metropolitan area in the country registered a request for at least one H-1B worker in the 2010-2011 period. However, 106 metro areas exhibited a high demand (over 250 requests on average), together accounting for 91 percent of all H-1B requests. That significantly exceeded the 67 percent of U.S. jobs located in these metro areas in 2011.

Several very large metro areas exhibit tremendous demand for high-skill foreign labor. The New York metropolitan area had by far the highest demand for H-1Bs: almost 53,000 on average over the 2010-2011 period, accounting for more than 16 percent of national demand. Los Angeles, San Francisco, San Jose, and Washington made up the remaining top five metro areas, each with between 14,000 and 18,000 requests. Together, the top nine metro areas accounted for half of all requests nationwide; these metro areas are also among the largest by total population (Table 4).

Demand for H-1B workers, however, is not limited to large metropolitan areas. Durham, NC, with just over 500,000 total population in 2010, ranked 20th for total H-1B requests despite ranking 102nd for total population. Likewise, Trenton, NJ, which ranks 138th for total population, ranked 29th for H-1B demand. In all, 22 metropolitan areas that do not rank among the 100 largest in the U.S. ranked among the top 106 for H-1B demand (See Appendix B for data on 106 metropolitan areas).

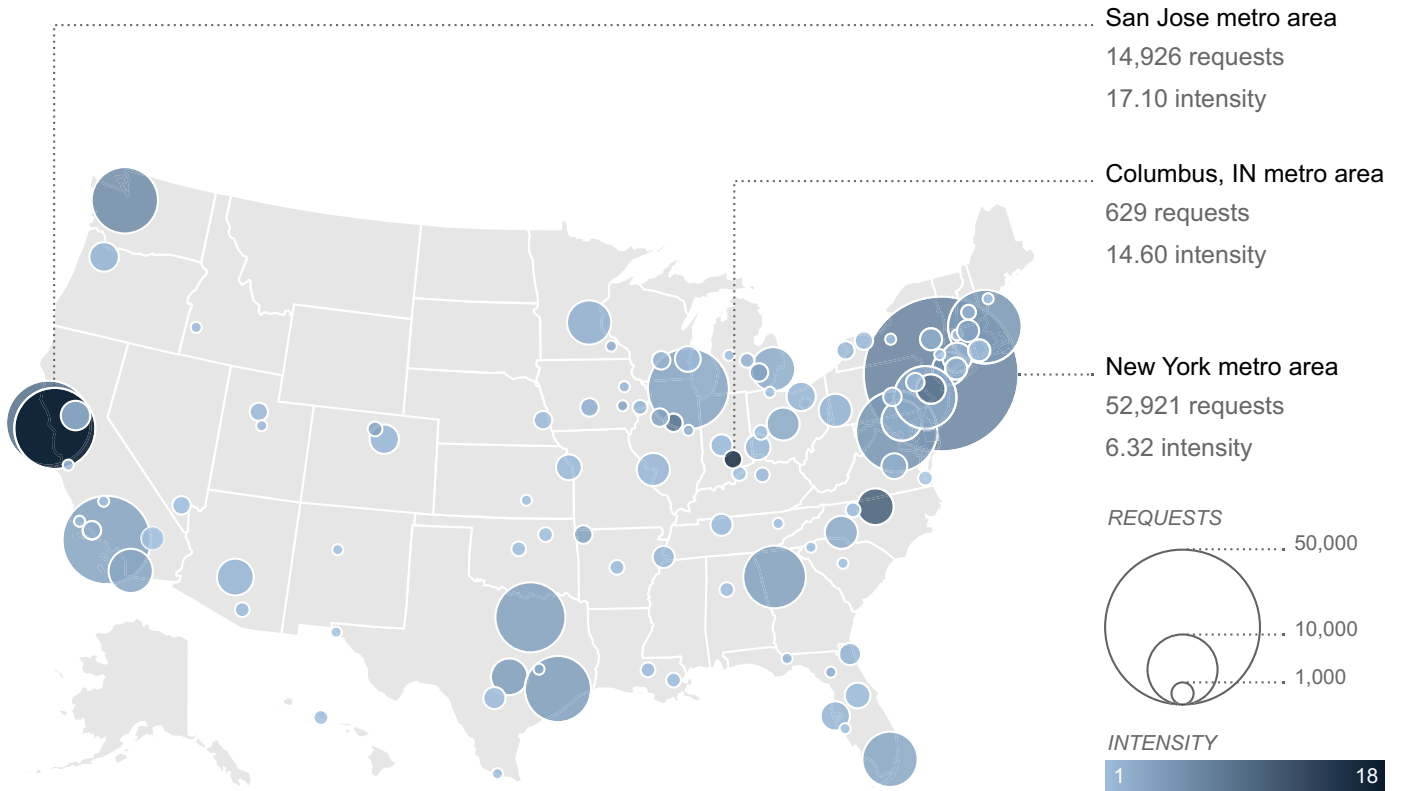
In these and other metropolitan areas, H-1B demand intensity, calculated as the ratio of H-1Bs requested to the total number of jobs in the metro area, is high (Table 5 and Map 1). The San Jose metro area—home of Silicon Valley—ranks highest at 17.10 requests per 1,000 workers compared to 2.40 for the nation. The next three highest intensity metro areas—Columbus, IN, Durham, NC, and Trenton,

**Table 4. Top Metropolitan Areas for H-1B Demand, 2010-2011 Average**

| Rank | Metropolitan Area                                  | 2010-2011 average | Share |
|------|--|-------------------|-------|
| 1    | New York-Northern New Jersey-Long Island, NY-NJ-PA | 52,921            | 16.3% |
| 2    | Los Angeles-Long Beach-Santa Ana, CA               | 18,048            | 5.5%  |
| 3    | San Francisco-Oakland-Fremont, CA                  | 16,333            | 5.0%  |
| 4    | San Jose-Sunnyvale-Santa Clara, CA                 | 14,926            | 4.6%  |
| 5    | Washington-Arlington-Alexandria, DC-VA-MD-WV       | 14,569            | 4.5%  |
| 6    | Chicago-Joliet-Naperville, IL-IN-WI                | 14,011            | 4.3%  |
| 7    | Boston-Cambridge-Quincy, MA-NH                     | 11,541            | 3.5%  |
| 8    | Dallas-Fort Worth-Arlington, TX                    | 10,651            | 3.3%  |
| 9    | Houston-Sugar Land-Baytown, TX                     | 10,107            | 3.1%  |
| 10   | Seattle-Tacoma-Bellevue, WA                        | 9,633             | 3.0%  |
| 11   | Philadelphia-Camden-Wilmington, PA-NJ-DE-MD        | 8,875             | 2.7%  |
| 12   | Atlanta-Sandy Springs-Marietta, GA                 | 8,309             | 2.6%  |
| 13   | Miami-Fort Lauderdale-Pompano Beach, FL            | 7,094             | 2.2%  |
| 14   | Detroit-Warren-Livonia, MI                         | 4,653             | 1.4%  |
| 15   | San Diego-Carlsbad-San Marcos, CA                  | 4,529             | 1.4%  |
| 16   | Minneapolis-St. Paul-Bloomington, MN-WI            | 4,199             | 1.3%  |
| 17   | Baltimore-Towson, MD                               | 3,560             | 1.1%  |
| 18   | Phoenix-Mesa-Scottsdale, AZ                        | 3,192             | 1.0%  |
| 19   | Austin-Round Rock-San Marcos, TX                   | 3,087             | 0.9%  |
| 20   | Durham-Chapel Hill, NC                             | 2,788             | 0.9%  |
|      | <b>United States</b>                               | <b>325,522</b>    |       |

Source: LCA database, Department of Labor

Map 1. H-1B Demand and Intensity, 106 Metropolitan Areas, 2010-2011 Average



Source: Authors' analysis of Department of Labor data

NJ—are not among the 100 largest metro areas. In fact, nine of the 20 metro areas ranking highest on H-1B demand intensity are smaller metro areas (in bold font in Table 5). These include several metro areas that are home to large universities: Duke University and the University of North Carolina, in the Durham, NC metro area; Princeton University in Trenton; the University of Michigan in Ann Arbor, MI; and the University of Colorado in Boulder, CO. In other smaller metro areas, private industry drove demand for H-1B workers. For example in Columbus, IN, Cummins Inc. was the major driver of demand, while in Bloomington, IL, HTC Global Services Inc. and Patni Americas Inc. were the highest-requesting employers. On average, there were 3.3 requests for H-1Bs per 1,000 workers in the 106 metro areas, compared to 2.4 for the nation as a whole.

**Table 5. Top Metropolitan Areas for H-1B Intensity, 2010-2011 Average**

| Rank      | Metropolitan Area                                  | 2010-2011 Average | H-1B Intensity |
|-----------|--|-------------------|----------------|
| 1         | San Jose-Sunnyvale-Santa Clara, CA                 | 14,926            | 17.10          |
| <b>2</b>  | <b>Columbus, IN</b>                                | <b>629</b>        | <b>14.60</b>   |
| <b>3</b>  | <b>Durham-Chapel Hill, NC</b>                      | <b>2,788</b>      | <b>9.79</b>    |
| <b>4</b>  | <b>Trenton-Ewing, NJ</b>                           | <b>2,032</b>      | <b>8.46</b>    |
| 5         | San Francisco-Oakland-Fremont, CA                  | 16,333            | 8.41           |
| <b>6</b>  | <b>Bloomington-Normal, IL</b>                      | <b>728</b>        | <b>7.84</b>    |
| 7         | New York-Northern New Jersey-Long Island, NY-NJ-PA | 52,921            | 6.32           |
| 8         | Bridgeport-Stamford-Norwalk, CT                    | 2,328             | 5.67           |
| 9         | Seattle-Tacoma-Bellevue, WA                        | 9,633             | 5.60           |
| 10        | Washington-Arlington-Alexandria, DC-VA-MD-WV       | 14,569            | 4.76           |
| 11        | Boston-Cambridge-Quincy, MA-NH                     | 11,541            | 4.75           |
| 12        | Austin-Round Rock-San Marcos, TX                   | 3,087             | 3.94           |
| 13        | Houston-Sugar Land-Baytown, TX                     | 10,107            | 3.93           |
| <b>14</b> | <b>Ann Arbor, MI</b>                               | <b>764</b>        | <b>3.87</b>    |
| 15        | Worcester, MA                                      | 1,217             | 3.74           |
| 16        | Dallas-Fort Worth-Arlington, TX                    | 10,651            | 3.65           |
| 17        | Atlanta-Sandy Springs-Marietta, GA                 | 8,309             | 3.63           |
| <b>18</b> | <b>Peoria, IL</b>                                  | <b>656</b>        | <b>3.60</b>    |
| <b>19</b> | <b>Boulder, CO</b>                                 | <b>575</b>        | <b>3.57</b>    |
| <b>20</b> | <b>Fayetteville-Springdale-Rogers, AR-MO</b>       | <b>749</b>        | <b>3.55</b>    |
|           | United States                                      | 325,522           | 2.40           |

*Bold font indicates metropolitan areas that are not among the 100 largest based on total population in 2010*

*Source: LCA database, Department of Labor*

## High Growth H-1B Demand Metropolitan Areas

Growth in H-1B demand varies widely across metropolitan areas. Some followed the national trend closely, while others experienced particularly fast growth. Columbus, IN, Bloomington, IL, and Fayetteville, AR, have all experienced enormous growth in H-1B demand over the last decade. In these metros, private employers such as Cummins, Patni Americas, and Wal-Mart, are some of the companies driving this growth. The growth of H-1B demand in these metros demonstrates that some small metropolitan areas are using temporary workers to address what they see as a lack of high-skilled labor in the local marketplace.

## Geographic Distribution of H-1B Employers

The top capped employers are the drivers of American innovation and its technical support system. Among these private companies, there are two geographic distribution patterns of H-1B demand by different types of firms. First, H-1B demand from product-based firms tends to be geographically concentrated, often at a headquarters location. The requests from these companies generally span occupation groups, including requests for computer, business, management, and other occupations. Companies of this type include Google, Amazon, Cummins, Credit Suisse, and Bloomberg. Second, service- or client-based companies have geographically widespread demand in order to be proximal to client sites. However, the distribution of requests across occupation groups is often very limited for these firms; their requests are highly concentrated in the occupations that they specialize in providing to clients. Examples of this company structure include Tata Consultancy, Fujitsu, Qualcomm, and Accenture.



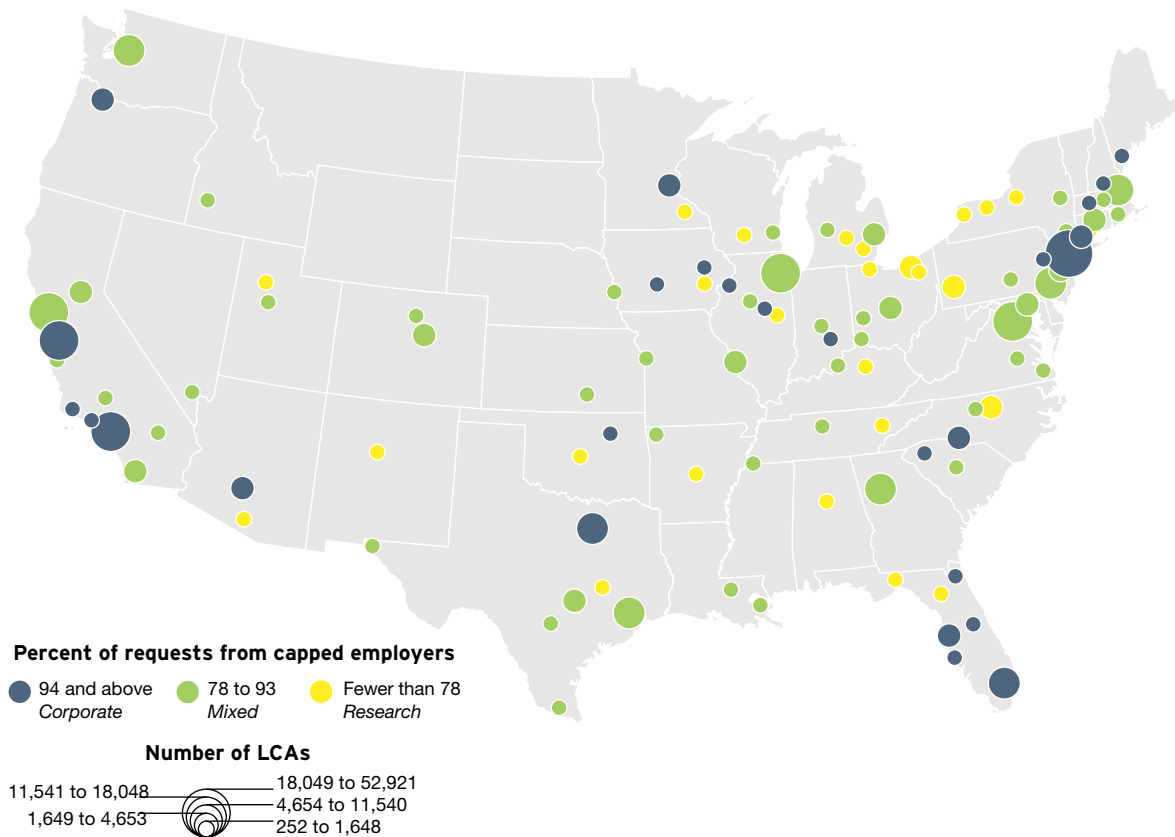
**3. Metropolitan areas vary by the number of employers using the H-1B program and the cap status of the employers.**

The demand for H-1B visas comes from employers, who file the applications and pay the fees in order to acquire the employees they need to run their businesses. Understanding demand for high-skilled temporary workers includes acknowledging the source of demand by considering the locations and types of employers making these requests.

**Rochester, MN**

Rochester, MN is one of only four high demand metro areas that have a majority of requests for H-1B workers from employers not subject to the visa cap. Seventy percent of Rochester's H-1B applications come from uncapped institutions, the highest share of any U.S. metro area. The Mayo Clinic is a major driver of demand in the region; it is both the largest employer in the area and highest requestor of H-1B workers. Rochester is characterized by its industry concentration of healthcare and social assistance, which accounts for 38 percent of all employment, a below average unemployment rate of 5.2 percent, and an even lower unemployment rate of 1.5 percent among those with bachelor's degrees and above in 2010. Demand for H-1B workers is concentrated in life sciences and healthcare occupations. Rochester has not received any H-1B visa fee funding from either the Employment and Training Administration (ETA) or the National Science Foundation (NSF).

**Map 2. H-1B Demand by Cap Status, 106 Metropolitan Areas, 2010-2011 Average**  
*Number of LCAs submitted and share of LCAs submitted by employers subject to annual visa cap*



Source: Authors' analysis of Department of Labor data

The 106 metropolitan areas in this analysis exhibit three patterns of H-1B usage based on the cap status of employers making the requests (Map 2). Twenty-seven of the metro areas are *corporate*, where requests come predominantly from capped employers.<sup>47</sup> The four metro areas requesting the most H-1B workers—New York, Los Angeles, San Francisco, and San Jose—are of this type. Nine of the top 20 metro areas for H-1B requests are corporate.

In *research* metro areas the share of requests from uncapped employers is at least 22 percent, much higher than the overall rate of 9 percent.<sup>48</sup> The 27 metro areas in this group are home to universities and other research institutions that make up a much higher-than-average share of H-1B requests.<sup>49</sup>

**Table 6. Metropolitan Areas by Concentration among Highest Requesting Employers, 2010-2011 Average**

| High/Low           | Rank | Metropolitan Area                                  | Top 5 Employers Share of Requests |
|--------------------|------|--|-----------------------------------|
| High Concentration | 1    | Columbus, IN                                       | 89.8%                             |
|                    | 2    | Iowa City, IA                                      | 79.1%                             |
|                    | 3    | Rochester, MN                                      | 74.6%                             |
|                    | 4    | College Station-Bryan, TX                          | 73.1%                             |
|                    | 5    | Champaign-Urbana, IL                               | 72.8%                             |
|                    | 6    | Gainesville, FL                                    | 69.6%                             |
|                    | 7    | Davenport-Moline-Rock Island, IA-IL                | 64.5%                             |
|                    | 8    | Knoxville, TN                                      | 61.0%                             |
|                    | 9    | Boise City-Nampa, ID                               | 55.5%                             |
|                    | 10   | Bloomington-Normal, IL                             | 54.9%                             |
| Low Concentration  | 97   | Atlanta-Sandy Springs-Marietta, GA                 | 10.8%                             |
|                    | 98   | San Francisco-Oakland-Fremont, CA                  | 10.3%                             |
|                    | 99   | Houston-Sugar Land-Baytown, TX                     | 9.3%                              |
|                    | 100  | Dallas-Fort Worth-Arlington, TX                    | 9.2%                              |
|                    | 101  | Detroit-Warren-Livonia, MI                         | 9.1%                              |
|                    | 102  | Chicago-Joliet-Naperville, IL-IN-WI                | 8.6%                              |
|                    | 103  | Washington-Arlington-Alexandria, DC-VA-MD-WV       | 6.3%                              |
|                    | 104  | Miami-Fort Lauderdale-Pompano Beach, FL            | 5.7%                              |
|                    | 105  | Los Angeles-Long Beach-Santa Ana, CA               | 5.3%                              |
|                    | 106  | New York-Northern New Jersey-Long Island, NY-NJ-PA | 4.1%                              |
|                    |      | <b>National</b>                                    | <b>4.7%</b>                       |

Source: LCA database, Department of Labor

## Columbus, IN

With a population of just over 75,000, Columbus, IN is the smallest of the high demand H-1B metros. It is categorized as a corporate metro due to its high percentage (99) of requests from employers subject to the annual cap. Columbus is characterized by its manufacturing sector, which accounts for one-third of employment in the metropolitan area, and a below average unemployment rate of 6.1 percent in 2010 with a 3 percent rate among those with bachelor's degrees and above. Cummins Inc. is the largest employer and the highest H-1B requestor in the metro area. Requests for H-1B workers are concentrated in engineering occupations, with mechanical, electrical, and industrial engineers accounting for over two-thirds of all requests. Despite this highly concentrated usage of foreign workers to fulfill employer needs, Columbus has yet to receive funding from H-1B visa fees for skills training.

In four metropolitan areas—Rochester, MN, College Station-Bryan, TX, Iowa City, IA, and Gainesville, FL—a majority of H-1B requests come from uncapped employers. Most research metro areas are relatively small; 11 of the 27 are not among the 100 largest metro areas in the country. Durham ranks highest among research metro areas for its number of H-1B requests, and Pittsburgh, Cleveland, New Haven, and Buffalo round out the top five research metro areas.

In about half of the high demand H-1B metros, applications come from a mix of capped and uncapped employers. Ten of the top 20 metro areas for H-1B requests are *mixed*. Washington, Chicago, Boston, and Houston had at least 10,000 H-1B requests on average over the 2010-2011 period. Philadelphia, with 8,800, ranks fifth among mixed metro areas. (See Appendix B for data on 106 metro areas.)

In addition to the cap status of the employers requesting H-1B workers, metropolitan areas differ by the number of employers that file H-1B applications and the share of requests from the highest requesting employers (Table 6). In general, these differences reflect the environment of H-1B use in metro areas: in smaller metro areas there are fewer employers and the highest requesters are most likely to account for a greater share of all requests. Still, the five highest demand employers only account for more than half of requests in only 12 metropolitan areas.

Of these 12 metro areas where H-1B demand is concentrated among just a few employers, eight are research metros where the largest requesting employer is an uncapped institution. In Iowa City, IA, College Station, TX, Gainesville, FL, Champaign-Urbana, IL, Knoxville, TN, and Ann Arbor, MI, the largest employers requesting H-1Bs are public institutions of higher education. In Rochester, MN and Salinas, CA the largest uncapped employers are research institutions, the Mayo Clinic and Defense Language Institute Foreign Language Center, respectively. In the remaining four metros, private employers are dominant—Cummins in Columbus, IN; Yash Technologies in Davenport, IA; Micron Technology in Boise City, ID; and Wal-Mart in Fayetteville, AR.

These metros with a few dominant employers are contrasted to those with the opposite profile—many employers each requesting just a few H-1Bs. In 20 metros no employer accounts for more than 5 percent of requests. Examples of these metros include Atlanta, Boston and Denver—mostly mixed metros with varied employers using the program.

### Atlanta-Sandy Springs-Marietta, GA

The Atlanta, GA metropolitan area is one of the most populous of the high H-1B demand metros. Atlanta's largest uncapped H-1B requestors are Emory University and the Georgia Institute of Technology, mostly for life scientists and postsecondary teachers. However, the majority of requests in the metro area come from employers subject to the annual cap, including Deloitte Consulting and Manhattan Associates. This private demand for H-1B workers is concentrated heavily in computer occupations, followed by financial specialists and engineering occupations. Atlanta's diverse industrial structure includes a high number of Fortune 500 companies, and the workforce has a higher intensity of science and engineering degrees than the national average. Atlanta has received over \$16 million in ETA technical skills grants over 2001-2011, and has also been a recipient of NSF S-STEM scholarship dollars.

Finally, some metros have one or a few employers driving demand for the metro, supported by many others that request smaller numbers of workers. This subset is characterized by ecosystems of research and development through clustering in computer products, biotechnology, or medical research. In these metro areas—such as Seattle, WA, Portland, OR, Durham, NC, San Diego, CA, and St. Louis, MO—one employer makes a large number of requests, and many smaller employers register a few requests each. In Seattle, Microsoft is the highest requesting employer, followed by Amazon, and over 2,000 other companies also submitted LCAs for H-1B workers. Similarly, Washington University in St. Louis had the most requests in that region, but almost 800 other companies submitted LCAs as well. (See interactive website at [www.brookings.edu/metro/h1b](http://www.brookings.edu/metro/h1b) for more details)

**4. In 92 of the 106 high demand metropolitan areas, STEM occupations accounted for more than half of all requests.**

The demand for STEM H-1B workers varies by metropolitan area. In 18 metro areas STEM occupations accounted for over 80 percent of requests, while in 14 others, STEM occupations accounted for less than half of requests. This variation is best explained by the different occupations in demand by metro area. (See [www.brookings.edu/metro/h1b](http://www.brookings.edu/metro/h1b) for data on top occupations requested by metropolitan area.)

The metro-level data indicate the extent to which computer occupations dominate among H-1B requests, as 48 of the 106 metros in the sample have more than half of their H-1B requests in the computer occupations minor group. The range, however, is quite large, from 94 percent of requests in Bloomington, IL to just 7 percent in McAllen, TX. This variation can be explained by a combination of industry and employer differences across metros. For example, Bloomington, IL has two employers, HTC Global Services and Patni Americas, which together account for almost half of requests in the area. In contrast, in McAllen, TX the largest share of demand is for health diagnosing and treating practitioners but only accounts for 29 percent of all requests.

In 11 of the 106 high demand metros, computer occupations are not the most highly requested minor group. In general, life sciences, health diagnosing and treating practitioners, and postsecondary teachers are requested most highly in research metros, where the demand comes from universities and associated research hospitals. Health diagnosing and treating practitioners makes up the largest share of requests in Bakersfield, CA, Buffalo, NY, El Paso, TX, and McAllen, TX. In Salinas, CA and Gainesville, FL, postsecondary teachers are the most requested occupation group accounting for 31 and 23 percent of demand respectively, and life scientists are the most requested group in Rochester, MN (29 percent) and in College Station, TX (18 percent).

Engineering occupations, which have among the highest ratios of H-1B requests to total workers in those jobs, are the most requested group in mixed metros. These occupations account for over half of requests in Peoria, IL and Columbus, IN and 43 percent in Boise City, ID. Corporate metros have the highest shares of requests for financial specialists, at almost twice the share of other high demand metros. Bridgeport, CT and New York, NY have the highest shares of requests for this occupation group, at 16 and 12 percent respectively. These variations in demand by occupation group demonstrate the varying needs across local labor markets with respect to skills and experience in specialized occupations.

Another aspect of demand that varies at the metropolitan area level is the number of occupation groups requested and how requests are distributed across occupations. Nationally, of the 97 SOC minor occupation groups, 87 are represented in H-1B requests in 2010-2011 (see table 7). The most occupationally concentrated metro areas are Bloomington, IL, Columbus, IN, Cedar Rapids, IA, Peoria, IL, and Davenport, IA—all smaller metro areas with one employer driving demand for H-1B workers. In contrast, the most occupationally diverse metro areas are New York, NY, Los Angeles, CA, Washington, DC, Miami, FL, and Dallas, TX—all larger metropolitan areas with varied requests coming from many employers across industries. These differences mirror those in the previous finding about the distribution of demand across employers and illuminate the variety of local labor market needs.

**5. H-1B visa fees designated for skills training and STEM education have not been proportionately distributed to metro areas requesting the highest number of H-1B workers.**

As described in the Background section, the H-1B program was designed so that employers who request temporary visas for high-skilled workers must pay a fee that is used to fund programs to address skills shortages in the U.S. workforce.<sup>50</sup> Over the course of the program (2001-2011), the government has collected over \$1 billion in visa fees to put toward these programs. The funds are split between two major programs, the Department of Labor's Employment and Training Administration (ETA) and the National Science Foundation (NSF).

ETA administers a competitive grant program in which applicants are instructed to emphasize the current and projected demand in the region for workers with particular skills and provide evidence that employers are currently using H-1B visas to fill these positions. To that end, as part of its current solicitation for grant applications, ETA publishes online a list of the minor occupation groups that comprise the most H-1B requests. These data are at the national level, however, and no guidance is

**Table 7. Metropolitan Areas by Concentration of Requests in Occupation Groups, 2010-2011 Average**

| High/Low           | Rank | Metropolitan Area                                  | Number of Occupation Groups Requested | Share of Largest Occupation Group |
|--------------------|------|--|---------------------------------------|-----------------------------------|
| High Concentration | 1    | New York-Northern New Jersey-Long Island, NY-NJ-PA | 74                                    | 41.6%                             |
|                    | 2    | Los Angeles-Long Beach-Santa Ana, CA               | 64                                    | 37.2%                             |
|                    | 3    | Washington-Arlington-Alexandria, DC-VA-MD-WV       | 63                                    | 48.9%                             |
|                    | 4    | Miami-Fort Lauderdale-Pompano Beach, FL            | 61                                    | 22.6%                             |
|                    | 5    | Chicago-Joliet-Naperville, IL-IN-WI                | 57                                    | 50.5%                             |
|                    | 5    | Houston-Sugar Land-Baytown, TX                     | 57                                    | 28.5%                             |
|                    | 7    | Dallas-Fort Worth-Arlington, TX                    | 56                                    | 57.6%                             |
|                    | 8    | Atlanta-Sandy Springs-Marietta, GA                 | 55                                    | 62.7%                             |
|                    | 8    | Boston-Cambridge-Quincy, MA-NH                     | 55                                    | 46.6%                             |
|                    | 8    | Philadelphia-Camden-Wilmington, PA-NJ-DE-MD        | 55                                    | 58.3%                             |
| Low Concentration  | 96   | Grand Rapids-Wyoming, MI                           | 24                                    | 50.4%                             |
|                    | 96   | Toledo, OH   | 24                                    | 47.1%                             |
|                    | 99   | Knoxville, TN                                      | 23                                    | 23.5%                             |
|                    | 100  | Davenport-Moline-Rock Island, IA-IL                | 22                                    | 83.8%                             |
|                    | 100  | Rochester, MN                                      | 22                                    | 28.6%                             |
|                    | 100  | Salinas, CA  | 22                                    | 31.2%                             |
|                    | 103  | Peoria, IL   | 20                                    | 55.8%                             |
|                    | 104  | Cedar Rapids, IA                                   | 19                                    | 64.1%                             |
|                    | 105  | Columbus, IN                                       | 18                                    | 53.9%                             |
|                    | 106  | Bloomington-Normal, IL                             | 15                                    | 93.7%                             |
|                    |      | <b>United States</b>                               | <b>87</b>                             | <b>44.6%</b>                      |

Source: LCA database, Department of Labor

provided to grant applicants about the types of occupations requested in their specific metro area. A 2001 GAO study of H-1B skills grant recipients found that of 43 grantees studied, 33 attempted to use H-1B visa data to inform their program, but only 23 were able to obtain it.<sup>51</sup> In line with legislative directives, the ETA evaluates each grant on a constellation of criteria to provide a ranked score that reflects program goals. The American Competitiveness in the Twenty-First Century Act dictates that the ETA should “fairly distribute grants across rural and urban areas, and across the different geographic regions of the United States.”<sup>52</sup> Beyond these guidelines, it is unclear how much geographical factors weigh into decision-making or how methodically ETA considers regional distribution of H-1B demand.

This analysis of the metropolitan distribution of ETA technical skills grants from 2001 to 2011 reveals that high H-1B metros have received 77 percent of all grant monies. This is a higher rate than their share of national employment (67 percent) but lower than their share of H-1B requests (90 percent). Relative to the size of the working age population, high H-1B demand metro areas as a whole have received less grant money than other metro areas. The low H-1B demand metros, those with less than 250 requests on average between 2010-2011 (i.e. the 260 metro areas outside this study’s focus), have received an average of \$15.26 per 1,000 working age persons compared to \$3.09 in the high H-1B demand metros.

Among the 106 high demand H-1B metro areas, Wichita, KS, Portland, ME, and El Paso, TX have received the highest amount of grant money relative to their H-1B demand (Table 8). Wichita, KS has received ETA grants for engineering and health technology training. The Workforce Alliance of South Central Kansas received a \$5 million ETA grant for their “Kansas Engineering Excellence Project (KEEP)”, which identifies individuals with experience in aviation and aerospace technology, a strong industry in Wichita, and guides them toward obtaining advanced degrees in the field so they can fill

## Workforce Alliance of South Central Kansas, Kansas Engineering Excellence Project (KEEP)

The Kansas Engineering Excellence Project (KEEP), a skills training grant program funded by the ETA, stands out as a successful example of supporting completion of advanced degrees in high demand fields. This \$5 million grant was administered in 2010 to the Workforce Alliance of South Central Kansas, and is implemented in partnership with Wichita State University and an advisory board of local private employers. This program is designed to capitalize on the robust aviation and aerospace industry in Wichita by helping long-term unemployed individuals through B.A., M.A., or Ph.D. programs in engineering at Wichita State University. The program has successfully recruited candidates from the pool of local workers with experience in the aviation industry and some postsecondary education. The program's goal is to have 100 participants, including 25 women or minorities and 75 long-term unemployed individuals. Private employers work with Wichita State and the program to train the students for jobs that will be in demand in the near future.

gaps in the high-skilled labor pool identified by local employers.

In Portland, ME, Coastal Counties Workforce Incorporated received \$6 million for training in advanced manufacturing, information technology, and energy/green construction over 2001-2011. In Connecticut, Workplace Incorporated responded to increased demand for healthcare workers in the area by creating the Southwestern Connecticut Health CareerRx Academy, a program that partners with local colleges and hospitals to help the unemployed gain skills in the medical field, which is projected to have stable job growth.

Thirty-six of the 106 high-demand H-1B metro areas have received no ETA skills grants. Of these, all but Austin, TX (with 3,087 requests) and Richmond, VA (with 1,648 requests) had fewer than 1,000 H-1B requests in 2010-2011. (See Appendix B for grant data on all 106 metro areas.)

The remaining funds are distributed by the National Science Foundation in the form of scholarship grants and K-12 math and science programs. These programs are designed to increase student interest in STEM fields in order to address skill gaps in the long term.<sup>53</sup> Scholarships in Science, Technology, Engineering and Mathematics (S-STEM) are designed to assist academically gifted and economically underprivileged students in completing full-time post-secondary education. The grants are awarded to post-secondary institutions, both community colleges and universities.<sup>54</sup> This program accounts for about two-thirds of the H-1B funding that NSF receives. Approximately 49,500 students in 948 projects have received H-1B funded scholarships between the program's inception and 2010. The NSF S-STEM provided \$281 million dollars from 2001 to 2011. An analysis of the distribution of these funds by metro area shows that a little more than half of S-STEM funds are distributed to high demand H-1B metro areas.

Compared to their share of H-1B requests, the low demand H-1B metro areas receive almost four times their share of S-STEM funds. NSF S-STEM funds are similarly distributed as ETA technical skills grants with the high H-1B metros receiving only \$1.00 per working age person compared to \$14.10 in the low H-1B metros and \$1.15 nationally.

For longer-term educational training in STEM, the Innovative Technology Experiences for Students and Teachers (ITEST) program encompasses K-12 activities that involve public-private partnerships in areas such as materials development, student externships, and math and science teacher professional development.<sup>55</sup> The program is designed to address STEM worker shortage by increasing interest in IT-intensive STEM careers.<sup>56</sup> Grant awardees collaborate with local partners such as universities, industry, museums, and science and technology centers in order to garner interest from students, especially those that do not thrive in traditional classroom settings. This program distributed \$76 million from 2000 and 2010 and has funded 140 projects and impacted 158,000 students. Unlike the previous two programs, high demand H-1B metros have received proportionately more funds for K-12 math and science educational programs at \$1.15 per person under 19 years old compared \$0.89 for the low demand H-1B metros and \$0.92 nationally.



**Table 8. Top Metropolitan Areas Receiving Grants from H-1B Applications, by Program, 2001-2011**

| <b>ETA</b>        |                                       |                      |                             |                                 |
|-------------------|---------------------------------------|----------------------|-----------------------------|---------------------------------|
| <b>Rank</b>       | <b>Metropolitan Area</b>              | <b>H-1B requests</b> | <b>Grant \$ distributed</b> | <b>Ratio (\$/1000 requests)</b> |
| 1                 | Wichita, KS                           | 262                  | \$5,975,000                 | \$22.85                         |
| 2                 | Portland-South Portland-Biddeford, ME | 282                  | \$5,999,858                 | \$21.31                         |
| 3                 | El Paso, TX                           | 261                  | \$3,991,880                 | \$15.32                         |
| 4                 | Gainesville, FL                       | 336                  | \$4,947,404                 | \$14.72                         |
| 5                 | Columbia, SC                          | 351                  | \$5,000,000                 | \$14.25                         |
| 6                 | Toledo, OH                            | 366                  | \$5,000,000                 | \$13.66                         |
| 7                 | New Haven-Milford, CT                 | 955                  | \$12,969,847                | \$13.59                         |
| 8                 | Manchester-Nashua, NH                 | 462                  | \$4,999,426                 | \$10.82                         |
| 9                 | McAllen-Edinburg-Mission, TX          | 290                  | \$3,000,000                 | \$10.34                         |
| 10                | Springfield, MA                       | 313                  | \$3,000,000                 | \$9.58                          |
| <b>NSF S-STEM</b> |                                       |                      |                             |                                 |
| <b>Rank</b>       | <b>Metropolitan Area</b>              | <b>H-1B requests</b> | <b>Grant \$ distributed</b> | <b>Ratio (\$/1000 requests)</b> |
| 1                 | College Station-Bryan, TX             | 313                  | \$4,874,020                 | \$15.60                         |
| 2                 | Springfield, MA                       | 313                  | \$2,144,027                 | \$6.85                          |
| 3                 | Allentown-Bethlehem-Easton, PA-NJ     | 639                  | \$4,031,783                 | \$6.31                          |
| 4                 | Tallahassee, FL                       | 335                  | \$2,079,645                 | \$6.21                          |
| 5                 | Syracuse, NY                          | 335                  | \$1,799,463                 | \$5.37                          |
| 6                 | Columbia, SC                          | 351                  | \$1,793,319                 | \$5.11                          |
| 7                 | Greensboro-High Point, NC             | 448                  | \$2,270,156                 | \$5.07                          |
| 8                 | Albuquerque, NM                       | 277                  | \$1,373,022                 | \$4.97                          |
| 9                 | Rochester, NY                         | 743                  | \$3,578,124                 | \$4.82                          |
| 10                | Boise City-Nampa, ID                  | 360                  | \$1,693,181                 | \$4.71                          |

It is less important for the geographical distribution of NSF STEM education funds to align with H-1B demand than it is for ETA funds to do so. STEM education is an investment in the longer-term national labor force since students may not end up working in the same metropolitan area in which they study. By contrast, ETA skills training grants are targeted to assist local workers who are less geographically mobile than students.

## Policy Implications

This report, like many others examining H-1B visas, documents significant continued demand for high-skilled foreign workers with employer requests annually outpacing available slots. Yet it sheds new and much-needed light on important variations across the country. Demand, the report shows, varies geographically depending on local employers' needs and propensities to fill specific occupations with H-1B visa holders. Moreover, the demand concentrates in a subset of metro areas that represented 91 percent of all requests in 2010-2011, versus just 67 percent of U.S. jobs. In short, the demand for H-1B visa workers—expressed by employers' H-1B visa applications—is neither geographically nor occupationally uniform. H-1B demand varies across metropolitan areas and focuses heavily on STEM skills, with significant policy implications.

For years a national dispute has raged over how many high-skilled foreigners should be granted permission to live and work in the United States. The annual H-1B visa cap is currently set by Congress at 85,000 for private employers. The business community prefers to either remove the annual cap to allow the market to dictate these levels, or, at a minimum, increase the current cap level. Critics of the H-1B visa program prefer to either abolish the program altogether or keep the cap level low since they believe that the program allows employers to hire cheaper foreign workers compared to native-born U.S. workers.

Despite the prominence of the debate over the cap level, the data in this report—which reflect only the demand side of the equation—cannot resolve this question. Instead, this report underlines a new dimension of the H-1B visa program that is much less noted: the intense regional variation of the program's usage and the need to make sure that employers in regional labor markets have appropriate access to high-skilled workers.

In view of that, the data presented here suggest that the nation needs to consider adjustments to the H-1B visa program that not only address the availability of specialized workers nationally but also local variation in demand. Additionally, the federal government needs to better deploy the revenue that the H-1B program generates for short- and long-term human capital development to suit the needs of America's metropolitan areas.

The challenge for policymakers is to figure out how to meet the demand for high-skilled workers by developing an immigration policy that allows the United States to continue to attract the foreign workers that it needs, while at the same time educating and training U.S. workers for these jobs in the near future. A pragmatic solution to America's skills needs calls for the following reforms in the H-1B visa program:

- ▶ Create an independent "Standing Commission on Labor and Immigration" that will recommend to Congress timely changes to U.S. immigration policy in order to more nimbly respond to economic needs, including the demand for high-skilled foreign workers in regional labor markets
- ▶ Target H-1B visa fees to metropolitan areas with a high demand for H-1B workers to train the existing workforce for high-demand skills needs

***A. Create an independent "standing commission on labor and immigration" that will make timely recommendations to Congress on national immigration policy in order to more nimbly respond to economic needs, including the demand for high-skilled foreign workers in regional labor markets.***

Although the H-1B visa program is just one component in the larger U.S. immigration system, it has prompted intense debate, lobbying, and reform proposals. While the national debate about immigration raged over the past decade, legislative reform has been at a standstill. Yet, given the significance of high-skilled immigration to maintaining America's economic competitiveness, there has been growing bipartisan support for reform in high-skilled immigration policy. One bill to address this challenge is the "Stopping Trained in America Ph.D.s from Leaving the Economy" (STAPLE) Act introduced by Rep. Jeff Flake (R-Ariz.) to grant green cards to foreigners earning Ph.D. degrees in STEM disciplines. Other recent bills include the "Securing the Talent America Requires for the 21st Century" (STAR) Act introduced by Sen. John Cornyn (R-Tex.); the "Sustaining our Most Advanced Researchers and Technology (SMART) Jobs Act of 2012 by Sens. Lamar Alexander (R-Tennessee) and Chris Coons (D-Del.);

and the Startup 2.0 bill by Sens. Coons (D-Del.), Rubio (R-Fla.), Moran (R-Kan.), and Warner (D-Va.).

These proposals are promising attempts at partial long-term reform but are not responsive enough to changing economic conditions in the near term. Adjustments to the annual cap on H-1B visas support this concern as past attempts to adjust the H-1B cap level have been rife with politics and delay. For example, a cap increase designed to help address workforce needs during the dot-com boom was not enacted until after the bubble had burst. America needs a more nimble solution to address employer demand for high-skilled foreign workers.

What might such a solution look like? One approach would be for the federal government to establish a politically independent entity charged with enabling the nation to respond much more rapidly and precisely to the country's economic needs, including the workforce. To that end, the federal government should create an independent "Standing Commission on Labor and Immigration" that can make real-time recommendations on the nation's needs.

Proposals for a standing commission have been around since 2006. Several organizations such as the Migration Policy Institute, the Economic Policy Institute, Council on Foreign Relations, and the Brookings-Duke Roundtable on Immigration Policy have made similar proposals.<sup>57</sup> All of them recognize the need for an independent, dedicated body of experts that could assess current labor market conditions to identify skills shortages and make recommendations in a systematic and timely manner.<sup>58</sup> Most of the previous proposals for a commission focus on a broad range of issues at the national level for this new body to tackle, ranging from low- to high-skilled immigration to unauthorized workers. Similar structures already exist to inform national governments on immigration levels in other countries, including the Netherlands, Spain, and the United Kingdom.<sup>59</sup>

However, to fully address the particular challenges of high-skilled immigration, this study recommends that the standing commission dedicate a special panel to the H-1B visa program. The H-1B program would benefit from a clear and independent advisory body so that the system can function better to provide workers in a timely manner to maintain a globally competitive market. As the largest dedicated program for U.S. employers to obtain temporary high-skilled workers, an H-1B panel is necessary to recommend annual adjustments to the program's policies, including the cap level. This panel should include recognized experts in the fields of business, demography, economics, immigration, and representatives from organizations such as the Bureau of Labor Statistics, the Employment and Training Administration (at the Department of Labor), the National Science Board (at the National Science Foundation), and a business research organization. These panel members would provide recommendations based on job growth projections and skills needs, in order to ensure that the H-1B program is filling labor gaps in specialty occupations, as originally intended.

Previous proposals for standing commissions were focused on the national policy agenda, and did not have a mechanism for receiving input from stakeholders such as employers, workforce agencies, and educational institutions at the local level. In the past, employers have reacted negatively to standing commission proposals due to concerns that this would create another bureaucratic layer unable to react quickly to business cycles.<sup>60</sup> Furthermore, they argue that the available data to assess skills shortages is insufficient.<sup>61</sup> Taking this into account, this study recommends that in order to understand the dynamism of U.S. metropolitan areas and economic competitiveness, the standing commission's panel on the H-1B visa program must use sub-national data to understand local variation in use of the program, while also soliciting input from critical stakeholder groups at the local level. The data presented in this report clarifies regional variation in use of H-1B workers, and input from local employers and business groups, workforce development groups, and educational institutions would provide a complementary qualitative evaluation of regional skills needs.

By instituting both a panel on H-1B concerns and regional level affiliates, the commission would be better able to make recommendations to Congress on many issues, including how the H-1B visa cap levels should be adjusted to reflect local labor market needs and employer demands.

This report recommends the creation of a standing commission that would:

- ▶ Be an independent, non-partisan body driven by data analysis to make annual recommendations to congress and the president quickly in reaction to business cycles and employers' skill needs
- ▶ Have a dedicated panel focused on the H-1B visa program that focuses on evaluating and projecting the demand for high-skilled foreign workers to inform the commission's recommendations

- ▶ Use metropolitan-level data on employer demand for H-1B workers and regional labor market indicators to assess skill needs at the local level and inform the national H-1B visa cap level
- In the end, creating a standing commission to help set H-1B levels recognizes that while imperfect, recommendations based on careful, ongoing empirical analysis would greatly improve upon current levels that result from slow-motion political horse-trading.

***B. Target H-1B visa fees to metropolitan areas with a high demand for H-1B workers to train existing workforce for high-demand skills needs.***

The H-1B visa program was redesigned in 1998 to charge employers additional visa fees to be channeled into skills training and STEM education so that the existing U.S. workforce can develop the skills to fill the jobs that H-1B workers are doing. This study shows that the funds have been disproportionately distributed to metropolitan areas with a relatively low demand for H-1B workers.

***Target Skills Training in High Demand Areas***

The majority of occupations for which employers request H-1Bs require extensive and time-consuming education and training. About 16 percent of all H-1B requests between 2010 and 2011 were in highly specialized occupations that require a Ph.D., M.D., or a master's degree. Additionally, 76 percent of requests require specialized work experience in addition to a bachelor's degree.<sup>62</sup>

The H-1B Technical Skills Program administered by the Employment and Training Administration (ETA) in the U.S. Department of Labor should channel funds from H-1B visa fees toward its original intent of training the existing workforce for jobs that H-1B recipients are doing. Even though there are many occupations that require a solid foundation in K-12 education in addition to a bachelor's degree and STEM professional or doctorate degrees that take many years of preparation, the ETA can and does focus on high-demand occupations that can be trained in a much shorter period (e.g. Kansas Engineering Excellence Project for training bachelors, master's and doctorates for former aerospace industry employees and Southwestern Connecticut HealthCareRx Academy for short-term training certificates and associates degrees in high demand healthcare occupations in Connecticut).

As highlighted in this analysis, some metropolitan areas are receiving disproportionately more funding than others. To identify metros that may have a high demand for specialized skills, federal and metropolitan leaders can use the data in this analysis when applying for and distributing technical skills grants. Appendix B and the interactive website (available at [www.brookings.edu/metro/h1b](http://www.brookings.edu/metro/h1b)) can assist policymakers and practitioners in identifying skills training needs in specific metropolitan areas.

For example, federal and local leaders can determine if a metropolitan area is in need of funds based on whether that metro has a higher ratio of H-1B requests to the total workforce ("intensity") relative to the national rate and a disproportionately low share of technical skills grants received to date. Given the competitive process that distributes these grants, local actors in high H-1B demand metropolitan areas could use these data to obtain visa fee dollars for local workforce training.

Interviews with administrators of the H-1B visa fee skills training programs reveal that the key to success is to engage employers and local chambers of commerce to understand future employer skills needs. Also, partnerships with local community colleges and universities will help to develop curriculum for certificate and degree programs that are relevant to local labor market needs. Further, partnerships with local employers can be very effective in determining specific skill needs in the local labor market as well as integrating work experience components into programs.

To better use the funds raised from the H-1B visa fees for local skills training, the federal government should:

- ▶ Target the H-1B Technical Skills Grants to train existing workforce for occupations that can be trained for local labor market needs using metro-specific data
- ▶ Require skills training programs to work with employers at the metropolitan level to identify skills requirements for areas of projected job growth

### **Develop a long-term Strategy for STEM Training**

Even though a small proportion of H-1B visa fees go to the National Science Foundation for K-12 education, more resources should be allocated to train a workforce that keeps American firms and institutions globally competitive. Interviews with high H-1B requesters throughout a diverse set of metropolitan areas indicate that employers have a difficult time recruiting residents with the skills they need, largely blaming the weak foundation of secondary education in the United States. A recent survey of American companies shows that their most significant challenge is identifying talent.<sup>63</sup> Many of these employers complain that there is a shortage of skilled workers. This sentiment was echoed during nearly all of the interviews that were conducted with employers requesting a large number of H-1B workers throughout the United States. Some of the employers interviewed for this study mentioned that they must recruit at over 50 college campuses in the United States to find 100 STEM employees.<sup>64</sup> While the availability of qualified labor may depend on other factors, including the wages and on-the-job training employers are willing to provide, it nevertheless seems safe to say that an increased supply of domestic STEM skills would be an important boon to long-term economic growth.

Given the problem of long-term STEM training, federal, state, and local governments should consider increasing the amount of funds available from resources outside of the H-1B visa program. Public-private partnerships can help multiply the number of resources dedicated towards long-term preparation of future STEM workers.

Since the majority of H-1B requests are for occupations that require solid K-12 training and STEM degrees, the federal government should:

- ▶ Work with states and local governments in providing educational funds to target a long-term strategy for developing a workforce in STEM occupations
- ▶ Work with private companies to obtain resources and input for training programs to target their current and future skills needs

## **Conclusion**

**T**he measurements and trends reviewed in this report offer new sub-national information about the demand for high-skilled foreign labor and a challenging assessment of how the United States and its regions can build a skilled labor force—from both foreign and domestic sources.

These metro areas and the employers located within them are looking to foreign labor to fill highly specialized skills especially in STEM fields such as mathematical science, life science, engineering, and computer occupations, as well as other occupations such as healthcare practitioners, post-secondary teachers, and financial and business operations. The revenues collected from H-1B visa fees to fund skills and STEM training for the existing workforce to replace the need to hire H-1B workers have not been proportionately distributed to the metros with the highest demand for H-1B workers.

Policymakers must find the right balance between allowing foreign high-skilled labor to come into the United States to fill specialty occupations that are aligned with local labor market needs while at the same time upgrading existing U.S. metropolitan labor force skills to fill these jobs. The federal government, through a standing commission on labor and immigration, should work together with state and local leaders and the employers located in these high H-1B demand regions to understand their skills needs so that they can design an immigration policy that allows for foreign workers in greatest demand to enter and remain in the country, while at the same time developing skills training and educational programs to prepare existing workers to be competitive in the global economy now and into the future.

## Appendix A. Additional Methodological Information

### **Data Limitations**

This dataset is subject to several limitations based on the detail collected and the quality of the data. The data does not distinguish between new and renewed requests, and though each LCA can correspond to multiple H-1B worker requests, the quality of data in this field is poor. In 2010-2011, 94 percent of LCAs were made for a single worker, so this study aggregates all LCAs, and conservatively assumes that each LCA corresponds to one worker request. Additionally, not every LCA will result in an I-129 petition being submitted to USCIS, but there is no sub-national data available on this step of the process. Finally, although LCAs require data on worker wages, this data was not consistently available and data quality was poor, so analysis of wages is outside the scope of this analysis.

The data are available for the fiscal years 2001-2011, with the exception of 2009 when data quality suffered as a result of changes to the recording system used by the Department of Labor. The level of detail available in the data varies over time. In particular, occupational information of the beneficiary by Standard Occupational Classification (SOC) code is only available in 2010 and 2011.

### **Constructing the Metropolitan LCA Database**

#### **Geographical Classification**

In order to use the LCA data for analysis at the metropolitan area level, it was necessary to match the given work location with a Core-Based Statistical Area (CBSA) classification. The LCA dataset contains two fields for work location (city and state), which we matched to official classifications of CBSAs, including all metropolitan areas, micropolitan areas, and non-CBSAs.<sup>65</sup> Additionally, for our detailed occupational analysis, we classified the data separately into New England City and Town Areas (NECTAs) in order to match the geographical units used by the Bureau of Labor Statistics' Occupational Employment Survey.<sup>66</sup>

Due to poor response quality (misspellings, alternative names, and missing data) in the city or state fields of the LCA database, the geographical classification process required extensive research to correctly classify work locations. After making corrections, we were unable to match less than one percent of records in each year, and we excluded these from our dataset.

#### **Employer Names**

All LCAs contain the name of the employer making the request for a temporary worker but the quality of these data is often poor. As with the work locations, the data contain many misspellings and errors that make it difficult to identify employers, or to aggregate their multiple requests into a total. As such, all data on numbers of employers and LCA counts by employer have some error due to data quality. In order to analyze the highest-demanding employers by broader measures that describe shared company characteristics, these employers were grouped by headquarter location and company type. Headquarter location is characterized as either "American" or "International" dependent on the location of headquarters as determined by internet research. Company type is characterized as product, service, or hybrid companies, depending on whether the company primarily sells products or services, determined by the NAICS industry classification of the firm.

#### **Occupation Titles**

Every LCA in the 2010 and 2011 data contains a 6-digit SOC code that identifies the occupation of the H-1B worker being requested. The 2010 LCA data use the 2000 SOC structure, while the 2011 LCA data use the 2010 SOC structure. In order to make these comparable, the 2010 LCA data were matched into the 2010 SOC structure, allowing averaging over the two years to provide smoothing. This analysis compares this demand by occupation to BLS data on the number of workers in each occupation to create an "occupational intensity" measure. Though the 2010 BLS data mostly follows the 2010 SOC structure, the transition to the new code structure was not complete, which required eight occupations to be matched by description to allow comparison between datasets.



### **Cap and STEM Status Indicators**

LCAs for H-1B visas are subject to a numerical cap unless the employer is considered an exempt institution, as defined by U.S. Citizenship and Immigration Services. These include institutions of higher education and certain types of non-profit, research, and governmental entities. In order to analyze the effect of the numerical cap and exemption criteria an indicator variable was needed to identify the cap status of each employer in the data. Since the dataset did not contain such a variable, a dummy was created and assigned a status to each record based on keywords in the employer name.<sup>67</sup>

Significant numbers of H-1B workers are in science, technology, engineering, and math (STEM) occupations. The U. S. Department of Commerce has established a definition of STEM occupations based on six-digit SOC codes.<sup>68</sup> Since six-digit SOC codes are available in the LCA database for 2010 and 2011, LCAs were classified as STEM or non-STEM. This was not possible for earlier years because the LCA data only contained job titles rather than SOC codes.

### **Other data sources**

To provide analysis relative to total employment, data from Moody's Analytics was used for employment by metropolitan statistical areas for the year 2010. Moody's provides data at the metropolitan level for the entire country, including New England, which is not available from any other dataset. Moody's 2011 data is used for employment by industry for all metropolitan areas, and at the national level.

In order to analyze detailed occupations, this inquiry used the 2010 Occupational Employment Survey (OES) from the Bureau of Labor Statistics (BLS). OES is the only BLS dataset that contains employment data at the metropolitan level with the highest level of detail for occupations. This survey is coded to the six-digit SOC level, allowing for matching occupations to the LCA database. For the New England States (Connecticut, Massachusetts, Rhode Island, New Hampshire, Vermont, and Maine), OES reports data for New England City and Town Areas (NECTAs) rather than Metropolitan Statistical Areas (MSAs). The primary difference between these two units is that NECTAs use cities and towns as their building blocks rather than counties. OES uses NECTAs because they provide better representation of labor market areas in New England. This study uses NECTAs for the occupational analyses since OES is the only applicable data source.

To analyze use of H-1B visa fees for skills training programs, data was used from the Department of Labor's Employment and Training Administration on skill grants and the National Science Foundation on STEM scholarships for the 2001-2011 period. The data could not be disaggregated by year due to the inconsistency of records, but were aggregated over these years and categorized into metropolitan areas according to the location of the recipient.

Data from the O\*Net Resource Center was used to compare skills required across high demand H-1B occupations. The O\*Net Job Zones are constructed using a combination of education, experience, and on-the-job training required to perform an occupation. The five job zones encompass all occupations in the SOC system, and provide a relative scale of preparation required across jobs.

### **Qualitative data sources**

As part of this study, interviews were conducted with employers that request a large number of H-1B workers in a diverse set of metropolitan areas around the US. These interviews were conducted in confidence so that the employers could respond as candidly as possible. The team conducted over 60 interviews with trade associations, policymakers, and employers representing all company types.

Additionally, two webinars were used to present initial findings and conducted structured focus group discussions with the highest requesting H-1B employers. These interviews and webinars helped inform the authors in developing recommendations in the policy implications section of this paper.



**Appendix B. High-Demand H-1B Metropolitan Areas**

| Metro Area                            | Average LCAs, 2010-2011 | Intensity (LCAs per 1,000 workers) | Share of requests from uncapped employers | Number of employers | Share of requests from top 5 employers | Number of occupation groups | Share of requests for largest occupation group | ETA Skill Grant Dollars (2001-2011, total) | ETA Skill Grant Dollars (2001-2011, per 16+ population) |
|---------------------------------------|-------------------------|------------------------------------|---|---------------------|--|-----------------------------|--|--|---|
| Akron, OH                             | 340                     | 1.06                               | 23.7%                                     | 220                 | 34.0%                                  | 29                          | 42.8%  | \$0  | \$0.00  |
| Albany-Schenectady-Troy, NY           | 1,256                   | 2.84                               | 11.0%                                     | 657                 | 32.9%                                  | 36                          | 58.0%  | \$5,365,666                                | \$7.57  |
| Albuquerque, NM                       | 277                     | 0.73                               | 23.7%                                     | 201                 | 33.1%                                  | 25                          | 29.8%  | \$0  | \$0.00  |
| Allentown-Bethlehem-Easton, PA-NJ     | 639                     | 1.89                               | 4.8%                                      | 373                 | 21.6%                                  | 32                          | 53.3%  | \$0  | \$0.00  |
| Ann Arbor, MI                         | 764                     | 3.87                               | 46.7%                                     | 358                 | 49.7%                                  | 31                          | 29.1%  | \$0  | \$0.00  |
| Atlanta-Sandy Springs-Marietta, GA    | 8,309                   | 3.63                               | 6.2%                                      | 4,145               | 10.8%                                  | 55                          | 62.7%  | \$16,593,043                               | \$4.11  |
| Austin-Round Rock-San Marcos, TX      | 3,087                   | 3.94                               | 6.4%                                      | 1,598               | 22.7%                                  | 44                          | 50.9%  | \$0  | \$0.00  |
| Bakersfield-Delano, CA                | 257                     | 0.94                               | 6.2%                                      | 173                 | 24.0%                                  | 28                          | 34.1%  | \$0  | \$0.00  |
| Baltimore-Towson, MD                  | 3,560                   | 2.73                               | 18.7%                                     | 1,915               | 24.3%                                  | 48                          | 39.5%  | \$967,005                                  | \$0.45  |
| Baton Rouge, LA                       | 512                     | 1.38                               | 21.6%                                     | 301                 | 46.7%                                  | 31                          | 26.7%  | \$1,000,000                                | \$1.59  |
| Birmingham-Hoover, AL                 | 444                     | 0.88                               | 38.2%                                     | 277                 | 41.3%                                  | 30                          | 34.7%  | \$0  | \$0.00  |
| Bloomington-Normal, IL                | 728                     | 7.84                               | 1.8%                                      | 279                 | 54.9%                                  | 15                          | 93.7%  | \$0  | \$0.00  |
| Boise City-Nampa, ID                  | 360                     | 1.37                               | 7.5%                                      | 140                 | 55.5%                                  | 24                          | 42.6%  | \$0  | \$0.00  |
| Boston-Cambridge-Quincy, MA-NH        | 11,541                  | 4.75                               | 13.5%                                     | 5,088               | 11.4%                                  | 55                          | 46.6%  | \$10,981,555                               | \$2.97  |
| Boulder, CO                           | 575                     | 3.57                               | 18.0%                                     | 326                 | 29.8%                                  | 31                          | 45.6%  | \$0  | \$0.00  |
| Bridgeport-Stamford-Norwalk, CT       | 2,328                   | 5.67                               | 2.5%                                      | 1,352               | 14.9%                                  | 46                          | 49.7%  | \$4,936,845                                | \$6.88  |
| Buffalo-Niagara Falls, NY             | 922                     | 1.69                               | 38.6%                                     | 464                 | 43.9%                                  | 38                          | 32.2%  | \$0  | \$0.00  |
| Cedar Rapids, IA                      | 252                     | 1.77                               | 1.8%                                      | 152                 | 46.6%                                  | 19                          | 64.1%  | \$0  | \$0.00  |
| Champaign-Urbana, IL                  | 307                     | 2.74                               | 48.1%                                     | 99                  | 72.8%                                  | 25                          | 35.9%  | \$0  | \$0.00  |
| Charlotte-Gastonia-Concord, NC-SC     | 2,210                   | 2.72                               | 2.1%                                      | 1,324               | 16.4%                                  | 39                          | 69.2%  | \$4,999,071                                | \$3.68  |
| Chicago-Joliet-Naperville, IL-IN-WI   | 14,011                  | 3.26                               | 7.5%                                      | 6,640               | 8.6%                                   | 57                          | 50.5%  | \$17,999,997                               | \$2.44  |
| Cincinnati-Middletown, OH-KY-IN       | 1,583                   | 1.58                               | 11.4%                                     | 916                 | 16.0%                                  | 37                          | 57.6%  | \$8,545,216                                | \$5.15  |
| Cleveland-Elyria-Mentor, OH           | 1,790                   | 1.78                               | 26.9%                                     | 915                 | 29.7%                                  | 40                          | 38.8%  | \$5,059,007                                | \$3.05  |
| College Station-Bryan, TX             | 313                     | 3.04                               | 67.2%                                     | 82                  | 73.1%                                  | 26                          | 17.8%  | \$0  | \$0.00  |
| Columbia, SC                          | 351                     | 0.97                               | 11.7%                                     | 298                 | 19.9%                                  | 29                          | 54.7%  | \$5,000,000                                | \$8.17  |
| Columbus, IN                          | 629                     | 14.60                              | 0.7%                                      | 71                  | 89.8%                                  | 18                          | 53.9%  | \$0  | \$0.00  |
| Columbus, OH                          | 2,655                   | 2.89                               | 9.0%                                      | 1,339               | 18.7%                                  | 38                          | 67.0%  | \$5,000,000                                | \$3.49  |
| Dallas-Fort Worth-Arlington, TX       | 10,651                  | 3.65                               | 4.1%                                      | 4,800               | 9.2%                                   | 56                          | 57.6%  | \$20,554,221                               | \$4.27  |
| Davenport-Moline-Rock Island, IA-IL   | 389                     | 2.10                               | 2.2%                                      | 158                 | 64.5%                                  | 22                          | 83.8%  | \$0  | \$0.00  |
| Dayton, OH                            | 438                     | 1.15                               | 11.0%                                     | 286                 | 27.5%                                  | 27                          | 58.4%  | \$0  | \$0.00  |
| Denver-Aurora, CO                     | 2,160                   | 1.79                               | 6.9%                                      | 1,413               | 12.9%                                  | 40                          | 58.4%  | \$9,483,409                                | \$4.76  |
| Des Moines, IA                        | 767                     | 2.37                               | 0.7%                                      | 518                 | 14.8%                                  | 28                          | 73.4%  | \$2,948,942                                | \$6.74  |
| Detroit-Warren-Livonia, MI            | 4,653                   | 2.66                               | 6.0%                                      | 2,448               | 9.1%                                   | 46                          | 42.6%  | \$16,512,381                               | \$4.88  |
| Durham-Chapel Hill, NC                | 2,788                   | 9.79                               | 22.7%                                     | 1,381               | 21.9%                                  | 41                          | 56.5%  | \$2,974,638                                | \$7.30  |
| El Paso, TX                           | 261                     | 0.86                               | 20.5%                                     | 211                 | 26.3%                                  | 34                          | 15.7%  | \$3,991,880                                | \$6.76  |
| Fayetteville-Springdale-Rogers, AR-MO | 749                     | 3.55                               | 6.9%                                      | 349                 | 50.6%                                  | 27                          | 78.9%  | \$0  | \$0.00  |
| Gainesville, FL                       | 336                     | 2.58                               | 62.1%                                     | 114                 | 69.6%                                  | 30                          | 22.8%  | \$4,947,404                                | \$22.00   |

**Appendix B. High-Demand H-1B Metropolitan Areas (continued)**

| Metro Area   | Average LCAs, 2010-2011 | Intensity (LCAs per 1,000 workers) | Share of requests from uncapped employers | Number of employers | Share of requests from top 5 employers | Number of occupation groups | Share of requests for largest occupation group | ETA Skill Grant Dollars (2001-2011, total) | ETA Skill Grant Dollars (2001-2011, per 16+ population) |
|--|-------------------------|------------------------------------|---|---------------------|--|-----------------------------|--|--|---|
| Grand Rapids-Wyoming, MI                           | 334                     | 0.90                               | 8.5%                                      | 289                 | 12.9%                                  | 24                          | 50.4%  | \$0  | \$0.00  |
| Greensboro-High Point, NC                          | 448                     | 1.30                               | 7.3%                                      | 315                 | 20.4%                                  | 28                          | 42.5%  | \$0  | \$0.00  |
| Greenville-Mauldin-Easley, SC                      | 323                     | 1.07                               | 1.7%                                      | 241                 | 26.2%                                  | 26                          | 52.5%  | \$154,018                                  | \$0.30  |
| Harrisburg-Carlisle, PA                            | 733                     | 2.25                               | 12.6%                                     | 475                 | 27.4%                                  | 27                          | 69.1%  | \$971,000                                  | \$2.18  |
| Hartford-West Hartford-East Hartford, CT           | 1,761                   | 2.76                               | 8.4%                                      | 866                 | 27.8%                                  | 39                          | 57.6%  | \$8,493,653                                | \$8.70  |
| Honolulu, HI                                       | 575                     | 1.18                               | 24.6%                                     | 452                 | 27.4%                                  | 40                          | 18.6%  | \$0  | \$0.00  |
| Houston-Sugar Land-Baytown, TX                     | 10,107                  | 3.93                               | 9.0%                                      | 5,409               | 9.3%                                   | 57                          | 28.5%  | \$13,940,247                               | \$3.10  |
| Indianapolis-Carmel, IN                            | 1,268                   | 1.43                               | 11.6%                                     | 820                 | 18.8%                                  | 38                          | 48.1%  | \$3,999,946                                | \$2.96  |
| Iowa City, IA                                      | 320                     | 3.44                               | 62.3%                                     | 81                  | 79.1%                                  | 25                          | 30.8%  | \$0  | \$0.00  |
| Jacksonville, FL                                   | 1,238                   | 2.05                               | 4.2%                                      | 790                 | 25.4%                                  | 39                          | 70.8%  | \$2,961,215                                | \$2.78  |
| Kansas City, MO-KS                                 | 1,527                   | 1.53                               | 9.8%                                      | 822                 | 16.2%                                  | 34                          | 57.5%  | \$8,872,418                                | \$5.64  |
| Knoxville, TN                                      | 326                     | 0.99                               | 48.6%                                     | 145                 | 61.0%                                  | 23                          | 23.5%  | \$975,000                                  | \$1.73  |
| Lansing-East Lansing, MI                           | 484                     | 2.18                               | 22.7%                                     | 354                 | 32.0%                                  | 30                          | 59.3%  | \$4,437,841                                | \$11.84   |
| Las Vegas-Paradise, NV                             | 780                     | 0.96                               | 6.8%                                      | 651                 | 13.0%                                  | 47                          | 34.3%  | \$420,727                                  | \$0.28  |
| Lexington-Fayette, KY                              | 387                     | 1.50                               | 29.8%                                     | 249                 | 42.0%                                  | 33                          | 38.6%  | \$0  | \$0.00  |
| Little Rock-North Little Rock-Conway, AR           | 455                     | 1.29                               | 30.4%                                     | 233                 | 41.5%                                  | 29                          | 35.6%  | \$0  | \$0.00  |
| Los Angeles-Long Beach-Santa Ana, CA               | 18,048                  | 3.41                               | 5.8%                                      | 12,539              | 5.3%                                   | 64                          | 37.2%  | \$30,219,251                               | \$2.99  |
| Louisville, KY-IN                                  | 516                     | 0.85                               | 14.2%                                     | 380                 | 32.8%                                  | 27                          | 48.2%  | \$3,000,000                                | \$2.96  |
| Madison, WI  | 848                     | 2.38                               | 22.2%                                     | 494                 | 30.7%                                  | 28                          | 58.0%  | \$0  | \$0.00  |
| Manchester-Nashua, NH                              | 462                     | 2.38                               | 1.0%                                      | 241                 | 29.8%                                  | 25                          | 75.1%  | \$4,999,426                                | \$15.69   |
| McAllen-Edinburg-Mission, TX                       | 290                     | 1.27                               | 12.2%                                     | 222                 | 19.0%                                  | 29                          | 28.6%  | \$3,000,000                                | \$5.56  |
| Memphis, TN-MS-AR                                  | 1,152                   | 1.92                               | 18.1%                                     | 614                 | 29.7%                                  | 31                          | 53.0%  | \$3,743,098                                | \$3.71  |
| Miami-Fort Lauderdale-Pompano Beach, FL            | 7,094                   | 3.20                               | 4.6%                                      | 6,308               | 5.7%                                   | 61                          | 22.6%  | \$2,135,877                                | \$0.47  |
| Milwaukee-Waukesha-West Allis, WI                  | 1,571                   | 1.91                               | 10.0%                                     | 850                 | 17.3%                                  | 34                          | 60.9%  | \$10,312,251                               | \$8.45  |
| Minneapolis-St. Paul-Bloomington, MN-WI            | 4,199                   | 2.44                               | 5.9%                                      | 1,969               | 20.3%                                  | 40                          | 66.3%  | \$10,639,688                               | \$4.16  |
| Nashville-Davidson--Murfreesboro, TN               | 1,065                   | 1.41                               | 16.4%                                     | 687                 | 25.4%                                  | 35                          | 55.3%  | \$3,000,000                                | \$2.40  |
| New Haven-Milford, CT                              | 955                     | 2.68                               | 40.5%                                     | 479                 | 44.7%                                  | 37                          | 24.3%  | \$12,969,847                               | \$18.63   |
| New Orleans-Metairie-Kenner, LA                    | 566                     | 1.07                               | 17.1%                                     | 400                 | 31.9%                                  | 37                          | 19.5%  | \$969,090                                  | \$1.04  |
| New York-Northern New Jersey-Long Island, NY-NJ-PA | 52,921                  | 6.32                               | 5.9%                                      | 24,814              | 4.1%                                   | 74                          | 41.6%  | \$16,006,266                               | \$1.06  |
| North Port-Bradenton-Sarasota, FL                  | 265                     | 1.07                               | 0.9%                                      | 255                 | 17.2%                                  | 31                          | 32.1%  | \$0  | \$0.00  |
| Oklahoma City, OK                                  | 585                     | 1.01                               | 25.3%                                     | 422                 | 26.1%                                  | 34                          | 30.1%  | \$5,000,000                                | \$5.12  |
| Omaha-Council Bluffs, NE-IA                        | 710                     | 1.50                               | 17.6%                                     | 419                 | 27.3%                                  | 32                          | 62.5%  | \$3,000,000                                | \$4.51  |
| Orlando-Kissimmee-Sanford, FL                      | 1,365                   | 1.35                               | 4.5%                                      | 1,067               | 20.8%                                  | 48                          | 30.2%  | \$12,929,196                               | \$7.61  |
| Oxnard-Thousand Oaks-Ventura, CA                   | 827                     | 2.72                               | 0.2%                                      | 497                 | 34.6%                                  | 28                          | 63.1%  | \$0  | \$0.00  |
| Peoria, IL   | 656                     | 3.60                               | 6.2%                                      | 197                 | 43.7%                                  | 20                          | 55.8%  | \$0  | \$0.00  |
| Philadelphia-Camden-Wilmington, PA-NJ-DE-MD        | 8,875                   | 3.24                               | 10.5%                                     | 3,837               | 11.5%                                  | 55                          | 58.3%  | \$11,268,691                               | \$2.37  |
| Phoenix-Mesa-Scottsdale, AZ                        | 3,192                   | 1.86                               | 4.5%                                      | 1,874               | 16.7%                                  | 41                          | 52.7%  | \$6,000,000                                | \$1.86  |

**Appendix B. High-Demand H-1B Metropolitan Areas (continued)**

| Metro Area                                   | Average LCAs, 2010-2011 | Intensity (LCAs per 1,000 workers) | Share of requests from uncapped employers | Number of employers | Share of requests from top 5 employers | Number of occupation groups | Share of requests for largest occupation group | ETA Skill Grant Dollars (2001-2011, total) | ETA Skill Grant Dollars (2001-2011, per 16+ population) |
|--|-------------------------|------------------------------------|---|---------------------|--|-----------------------------|--|--|---|
| Pittsburgh, PA                               | 2,370                   | 2.08                               | 25.1%                                     | 1,186               | 27.0%                                  | 41                          | 51.3%  | \$7,015,545                                | \$3.61  |
| Portland-South Portland-Biddeford, ME        | 282                     | 1.06                               | 2.5%                                      | 212                 | 32.3%                                  | 26                          | 63.2%  | \$5,999,858                                | \$14.30   |
| Portland-Vancouver-Hillsboro, OR-WA          | 2,096                   | 2.09                               | 5.7%                                      | 1,046               | 38.1%                                  | 38                          | 48.9%  | \$15,542,095                               | \$8.81  |
| Poughkeepsie-Newburgh-Middletown, NY         | 284                     | 1.10                               | 8.1%                                      | 179                 | 38.7%                                  | 30                          | 30.3%  | \$2,023,300                                | \$3.85  |
| Providence-New Bedford-Fall River, RI-MA     | 1,065                   | 1.55                               | 15.3%                                     | 724                 | 18.9%                                  | 39                          | 46.6%  | \$5,726,938                                | \$4.41  |
| Provo-Orem, UT                               | 257                     | 1.37                               | 9.1%                                      | 186                 | 27.0%                                  | 28                          | 37.9%  | \$0  | \$0.00  |
| Richmond, VA                                 | 1,648                   | 2.66                               | 6.8%                                      | 1,028               | 20.2%                                  | 38                          | 64.7%  | \$0  | \$0.00  |
| Riverside-San Bernardino-Ontario, CA         | 1,172                   | 1.00                               | 9.9%                                      | 936                 | 20.1%                                  | 43                          | 26.9%  | \$2,231,618                                | \$0.70  |
| Rochester, MN                                | 278                     | 2.60                               | 70.5%                                     | 94                  | 74.6%                                  | 22                          | 28.6%  | \$0  | \$0.00  |
| Rochester, NY                                | 743                     | 1.45                               | 25.5%                                     | 446                 | 27.9%                                  | 34                          | 49.6%  | \$2,133,983                                | \$2.52  |
| Sacramento--Arden-Arcade--Roseville, CA      | 1,759                   | 2.09                               | 12.6%                                     | 896                 | 37.4%                                  | 35                          | 49.4%  | \$8,000,000                                | \$4.76  |
| Salinas, CA                                  | 283                     | 1.64                               | 37.3%                                     | 119                 | 53.5%                                  | 22                          | 31.2%  | \$0  | \$0.00  |
| Salt Lake City, UT                           | 909                     | 1.47                               | 16.2%                                     | 582                 | 33.5%                                  | 34                          | 45.9%  | \$1,371,707                                | \$1.65  |
| San Antonio-New Braunfels, TX                | 1,251                   | 1.39                               | 9.1%                                      | 773                 | 29.2%                                  | 40                          | 50.3%  | \$5,000,000                                | \$3.04  |
| San Diego-Carlsbad-San Marcos, CA            | 4,529                   | 3.33                               | 9.1%                                      | 2,252               | 29.3%                                  | 49                          | 51.1%  | \$4,607,234                                | \$1.87  |
| San Francisco-Oakland-Fremont, CA            | 16,333                  | 8.41                               | 5.0%                                      | 7,421               | 10.3%                                  | 52                          | 60.1%  | \$16,965,044                               | \$4.81  |
| San Jose-Sunnyvale-Santa Clara, CA           | 14,926                  | 17.10                              | 2.6%                                      | 4,368               | 12.1%                                  | 43                          | 64.1%  | \$2,995,892                                | \$2.07  |
| Santa Barbara-Santa Maria-Goleta, CA         | 335                     | 1.79                               | 16.3%                                     | 223                 | 35.9%                                  | 30                          | 35.3%  | \$0  | \$0.00  |
| Seattle-Tacoma-Bellevue, WA                  | 9,633                   | 5.60                               | 3.5%                                      | 2,808               | 48.4%                                  | 47                          | 67.7%  | \$1,975,000                                | \$0.72  |
| Springfield, MA                              | 313                     | 1.05                               | 21.4%                                     | 211                 | 36.3%                                  | 30                          | 24.9%  | \$3,000,000                                | \$5.34  |
| St. Louis, MO-IL                             | 2,263                   | 1.71                               | 17.0%                                     | 1,261               | 22.4%                                  | 37                          | 57.0%  | \$975,000                                  | \$0.44  |
| Syracuse, NY                                 | 335                     | 1.06                               | 25.5%                                     | 208                 | 36.4%                                  | 27                          | 35.5%  | \$1,200,234                                | \$2.26  |
| Tallahassee, FL                              | 335                     | 1.94                               | 34.8%                                     | 209                 | 43.3%                                  | 27                          | 45.7%  | \$0  | \$0.00  |
| Tampa-St. Petersburg-Clearwater, FL          | 2,126                   | 1.86                               | 6.0%                                      | 1,435               | 12.8%                                  | 40                          | 58.9%  | \$12,001,623                               | \$5.29  |
| Toledo, OH                                   | 366                     | 1.21                               | 29.9%                                     | 228                 | 40.8%                                  | 24                          | 47.1%  | \$5,000,000                                | \$9.70  |
| Trenton-Ewing, NJ                            | 2,032                   | 8.46                               | 9.3%                                      | 1,065               | 16.5%                                  | 36                          | 70.4%  | \$0  | \$0.00  |
| Tucson, AZ                                   | 486                     | 1.33                               | 27.8%                                     | 288                 | 37.6%                                  | 35                          | 20.0%  | \$4,594,719                                | \$5.86  |
| Tulsa, OK                                    | 438                     | 1.04                               | 4.9%                                      | 312                 | 27.1%                                  | 27                          | 50.7%  | \$0  | \$0.00  |
| Virginia Beach-Norfolk-Newport News, VA-NC   | 560                     | 0.67                               | 17.8%                                     | 448                 | 15.5%                                  | 38                          | 26.4%  | \$5,000,000                                | \$3.76  |
| Washington-Arlington-Alexandria, DC-VA-MD-WV | 14,569                  | 4.76                               | 9.3%                                      | 7,716               | 6.3%                                   | 63                          | 48.9%  | \$27,426,462                               | \$6.19  |
| Wichita, KS                                  | 262                     | 0.89                               | 14.3%                                     | 158                 | 30.2%                                  | 27                          | 31.5%  | \$5,975,000                                | \$12.63   |
| Worcester, MA                                | 1,217                   | 3.74                               | 14.7%                                     | 506                 | 41.2%                                  | 34                          | 59.6%  | \$5,992,908                                | \$9.44  |
| <b>United States</b>                         | <b>325,522</b>          | <b>2.40</b>                        | <b>9.7%</b>                               | <b>70,216</b>       | <b>4.7%</b>                            | <b>87</b>                   | <b>44.6%</b>                                   | <b>\$628,537,903</b>                       | <b>\$2.58</b>   |

## Endnotes

1. National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, "Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future" (Washington: The National Academies Press, 2005).
2. Jonathan Rothwell and Alan Berube, "Education, Demand, and Unemployment in Metropolitan America" (Washington: Brookings Institution, 2011).
3. The McKinsey Global Institute projects that the U.S. will need at least 140,000 to 190,000 workers in the labor force with "deep analytical" expertise and another 1.5 million data-literate managers. Deloitte and the International Society of Certified Employee Benefits Specialists (ISCEBS) also recently released their annual survey of employers finding that the shortage of qualified talent and the skills gap has emerged as the biggest challenge facing employers over the next three years. This has been especially true for U.S. manufacturing where access to highly skilled, flexible labor supply has been the number one factor affecting their ability to expand operations and improve productivity. The U.S. Department of Labor Bureau of Labor Statistics projects that occupations requiring postsecondary, master's, and doctoral degrees are predicted to grow the fastest during the 2010-2020 period. To learn more see the following: Steve Lohr, "The Age of Big Data," *New York Times*, February 11, 2012; Deloitte and International Society of Certified Employee Benefit Specialists (ISCEBS), "2012 Top Five Total Rewards Priorities Survey: Strategic challenges zero in on shortage of talent and pressures of health care" (New York: Deloitte Development LLC, 2011); Deloitte Consulting and Manufacturing Institute, "Boiling point? The skills gap in U.S. manufacturing" (New York: Deloitte Development LCC, 2011); and Bureau of Labor Statistics, "Employment Projections 2010-2020" (Washington: US Department of Labor, 2012).
4. National Science Foundation, "Science and Engineering Indicators 2012" (Washington: National Science Foundation, 2012).
5. Ibid.
6. Ibid.
7. Emilia Istrate, "America's Stealth Education Export," *The Avenue*, November 17, 2011.
8. World Bank, *Migration and Remittances Factbook 2011* (2011).
9. Matthew Hall, Audrey Singer, Gordon F. DeJong, and Deborah Roempke Graefe, "The Geography of Immigrant Skills: Educational Profiles of Metropolitan Areas" (Washington: Brookings Institution, 2011).
10. Additionally, there is evidence that U.S. STEM graduates are being diverted away from STEM occupations to a wider variety of occupations and industries that now rely on STEM competencies. For more information see: National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, "Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future" (Washington: The National Academies Press, 2005); National Science Foundation, "Science and Engineering Indicators 2012" (Washington: National Science Foundation, 2012); U.S. Department of Commerce, "The Competitiveness and Innovative Capacity of the United States" (Washington: U.S. Department of Commerce, 2012). U.S. Department of Commerce, "The Competitiveness and Innovative Capacity of the United States" (Washington: U.S. Department of Commerce, 2012); Anthony Carnvale, Nicole Smith, and Michele Melton, "Science, Technology, Engineering, and Mathematics." (Washington: Georgetown University, 2011).
11. James Manyika, and others, "Urban America: US cities in the global economy" (Washington: McKinsey Global Institute, 2012).
12. Jonathan Rothwell and Alan Berube, "Education, Demand, and Unemployment in Metropolitan America."
13. Regional innovation clusters are "geographical concentrations of interconnected businesses, suppliers, service providers, coordinating intermediaries, and associated institutions like universities or colleges in a particular field" that allow networks of people with skills and entrepreneurial talent to transform innovative ideas into commercialized products. For more information see Mark Muro and Bruce Katz, "The New 'Cluster Moment': How Regional Innovation Clusters Can Foster the Next Economy," (Washington: Brookings Institution, 2010).
14. AnnaLee Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (Cambridge, Harvard University Press, 1994).
15. Nearly all recent studies on H-1B visas have focused on national-level analysis rather than examining sub-national trends. A recent study by Madeline Zavodny shows the significance of H-1B workers in creating jobs for U.S. natives. In another paper, Marshall Fitz uses national data on H-1B employers to identify problems with the high-skilled immigration system. Jennifer Hunt shows

that nationally, immigrants entering as students or on temporary work visas such as the H-1B visa program have a large advantage over natives in patenting, wages, and publishing because of their higher educational attainment and fields of study. Other scholars such as Alex Nowrasteh, Stuart Anderson, and Darrell M. West have shown the tremendous contributions of high-skilled immigrants to U.S. economic development and all argue to reform the U.S. immigration system to keep America competitive. B. Lindsay Lowell made the first attempt at estimating the total population of H-1B workers in the United States to forecast that only 25,000 H-1B workers and their families would be absorbed into the permanent immigration system per year. In 2008 William R. Kerr and William F. Lincoln conducted the only study containing a sub-national level analysis of H-1B visa data, evaluating the impact of high-skilled immigration on innovation. They used city-level data on H-1Bs and patents to establish a positive relationship between H-1B admissions and the rate of Indian and Chinese patenting in cities and firms that depend on the H-1B program, but sub-national data was used to make a national-level conclusion that total invention increases with higher H-1B admission levels. To date there has been no study exploiting sub-national trends, especially at the metropolitan-level. For more information read: Madeline Zavodny, "Immigration and American Jobs" (Washington: American Enterprise Institute for Public Policy Research and the Partnership for a New American Economy, 2011); Marshall Fitz, "Immigration for Innovation: How to Attract the World's Best Talent While Ensuring America Remains the Land of Opportunity for All" (Washington: Center for American Progress, 2012); Jennifer Hunt, "Which Immigrants Are Most Innovative and Entrepreneurial? Distinctions by Entry Visa." Working Paper 14920 (National Bureau of Economic Research, 2009); Alex Nowrasteh, "H-1B Visas: A Case for Open Immigration of Highly Skilled Foreign Workers" (Washington: Competitive Enterprise Institute, 2010); Stuart Anderson, "The Global Battle for Talent and People" (Washington: Immigration Policy Center, 2003); Darrell M. West, *Brain Gain: Rethinking U.S. Immigration Policy* (Washington: Brookings, 2010); B. Lindsay Lowell, "H-1B Temporary Workers: Estimating the Population." Working Paper 12 (The Center for Comparative Immigration Studies, 2000); William R. Kerr and William F. Lincoln, "The Supply Side of Innovation: H-1B Visa Reforms and US Ethnic Invention." Working Paper 09-005 (Harvard Business School, 2008).

16. Proponents of the H-1B visa see the mobility of high-skilled labor as a result of natural push and pull factors of the global economy: migrants seek better economic and professional opportunities abroad especially in the developed world, where most centers of innovation and

economic activity occur. Conversely, migrants are also increasingly drawn to emerging nations with quickly expanding economies. For these and other reasons, proponents of the H-1B visa generally believe global mobility is unavoidable in today's world. Economists such as Lant Pritchett who wrote *Let Their People Come: Breaking the Gridlock on Global Labor Mobility* (Washington: Center for Global Development, 2006) argued that several forces place a tremendous amount of pressure for people to migrate across international borders: gaps in unskilled wages, differing demographic futures, the globalization of everything but labor, and the rise of employment in service industries in developed countries. In addition, some scholars like Devesh Kapur and John McHale who wrote, *Give Us Your Best and Brightest: The Global Hunt for Talent and its Impact on the Developing World* (Washington: Center for Global Development, 2005), argue that the skills bias coming from technological advancements towards knowledge-based industries creates a situation where industry is likely to push for liberalizing immigration policies to ease these pressures. Analysis of the impact of foreigners on innovation and entrepreneurship by William R. Kerr and William F. Lincoln in a paper they wrote, "The Supply Side of Innovation: H-1B Visa Reforms and US Ethnic Invention," has shown that inventions, as measured by the number of patents filed, have increased due to contributions of foreign inventors admitted through programs like the H-1B visa program. In a 2011 study funded by the American Enterprise Institute and the Partnership for a New American Economy (a bi-partisan consortium of mayors and business leaders), economics professor Madeline Zavodny finds that, even during the tough economic times of the last few years, immigration on the whole has not hurt the job prospects of native-born Americans. By analyzing whether states with higher concentrations of immigrant workers have higher or lower employment rates for natives, she finds no significant effect on the whole, but a boost from high-skilled immigrants (at least up until the recession hit in late 2007). Specifically, between 2000 and 2007, each additional 100 foreign-born workers with advanced degrees were correlated with an additional 44 jobs for U.S. natives, and if those 100 workers were in STEM fields, the number of additional jobs for natives went up to 262. See Zavodny, "Immigration and American Jobs."

17. Department for Professional Employees, AFL-CIO, "Gaming the System 2012: Guest Worker Visa Programs and Professional and Technical Workers in the U.S." (2012).
18. The most serious concern is that foreign workers displace Americans in the labor force. Norman Matloff at

- University of California, Davis argues that employers use the program to get cheap young foreign skilled labor, and he has documented widespread abuses in the H-1B visa program in terms of underpaying workers and not recruiting native-born workers. However, a recent study by Magus Lofstrom analyzed H-1B petitions to show that H-1B workers earn more than others within their occupational group, providing evidence that H-1B visas are not depressing wages. The other ongoing debate is over whether H-1B recipients take jobs from native-born Americans or fill a “skills gap” in the U.S. labor force. Many people have argued that the “skills gap” promulgated by industry lobbyists is a myth and that there are enough skilled U.S.-born workers to fill these jobs. For example, a 2007 study by the Urban Institute found that the U.S. education system produces science and engineering graduates far in excess of demand: each year there are more than three times as many science and engineering (S&E) four-year college graduates as there are S&E job openings. A 2011 study by the Center on Education and the Workforce at Georgetown University found that the concern over producing enough STEM workers to compete in the global economy is indeed warranted, but not for the reasons commonly argued. Rather, they find that U.S. workers in STEM fields are being diverted—voluntarily and involuntarily—to occupations in non-STEM fields. The authors found that forty-three percent of STEM graduates do not work in a STEM field immediately after graduation, and that another three percent have left STEM occupations by their tenth year after college. Some argue that this diversion, rather than a true labor shortage, may be what is driving U.S. employers’ reliance on temporary foreign workers, especially in STEM occupations. For more information see Carnevale, Smith, and Melton, “Science, Technology, Engineering, and Mathematics.”
19. United States Government Accountability Office, “H-1B Visa Program: Reforms Are Needed to Minimize the Risks and Costs of Current Program” (2011).
  20. Ibid.
  21. US Citizenship and Immigration Services, “Characteristics of H-1B Specialty Occupation Workers” (Washington: US Citizenship and Immigration Services, 2009).
  22. Ibid.
  23. Neil Ruiz and Audrey Singer, “A Bipartisan Tweak to Reduce the Immigration Reform Backlog,” *UpFront*, December 2, 2011.
  24. Department of Homeland Security Office of Immigration Statistics, “Nonimmigrant Admissions to the United States: 2010” (2011).
  25. US Citizenship and Immigration Services, “Characteristics of H-1B Specialty Occupation Workers” (Washington: US Citizenship and Immigration Services, 2009).
  26. U.S. Department of Labor Employment and Training Administration Office of Foreign Labor Certification, “Foreign Labor Certification Annual Report, 2009-2010” available at [http://www.foreignlaborcert.doleta.gov/pdf/oflc\\_2010\\_annual\\_report\\_master.pdf](http://www.foreignlaborcert.doleta.gov/pdf/oflc_2010_annual_report_master.pdf)
  27. U.S. GAO, “H-1B Visa Program” 2011.
  28. Ibid.
  29. Demetrios G. Papademetriou and Stephen Yale-Leohr, *Balancing Interests: Rethinking U.S. Selection of Skilled Immigrants* (Washington: Carnegie Endowment for International Peace, 1996).
  30. U.S. GAO, “H-1B Visa Program” 2011.
  31. USCIS, “Characteristics of H-1B Specialty Occupation Workers,” 2012.
  32. Ibid. These data are for petitions approved by USCIS rather than actual H-1B visas issued, which is done by the Department of State.
  33. Linda Levine, “Education and Training Funded by the H-1B Visa Fee and the Demand for Information Technology and Other Professional Specialty Workers” (Washington: Congressional Research Service, 2005).
  34. “H-1B Technical Skill Training Grants (SGA/DFA 00-108), Employment and Training Administration (ETA)—U.S. Department of Labor,” available at <http://www.doleta.gov/grants/sga/00-108sga.cfm> (May 2012).
  35. USCIS, “H-1B Fiscal Year (FY) 2013 Cap Season” available at [www.uscis.gov/portal/site/uscis/menuitem.5af9bb95-919f35e66f614176543f6d1a/?vgnextoid=4b7cdd1d5fd37210VgnVCM100000082ca60aRCRD&vgnnextchannel=73566811264a3210VgnVCM1000000b92ca60aRCRD](http://www.uscis.gov/portal/site/uscis/menuitem.5af9bb95-919f35e66f614176543f6d1a/?vgnextoid=4b7cdd1d5fd37210VgnVCM100000082ca60aRCRD&vgnnextchannel=73566811264a3210VgnVCM1000000b92ca60aRCRD)
  36. Brookings analysis of data from the Employment and Training Administration and interview with Assistant Secretary Jane Oates, Department of Labor. The National Foundation for American Policy (NFAP) estimated that \$2.3 billion dollars was raised for H-1B technical skills training and NSF scholarships for fiscal years 2000 to



- 2011, which is more than double the amount of Brookings' estimate. This difference is explained by the difference in data sources. NFAP estimated this amount using data from the U.S. Citizenship and Immigration Services that deals with approving H-1B visa applications, whereas this analysis used data from the administrators of the grant programs from the Employment and Training Administration and the U.S. Department of Labor and the National Science Foundation. For more information see: National Foundation for American Policy, "Employers Have Paid Over \$3 Billion in Mandatory Fees to Hire Skilled Foreign Nationals in Past Decade" (2011).
37. In FY2011, USCIS approved a total of 269,653 H-1B petitions, compared to 336,309 LCAs filed with the Department of Labor. Of those approved by USCIS, 40 percent were for initial employment and 60 percent were for continuing employment.
  38. Note that these are federal government fiscal years which run from October 1 to September 30th, and not calendar years. The federal government begins accepting H-1B visa applications for the next fiscal year on the first business day of April. This means that for the government's fiscal year 2001, the H-1B visa applications can be filed on April 3, 2000 for those beginning on October 1, 2000. This also shows that an increase in the cap does not equate approval. H-1B applications can still be rejected for various reasons by Department of Labor, Department of Homeland Security, and the Department of State for a number of reasons. Post-admissions, the U.S. Citizenship and Immigration Services (USCIS) conducts site to employer locations to check for fraud and abuse.
  39. Visa issuance data come from the Department of State. Initial applications for H-1B workers (from the Department of Labor) include both first-time applications and renewals from both cap-exempt employers and those subject to the annual cap.
  40. For fiscal years 2010 and 2011, the H-1B visa issuance rate has been 37 and 38 percent, respectively. The current cap of 85,000 includes 20,000 H-1B visas that are set aside for foreigners who have graduate degrees from U.S. universities. The other 65,000 is open to all others.
  41. Neil Ruiz, "The Race for H-1B Visas Begins," *The Avenue*, April 9, 2012.
  42. Neil Ruiz and Jill Wilson, "The End of the Race for H-1B Visas," *The Avenue*, June 13, 2012.
  43. According to USCIS, in FY2009 27,288 employers had petitions for H-1B workers approved. The discrepancy between these numbers is explained by both the difference between those who apply and those who actually receive visas, and also data constraints of the LCA dataset; see Appendix A for greater detail.
  44. Government Accountability Office, "High-Skill Training: Grants from H-1B Visa Fees Meet Specific Workforce Needs, but at Varying Skill Levels" (Washington: Government Accountability Office, 2002).
  45. Ibid.
  46. "National Science Foundation FY2010 Budget Request to Congress" available at [www.nsf.gov/od/oia/OIABudget/NSFBudget/FY2010\\_BudgetRequestToCongress.pdf](http://www.nsf.gov/od/oia/OIABudget/NSFBudget/FY2010_BudgetRequestToCongress.pdf).
  47. This analysis uses the 75th percentile as the threshold for determining which metro areas qualify as corporate or research based on the percent of H-1B requests that come from capped employers. Corporate metro areas have at least 94 percent of their requests from capped employers whereas research metro areas have at least 22 percent of their requests from uncapped employers.
  48. National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, "Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future" (Washington: The National Academies Press, 2005).
  49. Nine percent of H-1B requests in the 106 metro areas of analysis come from uncapped institutions.
  50. Linda Levine, "Education and Training Funded by the H-1B Visa Fee and the Demand for Information Technology and Other Professional Specialty Workers."
  51. United States General Accounting Office. "High-Skill Training: Grants from H-1B Visa Fees Meet Specific Workforce Needs, but at Varying Skill Levels" (2002).
  52. *American Competitiveness in the Twenty-First Century Act of 2000*, S. 2045, 106 Cong. 2 sess. (Government Printing Office, 2000).
  53. Linda Levine. "Education and Training Funded by the H-1B Visa Fee and the Demand for Information Technology and Other Professional Specialty Workers."
  54. National Science Foundation, "NSF Computer Science, Engineering and Mathematics Scholarship (CSEMS): Program Solicitation" (Washington: National Science Foundation, 2001)..

55. National Science Foundation, "FY 2002 Budget Requests to Congress" (Washington: National Science Foundation, 2002).
56. National Science Foundation, "FY 2010 Budget Requests to Congress" (Washington: National Science Foundation, 2010).
57. For more information see: Demetrios G. Papademetriou, Doris Meissner, Marc R. Rosenblum, and Madeleine Sumption, "Harnessing the Advantages of Immigration for a 21st-Century Economy: A Standing Commission on Labor Markets, Economic Competitiveness, and Immigration" (Washington: Migration Policy Institute, 2009); Ray Marshall, *Immigration for Shared Prosperity: A Framework for Comprehensive Reform* (Washington, DC: Economic Policy Institute, 2009); The Brookings-Duke Immigration Policy Roundtable, "Breaking the Immigration Stalemate: From Deep Disagreements to Constructive Proposals," (Washington, DC: The Brookings Institution, 2009).
58. Matthew Hall, Audrey Singer, Gordon F. De Jong, and Deborah Roempke Graefe, "The Geography of Immigration Skills: Educational Profiles of Metropolitan Areas," Washington, D.C.: Brookings Institution, 2011.
59. Demetrios G. Papademetriou and others, "Harnessing the Advantages of Immigration for a 21st Century Economy" (Washington: Migration Policy Institute, 2009).
60. American Council on International Personnel, "Examining Proposals to Create a New Commission on Employment-Based Immigration" (2009).
61. A National Foundation for American Policy (NFAP) study argued that the labor market is global, rather than strictly domestic. Even if the data were improved, labor shortages may not show up in government data since many companies have a global workforce and if they cannot find someone in the U.S., then they usually offshore work to hire people they need. Finally, as many employers have noted during interviews for this study, they are not necessarily looking for any employee with a specific degree (e.g. such as an engineering degree), but they are looking for highly-specialized individuals who have not only the educational background, but also a specific combination of skills, relevant work experience, and exposure to the most up-to-date technologies. Many of these characteristics cannot be captured by available data.
62. Estimates of education and work experience requirements for occupations are based on standards from the O\*Net Resource Center. See Appendix A for further detail.
63. Deloitte and the International Society of Certified Employee Benefit Specialists, "2012 Top Five Total Rewards Priorities Survey: Strategic Challenges Zero in on Shortage of Talent and Pressures on Health Care" (New York: Deloitte Development LLC).
64. Som Mittal, "India's Tech Industry in the US" (Washington, DC: March 22, 2012).
65. This study used the December 2009 Office of Management and Budget definitions of core-based statistical areas (CBSAs).
66. New England City and Town Areas (NECTAs) are defined by the Office of Management and Budget for the six New England states (VT, NH, CT, RI, MA, and ME) using cities and towns as components rather than counties. While OMB also defines Metropolitan Statistical Areas (MSAs) for New England, which use counties as building blocks across the country, OES produces data only for NECTAs and not MSAs in New England.
67. This analysis first ruled out employer names with keywords such as "company," "LLC," "Inc.," etc. We then looked for 1) higher education keywords such as "college," "university," "air force," "army," "coast guard," "marines," "military," "naval," "regents," and "trustees"; 2) research institution keywords such as "institute" and "institution"; and 3) government research keywords such as "national lab," and "defense language institute".
68. STEM definitions are taken from Department of Commerce, "STEM: Good Jobs Now and for the Future" (2011).

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