

## **The Role of High-Skilled Foreign Accounting Labor in Shaping U.S. Startup Outcomes**

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### **Abstract**

This study examines whether and how high-skilled foreign accounting workers provide value to U.S. startup firms. We use the H-1B visa setting where U.S. firms that apply to hire high-skilled foreign workers are randomly awarded access to hire the workers through a computer-generated lottery. We find that startup firms awarded access to high-skilled foreign accounting labor are more likely to receive external funding and are more likely to successfully exit the private market by either IPO or acquisition. Consistent with these workers aiding market participants in the assimilation of firm information, we find that startup firms demand high-skilled foreign accounting workers at a higher rate during the years they are preparing their prospectuses. Additionally, we find that IPO startup firms awarded high-skilled foreign accounting workers are priced more accurately by analysts and have lower analyst forecast dispersion during their prospectus years. Collectively, these findings suggest that high-skilled foreign accounting workers aid startups in exiting the private sector and help facilitate information assimilation by the market. As the accounting profession struggles to find workers, we provide evidence of how a source of talent serves an economically important sector of the U.S. economy.

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## 1. Introduction

This study examines whether and how high-skilled foreign accounting workers provide value to U.S. startup firms. Prior research shows that foreign workers with highly specialized knowledge can improve startup firm outcomes by contributing to their technological innovation (Kerr and Lincoln 2010; Chen, Hsieh, Zhang 2021; Dimmock, Huang, and Weisbenner 2022). These high-skilled foreign workers, therefore, serve an important role because startup firm growth and technological innovation are vital to the health of the U.S. economy (Schumpeter 1942; Kydland and Prescott 1982; Romer 1990; Greenwood and Jovanovic 1999; Gourio, Messer, and Siemer 2016). The success of startups, however, requires not only workers to advance technological innovation but also workers with the technical financial-accounting skills necessary to bring the innovations to market (Kim and Ritter 1999; Demers and Joos 2007). U.S. workers with technical financial-accounting skills, however, are scarce. Indeed, demand for accounting workers in the U.S. has historically outpaced supply (Albrecht and Sack 2000; Mortimer 2003; Demski 2007; Madsen 2015), and a recent shortage of domestic accounting workers has elevated the issue to crisis levels (Wooldridge 2022; Maurer 2022; Ellis 2022; 2023). Thus, foreign workers with highly specialized knowledge in accounting have the potential to contribute to the success of U.S. startups by filling an important skills gap on the *business-side* of innovation. In this paper, we study how access to this foreign labor force affects the outcomes of U.S. start-up firms.

To conduct our investigation, we exploit the H-1B visa program where U.S. firms that apply to hire high-skilled foreign workers are randomly awarded access to hire the workers through a computer-generated lottery. The U.S. federal government uses a lottery to allocate all H-1B visas in years where aggregate firm demand for high-skilled foreign workers exceeds the statutory limit of available H-1B visas. This scenario occurred in ten years from 2008 to 2021, which are the focus of our study. These years provide a setting in which we can observe exogenous variation in

startup firm access to high-skilled foreign workers over time and across occupations. This allows us to provide insight into the value of high-skilled foreign accounting workers to startup firms relative to all startup firms that demand high-skilled foreign accounting workers, and startup firms that demand high-skilled foreign workers from other occupations.

If high-skilled foreign accounting workers provide value to U.S. startup firms then we predict that the startup firms that demand foreign accounting workers and that are randomly rewarded access to hire them will have improved startup outcomes. In addition, if a key reason that startup firms seek to hire high-skilled foreign accounting workers is to obtain assistance with exiting the private market via IPO, then we expect that startup firms' will demand foreign accounting workers at a higher rate in the years that immediately precede their initial public offerings. Moreover, we expect the IPO startups that are awarded access to hire more accounting resources will have higher-quality information environments. We test for these possibilities in our study using a sample of 4,877 private startup firm-years from the Crunchbase database where the firms applied to hire one or more H-1B workers during a lottery year. Because H-1B lottery win data is publicly available at the firm level rather than the individual visa application level, we use the percentage of a startup firm's total H-1B lottery wins to their total applications in a year to identify the firms that are more likely to have been awarded access to hire foreign accounting workers. This is a key identification assumption in our study. Given the median startup firm in our sample only applies for two H-1B workers in a year, however, the aggregate lottery win rate for a firm-year provides a close proxy for individual visa lottery wins in our study.

Descriptively, we find that 29.5 percent of startup firms that apply to hire at least one H-1B worker in a lottery year seek a worker to fill an accounting-related job. This is an exceptionally *broad* rate of demand relative to other occupations, ranking 2<sup>nd</sup> highest out of 97 occupations.

While the overall *quantity* of H-1B workers demanded is higher for traditional STEM occupations (e.g., computer occupations, engineers, etc.), applications for these workers come from a narrower set of firms. High-skilled foreign accounting workers are, therefore, demanded more universally by startup firms, consistent with them providing an essential service that is necessary for accessing capital and/or exiting the private market.

With respect to our predictions, we find that startup firms seeking to hire foreign accounting workers and that have higher H-1B lottery win rates are more likely to have successful outcomes. Specifically, we find that these startup firms are more likely to receive external funding and are more likely to successfully exit the private market through either an acquisition or IPO. Interestingly, we do not find this same consistent pattern for firms seeking to hire foreign workers in other occupations. Thus, foreign accounting workers appear to uniquely impact the success of startup firms in our study. These results are robust to controlling for startup firm attributes and including industry- and year-fixed effects to absorb the influence of time-invariant industry-level omitted variables and economy-wide market conditions.

Next, we find that startup firms apply to hire H-1B accounting workers at a higher rate in the years immediately preceding their initial public offerings. This finding on the *timing* of startup firm demand for high-skilled foreign accounting workers supports our inference that a key reason startups seek to hire high-skilled foreign accounting workers is to obtain assistance with exiting the private market. This is consistent with startup firms having a higher need for accounting expertise as they create their prospectuses and assist market participants with price discovery (Kraus and Stromsten 2012). Again, we do not find this same consistent pattern in H-1B applications for firms seeking to hire foreign workers in other occupations. This evidence suggests that, while H-1B workers, on average, contribute to startup firms' technical innovation (Kerr and

Lincoln 2010; Chen et al. 2021; Dimmock et al. 2022), the timing of startup firms' demand for different *types* of H-1B workers varies across the firms' lifecycles.

We then consider a plausible channel through which high-skilled foreign accounting workers may affect startup firm outcomes – enhanced communication with market participants. Because startup firms are private and inherently have less proven business models, they have greater information asymmetry with market participants and greater uncertainty surrounding their financial operations (Brav and Gompers 2003). High-skilled accounting workers, however, can help the market better understand startup firms by improving financial reporting quality, interacting with investors and analysts, and facilitating the assimilation of firm-specific information (Kim and Ritter 1999; Demers and Joos 2007). We test for these possibilities for high-skilled foreign accounting workers using properties of analyst forecasts and a subsample of startup firms that exited the private market via IPO. Consistent with high-skilled foreign accounting workers improving the information environments of startup firms, we find that the IPO startup firms that apply to hire foreign accounting workers and that have higher H-1B lottery win rates are more likely to have lower analyst forecast errors and lower analyst forecast dispersion.

Lastly, in additional analyses, we perform several tests to assess the sensitivity of our findings to different research designs and alternative explanations. First, we assess the possibility that H-1B lottery winners are not actually randomly determined in our sample by regressing startup firms' lottery win rates on a lagged set of our baseline control variables (Dimmock et al. 2022). Second, we consider whether our findings are an artifact of ongoing trends that precede H-1B lotteries by performing placebo tests. Third, we address the potential of structural issues with our sample by entropy balancing observations with high and low H-1B lottery win rates (Hainmueller 2012; McMullin and Schonberger 2018). Finally, we address the possibility that lower-skilled H-

H-1B accounting workers are driving our results by limiting our definition of high-skilled foreign accounting workers to either individuals with salaries in the top quartile of our sample or individuals with executive titles. Across all tests, the results are inconsistent with these alternative explanations.

This study contributes to two streams of literature. First, this study contributes to the literature on the relationship between immigration and U.S. innovation. While inflows of high-skilled foreign workers into the U.S. do not guarantee a higher rate of innovation, historically, this has been the case (Hunt and Gauthier-Loiselle 2010; Kerr and Lincoln 2010; Bernstein, Diamond, Jiranaphawiboon, McQuade, and Pousada 2022). Indeed, Bernstein et al. (2022) find that 36 percent of total U.S. innovative output from 1990 to 2016 can be attributed to immigrant workers. Our study complements this work by focusing on the impact of high-skilled H-1B workers on startup firms, an economically important sector of the U.S. economy (Schumpeter 1942; Kydland and Prescott 1982; Romer 1990; Greenwood and Jovanovic 1999; Gourio et al. 2016). Prior research studies the random allocation of H-1B visas to workers from *all* occupations and shows that H-1B workers improve startup firm outcomes by contributing to their technological innovation (Chen, et al. 2021; Dimmock et al. 2022). In this study, we consider the impact of access to H-1B visas for a specific *type* of foreign worker, accountants, and investigate the impact of these workers on the *business-side* of innovation. We provide evidence that high-skilled foreign accounting workers aid startups in exiting the private sector and help facilitate information assimilation by the market. Additionally, we provide evidence that demand for high-skilled foreign accounting workers is concentrated in the years preceding startup firms' initial public offerings. These findings should be of interest to U.S. policymakers who currently award access to H-1B visas on a random basis, without consideration of allocations across specialized occupations or the

lifecycles of the hiring firms. Our study provides evidence that the *types* of workers awarded H-1B visas affect startup outcomes, and the *timing* of H-1B visa awards affects the likelihood of startup firms going public.

Second, our study contributes to the literature on the intersection of labor economics and accounting. Specific to our study on immigration and accounting, prior studies examine how the global convergence of accounting rules enables cross-border labor migration (Bloomfield, Brüggemann, Christensen, and Leuz 2017), and how high-skilled foreign accounting workers serve as complements rather than substitutes for domestic auditing labor (Aobdia et al. 2018). Additionally, there are several studies on the supply of domestic accounting workers that call for policy interventions to improve the shortage of accounting workers in the U.S. (Zeff 1989; Mortimer 2003; Hanson 2012; Madsen 2015).<sup>1</sup> Our study complements this work by showing how high-skilled foreign accounting workers provide value to U.S. startup firms. As the accounting profession struggles to find workers, we provide evidence of how a source of talent serves an economically important sector of the U.S. economy.

## **2. Background and Hypothesis Development**

### ***2.1 H-1B Visa Program***

The H-1B visa program is available to U.S. firms to temporarily hire educated foreign workers in occupations that require highly specialized knowledge.<sup>2</sup> H-1B visas grant permission to foreign workers to enter the United States and work for domestic firms for an initial period of

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<sup>1</sup> The severity of the accounting labor shortage corresponds with an aging U.S. population, which may make finding domestic accounting workers difficult for years to come. Indeed, from 2010 to 2020, there was a 38 percent increase in Americans 65 years or older. Additionally, as of 2020, more than 1 in 6 Americans were 65 or older (Searing 2023).

<sup>2</sup> Occupations are broadly classified under 8 CFR 214.2(h)(4)(iii)(A) as “specialty occupations” that are considered to require highly specialized knowledge if they commonly require a bachelor’s degree or equivalent specialized training.



up to three years. The workers can then renew their H-1B visas for an additional three years, after which the worker must seek an alternative arrangement to continue U.S. employment.

To receive access to hire an H-1B worker, firms must apply with the Department of Labor via a Labor Condition Application (LCA). LCAs indicate that a firm intends to hire a worker in a specific job classification, with a specific job title, for a defined period of time, and at a specific worksite location. LCAs additionally require firms to certify that their employment offer complies with the requirements of the H-1B program, including the requirement that firms pay foreign workers the same prevailing wage as domestic workers.<sup>3</sup> If the Department of Labor certifies an LCA, the firm may then proceed to petition for an H-1B visa with the U.S. Citizenship and Immigration Services (USCIS).

The USCIS caps the number of H-1B visas available to domestic firms each federal fiscal year (i.e., October 1<sup>st</sup> through September 30<sup>th</sup>). Since 2004, the quota has been capped at 65,000 visas per fiscal year for specialized foreign workers, with an additional 20,000 visas available for individuals who hold a master's degree or Ph.D. (i.e., there are a total of 85,000 H-1B visas available each fiscal year). The USCIS begins to accept and process LCA applications on the first business day of April for the upcoming fiscal year. The USCIS processes the applications in the order that they were received until the year's quota is filled. In years where the quota of H-1B visas is not filled, the visas are granted to firms on a first-come, first-serve basis. In the years 2008, 2009, and every year since 2014, however, the quota of available visas was oversubscribed within the filing period and the cap was reached. When this happens, a computer-generated random lottery selects the workers that receive an H-1B visa in a two-phase process. First, the USCIS conducts a lottery to assign the 20,000 H-1B visas available to master's and Ph.D. degree holders. Second,

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<sup>3</sup> If a firm is found to be in violation of the LCA offer details after the H-1B worker begins employment, then they are subject to both civil and criminal penalties (USCIS 2022).

the USCIS pools all workers together, regardless of their advanced education, and conducts a second lottery to assign the remaining 65,000 visas. Consequently, with this process, individuals with more advanced education have a higher chance of receiving an H-1B visa given that they are entered in the second lottery if they are not selected in the first lottery.

Although H-1B visas are linked to specific employers, it is important to note that workers can transfer employers subject to USCIS approval. These transfers do not count against the H-1B visa quota and are not subject to the lottery, therefore, they require additional consideration in empirical studies exploiting the H-1B lottery process. In this study, we address the potential confounding effects of worker transfers by filtering the LCA data to consider only new workers following the procedures in Dimmock et al. (2022).

## ***2.2 Hypothesis Development***

The demand for foreign workers in a country is determined by the aggregate supply and demand for labor within specific occupations (Borjas 1989, 1994; Friedberg and Hunt 1995; Orrenius and Zavodny 2007). In the field of accounting, the aggregate demand for workers in the U.S. has historically exceeded the supply (Albrecht and Sack 2000; Mortimer 2003; Demski 2007; Madsen 2015), and recently, the issue has escalated to crisis levels (Wooldridge 2022; Maurer 2022; Ellis 2022; 2023). Thus, there is likely a high demand for foreign accounting workers in the U.S., and these workers have an opportunity to contribute to the success of U.S. companies.

We consider the potential impact of high-skilled foreign accounting workers on startup firms because startup firm growth and technological innovation are vital to the health of the U.S. economy (Schumpeter 1942; Kydland and Prescott 1982; Romer 1990; Greenwood and Jovanovic 1999; Gourio et al. 2016). Prior research shows that access to foreign workers with highly specialized knowledge can improve startup firm outcomes by contributing to their *technological*

*innovation* (Kerr and Lincoln 2010; Chen et al. 2021; Dimmock et al. 2022). The success of startups, however, requires not only workers to advance technological innovation but also workers with the *technical financial-accounting* skills necessary to bring the innovations to market (Kim and Ritter 1999; Demers and Joos 2007). Thus, we expect that startup firms that are given the opportunity by the USCIS to hire foreign workers with highly specialized knowledge in accounting will have improved outcomes. We use successful funding rounds and private market exits to proxy for successful startup firm outcomes following prior literature (Hochberg et al. 2007; Sorensen 2007; Kerr et al. 2014; Berstein et al. 2016; Dimmock et al. 2021). Using these measures, the reasoning above leads to our first hypothesis:

**H1:** *Startup firms given the opportunity to hire H-1B accounting workers are more likely to receive funding and are more likely to exit the private market.*

If the value of high-skilled foreign accounting workers stems from their ability to assist with accounting-intensive activities around startup milestones, then we expect that the demand for H-1B accounting workers and the quality of startup firms' financial reporting will vary in certain settings. Specifically, because initial public offerings are one of the most financial reporting-intensive activities that startup firms undertake, we expect that startup firms will demand foreign accounting workers at a higher rate in the years that immediately precede IPO events. Additionally, because high-skilled accounting workers can improve the quality of financial reports and aid market participants with the assimilation of firm information (Kim and Ritter 1999; Demers and Joos 2007; Kraus and Stromsten 2012), we expect IPO startup firms with access to H-1B accounting workers will have higher quality information environments. We use the quantity of LCA applications for accounting workers to proxy for startup firm demand for H-1B accounting

workers, and properties of analyst forecasts to proxy for the quality of the firms' information environments. The discussion above leads to the following predictions:

**H2:** *Startup firm applications for H-1B accounting workers are higher in the years directly leading up to an IPO event.*

**H3:** *Startup firms with access to hire H-1B accounting workers have lower post-IPO analyst forecast errors and dispersion.*

### 3. Data and Sample Selection

We collect data from several different sources. First, we obtain data on firms' H-1B worker applications (i.e., LCAs) from the Department of Labor.<sup>4</sup> These data describe firm requests for prospective foreign workers, including details on the hiring firms, job tasks, start and end dates, worksites, salaries, and the prevailing wages at each worksite. Additionally, the data include the status of each LCA (i.e., certified for further consideration by the USCIS, denied, or withdrawn).<sup>5</sup> Next, we obtain H-1B lottery result data from the USCIS, which provides details on how many H-1B workers each firm won in a given government fiscal year.<sup>6</sup> Finally, we obtain data on private start-up companies from Crunchbase. Crunchbase is a crowd-sourced database that tracks events related to start-up companies. As of the end of April 2022, the Crunchbase dataset covered more than 233,000 firms and more than 633,000 events, including investor and VC-backed funding rounds, acquisitions, and IPO events.

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<sup>4</sup> For detailed information on the LCA data, refer to the following website: <https://www.dol.gov/agencies/eta/foreign-labor/performance>.

<sup>5</sup> The denial rate for LCA applications is low in our sample, averaging approximately 3 percent across ten years. Following Dimmock et al. (2022), we exclude denied applications from our sample. In untabulated analyses, however, we note that our results are unchanged if denied applications are included in our sample and considered lottery losses.

<sup>6</sup> For detailed information on the USCIS lottery data, refer to the following website: <https://www.uscis.gov/tools/reports-and-studies/h-1b-employer-data-hub/h-1b-employer-data-hub-files>.

To construct our sample of firm-year observations, we limit the data to years where the USCIS allocated H-1B visas via a lottery. For purposes of our study, this gives us a sample period of government fiscal years 2008 and 2009, and then 2014 to 2021. We then follow Dimmock et al. (2022) and select Crunchbase firms that meet the following two criteria: (1) the firm is private as of the start of the government fiscal year, and (2) the firm completed at least one round of external financing with available dollar amount information. Lastly, we retain only firm-years where a firm applied for at least one H-1B worker.<sup>7</sup> This matching procedure provides us with 3,386 unique firms and 4,877 firm-year observations.

Table 1 reports the distribution of startup firm-years in our sample across government fiscal years (Panel A.1) and two-digit NAICS industries (Panel A.2). Results are reported for all firm-years in Column 1 and then for only firm years where startups applied for at least one accounting H-1B worker in Columns 2-4. Additionally, Table 1 Panel A.3 reports the distribution of startup firm-years in our sample by worker occupation. Because the unit of observation in our study is firm-years, but firms can apply for foreign workers from multiple occupations in a single firm-year, we report the summary statistics in Panel A.3 based on whether a firm applied for one or more H-1B visas in a firm-year (Columns 1 and 2) and the average number of visas (Column 3).

A key takeaway from Table 1 is that we find that 29.5 percent of startup firms that apply to hire at least one H-1B worker in a lottery year seek a worker to fill an accounting-related job. This is an exceptionally *broad* rate of demand relative to other occupations, ranking 2<sup>nd</sup> highest

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<sup>7</sup> During the first half of our sample period (i.e., years 2008, 2009, 2014, and 2015), the Department of Labor did not disclose whether an LCA was for new employment. Beginning in 2017, however, the LCA data includes an indicator for whether an LCA petition is for new employment or transferring employment. To address this data limitation in the first half of our sample, we follow the sample screening procedures in Dimmock et al. (2022) to capture new H-1B workers. Dimmock et al. (2022) perform robustness checks on their identification procedures by applying their screens to years after 2017 when the Department of Labor began providing an indicator for whether applications related to new employment. They found that their early-period screens accurately retained approximately 95 percent of new H-1B workers in their late-sample years. As such, we follow the same sampling screens in this study. For sample years 2017 and onward, however, we simply filter the LCA data using the provided indicator for new H-1B workers.

out of 97 occupations. While the overall *quantity* of H-1B workers demanded is higher for traditional STEM occupations (e.g., computer occupations, engineers, etc.), applications for these workers come from a narrower set of firms. High-skilled foreign accounting workers are, therefore, demanded more universally by startup firms, consistent with them providing an essential service that is necessary for accessing capital and/or exiting the private market.

#### 4. Research Design

To examine the effect of winning H-1B visa lotteries on startup firm outcomes, we estimate the following linear probability model:

$$Outcome = \beta_1 Win Rate + \beta_2 No. of H-1B Applications + \beta_3 Win Rate \times No. of H-1B Applications + \sum \beta_k Controls + Industry FE + Year FE + \varepsilon$$

where *Outcome* captures four different dependent variables, which we measure with indicators for whether one of the following startup outcomes occurs within three years of an H-1B lottery: (1) *Funded*, which equals one if a startup firm receives additional external financing from investors, zero otherwise; (2) *Successful Exit*, which equals one if a startup firm either has an IPO event or is acquired, zero otherwise; (3) *IPO*, which equals one if a startup firm has an IPO event, zero otherwise; and (4) *Acquired*, which equals one if a startup firm is acquired, zero otherwise.<sup>8</sup> *Win Rate* then captures the number of H-1B lottery wins for a firm-year divided by the total number of H-1B applications for a firm-year.<sup>9</sup> Additionally, *No. of H-1B Applications* captures the number

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<sup>8</sup> The three-year windows for our outcome variables begin in October, which is when the winners of the H-1B lotteries are eligible to work. Following Bernstein et al. (2016), we consider an acquisition to be a “successful exit” from the private market if the startup firm was acquired for at least \$25M, inflation-adjusted. Acquisitions made under this threshold often result in a loss to investors (Metrick and Yasuda 2011).

<sup>9</sup> Note that because the H-1B lottery results data only lists the number of visas won, we are unable to disentangle the accounting worker win rate from the overall win rate. However, because the number of applications for both sample sets are small in number, it is unlikely that the win rate for these startup firms would converge to the aggregate win rate due to the Law of Large Numbers.

of H-1B applications for a firm-year in three ways: (1) in total (*No. of Total H-1B Applications*), (2) for only accounting workers (*No. of Accounting H-1B Applications*), and (3) for only non-accounting workers (*No. of Non-Accounting H-1B Applications*). Our main variables of interest are the  $Win\ Rate \times No.\ of\ H-1B\ Applications$  interactions. We describe *Controls* below and provide variable definitions in Appendix A. In its alternative form, H1 predicts that  $\beta_3$  is positive when *No. of H-1B Applications* captures the number of H-1B applications for only accounting workers.

*Controls* consist of attributes shown by prior research to impact startup firm outcomes, which we measure as of March 31<sup>st</sup> each year to correspond to the timing of the H-1B visa lotteries (Dimmock et al. 2021). These attributes include the number of financing rounds that a startup firm has participated in (*No. of Prior Financing Rounds*), the amount of money raised (*Prior Amount Raised*), the length of time since a firm's first and last financing rounds [*(Months Since First Round)* and *(Months Since Last Round)*], and the average annual salary of the applicants sponsored by a firm (*Salary*). Additionally, we include industry- and year-fixed effects to absorb the influence of time-invariant industry-level omitted variables and economy-wide market conditions.

## 5. Empirical Results

### 5.1 Descriptive Statistics

Table 2 reports the descriptive statistics for our startup firm outcome measures, H-1B lottery measures, and control variables, in aggregate (Panel A) and then partitioned based on firm-years with lottery win rates in the top and bottom terciles of the sample (Panel B). Panel A shows that the average *Win Rate* for all firms in the sample is 34 percent and the average H-1B worker in our sample makes an annual salary of approximately \$87,190.<sup>10</sup> This salary leads to an average

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<sup>10</sup> The win rate for startup firms is similar to the 38 percent win rate for all firms (i.e., startup and non-startup firms) over our sample period (USCIS 2022).

salary over prevailing wage ratio (untabulated) of 1.15, which suggests that startup firms in our sample are willing to pay a premium for high-skilled foreign workers compared to their domestic counterparts. Additionally, in terms of other control variables, we see that the average startup firm in the sample previously completed 2.11 financing rounds, received a total of \$62.3M of financing, and concluded its first and last financing rounds approximately 99.5 and 55.4 months prior, respectively. Lastly, and importantly, in Panel B we see that firms with higher H-1B lottery win rates are more likely to receive funding and are more likely to successfully exist the private market. This evidence is consistent with the findings from Chen et al. (2021) and Dimmock et al. (2021) who show that, on average, H-1B visa lottery winners have improved startup outcomes. In this study, we extend these findings in our multivariate analyses by providing evidence on how a specific *type* of worker, accountants, contributes to these outcomes. Additionally, we provide evidence on how the *timing* of H-1B applications impacts startup firms' IPO outcomes and information environments.

### ***5.2.1 H-1B Accounting Workers and External Financing***

We first consider the impact of firms winning H-1B lotteries on their likelihood of receiving external funding in a three-year, post-lottery window. Table 3 presents our results with *Win Rate* interacted with the quantity of H-1B applications for all workers (Model 1), non-accounting workers (Model 2), and accounting workers (Model 3). Across models, we find only the coefficient on the accounting workers interaction is significant (p-value 0.02). This indicates that foreign accounting workers uniquely contribute to startup firms' funding success. Collectively, this evidence suggests that the *type* of foreign workers hired by startup firms impacts their success.



### 5.2.2 H-1B Accounting Workers and Successful Exits of the Private Market

Next, we consider three alternative firm-level outcomes: *Successful Exit*, *Acquired*, and *IPO*. Table 4 presents our results on the effect of firms winning workers in the H-1B lottery on their likelihood of successfully exiting the private market via an acquisition or IPO. Across all worker types, we find the coefficients on the *Win Rate* × *No. of H-1B Applications* interactions are positive and statistically significant at the 10 percent level. These results suggest that all types of foreign workers are involved in helping startup firms exit the market after an H-1B lottery. When we test across the coefficients on the interactions for accounting and non-accounting workers, however, we find that the coefficient on the accounting workers interaction is larger than the coefficient on the non-accounting workers interaction and the coefficients are statistically different at the 5 percent level. This result suggests that even though all types of foreign workers contribute to startup firms exiting the private market, accounting workers appear to help incrementally more than other workers. To investigate this result further, we break up the *Successful Exit* outcome to consider acquisition and IPO exits separately.

Table 5 presents the results for startup firms winning the H-1B lottery and their likelihood of being *acquired* in a three-year, post-lottery period. Similar to the previous tests, we find a positive and significant coefficient on the accounting worker interaction term (*p-value* 0.03), which suggests that accounting workers help startup firms become acquired. Interestingly, in models considering all worker types and non-accounting workers, we find significantly negative coefficients on the interaction term at the 5 percent level. This directional result suggests that besides accounting workers, other occupations actually discourage a successful acquisition for their startup. This evidence suggests that high-skilled foreign accountants uniquely contribute to the likelihood of a firm exiting the private market by becoming acquired.

Table 6 presents our results on the effect of startup firms winning foreign workers in an H-1B lottery and their likelihood of going public. Across models of all the worker types, we find statistically positive results at the 5 percent level and the economic magnitude of these results is significant. A one-standard deviation increase in the interaction term is associated with 1.00 to 4.22 percent increase in the probability of going public in the three-year post-lottery period for all workers. This result suggests that all types of foreign workers contribute to firms going public. When we test across the coefficients on the interactions for accounting and non-accounting workers, however, we find that the coefficient on the accounting workers interaction is larger than the coefficient on the non-accounting workers interaction and the coefficients are statistically different at the 5 percent level. This result suggests that even though all types of foreign workers contribute to startups going public, accounting workers appear to help significantly more than other types of workers.

In summary, the main analyses above provide evidence on the effect of winning accounting workers on various firm outcomes, which represent the cumulative effect of these workers through multiple channels. We provide evidence that winning the H-1B lottery directly increases the likelihood of a firm receiving external funding and successfully exiting the market through either an acquisition or IPO event. Further, this evidence indicates that accountants uniquely contribute to these outcomes beyond the contributions of workers from other occupations.

### ***5.2.3 Timing of Demand for H-1B Accounting Workers***

Because prior research suggests that accountants play a significant role in the years leading up to an IPO event (i.e., the years that startup firms form their prospectuses), we consider the composition of H-1B worker applications in the years leading up to startup firms going public. Specifically, we investigate whether there is a significant change in startup firm demand for high-

skilled foreign accounting workers in the years leading up to IPO events (Kraus and Stromsten 2012). To test for this possibility, we re-estimate Equation 1 with the number of H-1B applications for accounting and non-accounting workers as the dependent variables and with individual, lagged indicators for the years immediately preceding an IPO event as our variables of interest [i.e., *IPO (t-1)*, *IPO (t-2)*, and *IPO (t-3)*].

Table 7 presents the results from our IPO timing analyses. First, we see that, when we consider the applications of all workers and non-accounting workers, we find insignificant results. Thus, we fail to find evidence that startup firms change their overall hiring practices of high-skilled foreign workers in the years leading up to an IPO. When we only consider accounting H-1B applications, however, we find a statistically significant and positive coefficient on the year leading up to an IPO event at the 5 percent level. This evidence is consistent with startup firms having a higher need for accounting expertise as they create their prospectuses and assist market participants with price discovery (Kim and Ritter 1999; Demers and Joos 2007).

#### ***5.2.4 H-1B Accounting Workers and the Information Environments of Post-IPO Startups***

Next, we consider a plausible channel through which high-skilled foreign accounting workers may affect startup firm outcomes – enhanced communication with market participants. Prior research suggests that both accountants and analysts have an important role in the IPO process (Kraus and Stromsten 2012; Pisciotta 2023). Because startup firms are private and inherently have less proven business models, they have greater information asymmetry with market participants and greater uncertainty surrounding their financial operations (Brav and Gompers 2003). High-skilled accounting workers, however, can help market participants better understand startup firms by improving financial reporting quality, interacting with investors and analysts, and facilitating the assimilation of firm-specific information (Kim and Ritter 1999;

Demers and Joos 2007). Additionally, when analysts are assigned to an IPO event, Pisciotta (2023) finds that analysts have an incentive to accurately price the IPO to decrease their reputation risk and profit from the sale of initial stock trades from the IPO. This suggest that startup firms that are granted access to hire high-skilled foreign accounting workers should have higher quality post-IPO analyst forecasts.

To test this possibility, we use Compustat and our H-1B data to create a sample of all firms that went public over our sample period and that applied to hire an H-1B worker over the same period. We then match the Compustat data to I/B/E/S and calculate two analyst outcomes. First, we calculate the *Forecast Error*, which is the absolute difference in the year-end mean analyst forecast and a firm's actual earnings for the period, scaled by each firm's year-end stock price. Second, we calculate *Analyst Dispersion* as the standard deviation of analyst forecasts, scaled by each firm's year-end stock price. We regress these two analyst outcomes on the interactions between the firms' win rates and the number of accounting and non-accounting H-1B workers the firm applied for during the sample period. Additionally, we include controls for firm financial reporting quality in our models following prior research (Dechow, Ge, and Schrand 2010).

Table 8 presents the results. Models 1 and 2 report the results for our analyst forecast error tests and Models 3 and 4 report the results from our analyst forecast dispersion tests. Consistent with H-1B accountants providing higher quality financial reporting quality and assisting with the assimilation of firm information, we find a negative and statistically significant relationship ( $p$ -value < 0.05) between firms winning H-1B accounting workers and their analyst forecast errors and dispersion. Thus, while higher analyst workloads from IPO assignments may negatively impact analyst forecast quality (Pisciotta 2023), our results suggest that high-skilled foreign accounting workers within IPO firms appear to more than offset the impact. When we consider the

influence of non-accounting workers (Columns 2 and 4), however, the results are insignificant. This suggests that winning non-accounting foreign workers does not influence analyst forecast quality post-IPO.

## 6. Additional Analyses

Lastly, in additional analyses, we perform several tests to assess the sensitivity of our findings to different research designs and alternative explanations. First, we assess the possibility that H-1B lottery winners are not actually randomly assigned in our sample. The key identification assumption in our models is that *Win Rate* captures exogenous, random variation in a startup firm's access to hire high-skilled foreign labor. At a high level, this assumption appears to be reasonable as the winners of an H-1B lottery are assigned based on a computer-generated random lottery. However, there are issues that could affect the validity of the *Win Rate*. One potential issue is that the early years of our sample do not have an indicator for new H-1B workers, thus the filters used in our sample selection procedures might have measurement errors in the denominator of each firm's *Win Rate*. Because the USCIS provided an indicator for new H-1B employees in 2017 and all subsequent years, however, we use these years to test the construct validity of *Win Rate*. Specifically, we use the sample filters from our main analyses (i.e., LCA must be filed in February or March and the employment start date must be five to six months in the future) and apply them to all years that have an indicator for new employment to see if we are capturing only new H-1B workers. When we add the filters to the later sample years, we find that we retain 91 percent of all new workers.<sup>11</sup> Thus, the two data screens are reasonably effective in removing LCA's related to renewing or transferring H-1B employees while retaining LCA's for new hires. Second, the *Win*

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<sup>11</sup> This procedure is similar to the Dimmock et al. (2021) study where they find that their filters retain 93 percent of all new hires in later years.

*Rate* might not be truly exogenous if the variable is predictable using firm characteristics or information about the high-skilled foreign applicants. Following this logic and the procedures from Dimmock et al. (2021), we regress the *Win Rate* on our baseline set of firm characteristic control variables measured prior to each H-1B lottery. From this test, we fail to find significant coefficients on any of the control variables. This lack of results further support our assumption that *Win Rate* is randomly determined.

Second, we consider whether our findings are an artifact of ongoing trends that precede H-1B lotteries by performing placebo tests. Specifically, we re-estimate our main analyses considering both the pre- and post-lottery windows. Figure 1 plots the coefficients on *Win Rate* from these analyses. Figure 1 shows that firms that are winners in an H-1B lottery have a significantly higher chance at receiving funding from investors in the year directly following the lottery compared to firms that lose in a lottery. Additionally, firms that win an H-1B lottery also have a significantly higher chance of successfully exiting the private market (10 percent level) and going public through an IPO event (5 percent level). Importantly, we fail to find evidence of a pre-lottery trend across all three analyses. Collectively, these findings suggest that our main analyses are not driven by unmodeled ongoing trend in startup firm outcomes.

Third, we address the potential of structural issues with our sample by entropy balancing observations with high and low H-1B lottery win rates. Entropy balancing is a multivariate matching approach that weights each observation in a study such that the post-weighted mean, variance, and skewness properties of control variables are virtually identical across treatment and control groups, thereby ensuring covariate balance (e.g., Hainmueller 2012; McMullin and Schonberger 2018). In untabulated analyses, we estimate our main analyses with entropy balanced samples and continue to find that our results hold.

Finally, we address the potential that lower-skilled H-1B accounting workers are driving the results in our study by limiting our definition of high-skilled foreign accounting workers to either individuals with salaries in the top quartile of our sample or individuals with executive titles. In untabulated analyses, we continue to find that our results hold with across both alternative definitions of high-skilled foreign accounting workers.

## **7. Conclusion**

This study examines whether and how high-skilled foreign accounting workers provide value to U.S. startup firms. We use the H-1B visa setting where U.S. firms that apply for high-skilled foreign workers are randomly awarded access to hire the workers through a computer-generated lottery. We find that startup firms awarded access to high-skilled foreign accounting labor receive more external funding and are more likely to successfully exit the private market by either IPO or acquisition. Consistent with these workers aiding market participants in the assimilation of firm information, we find that startup firms demand high-skilled foreign accounting workers at a higher rate during the years they are preparing their prospectuses. Additionally, we find that startup firms awarded high-skilled foreign accounting workers are priced more accurately by analysts and have lower analyst forecast dispersion during their prospectus years. Collectively, these findings suggest that high-skilled foreign accounting workers aid startups in exiting the private sector and help facilitate information assimilation by the market.

Our study contributes to two streams of literature. First, our study contributes to the literature on the relationship between immigration and U.S. innovation. We consider the impact of access to H-1B visas for a specific *type* of foreign worker, accountants, and investigate the impact of these workers on the *business-side* of innovation. Our study provides evidence that the *types* of

workers awarded H-1B visas impact startup outcomes, and the *timing* of H-1B visa awards affect the ability of startups to go public. Second, our study contributes to the literature on the intersection of labor economics and accounting. Our study complements this work by showing how high-skilled foreign accounting workers provide value to U.S. startup firms. As the accounting profession struggles to find workers, we provide evidence of how a source of talent serves an economically important sector of the U.S. economy.



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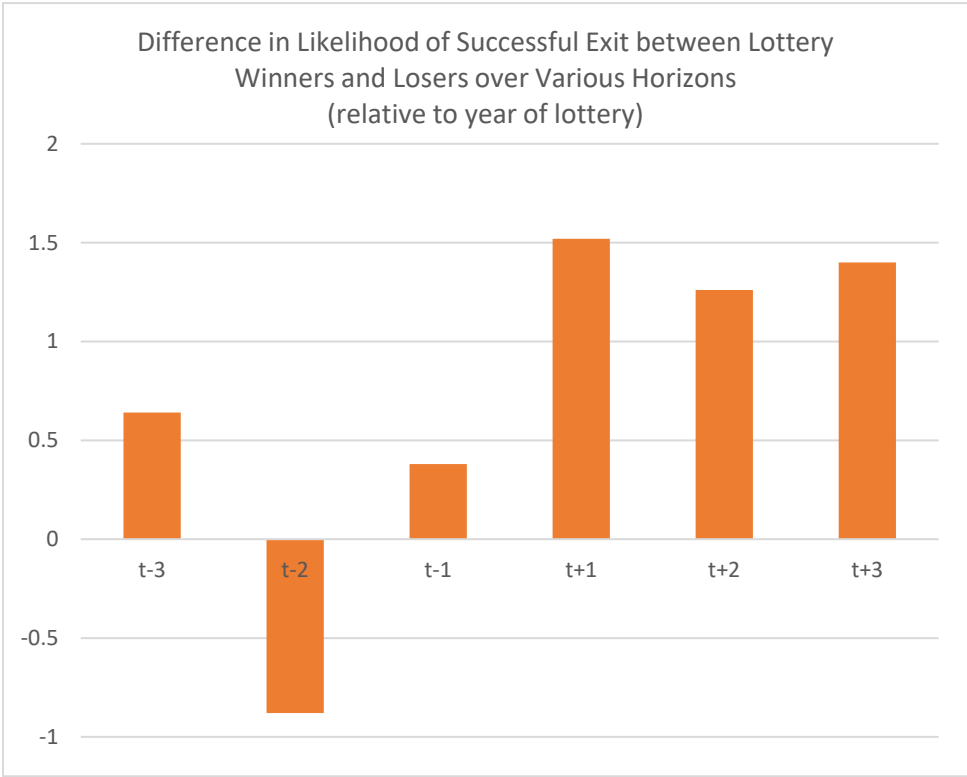
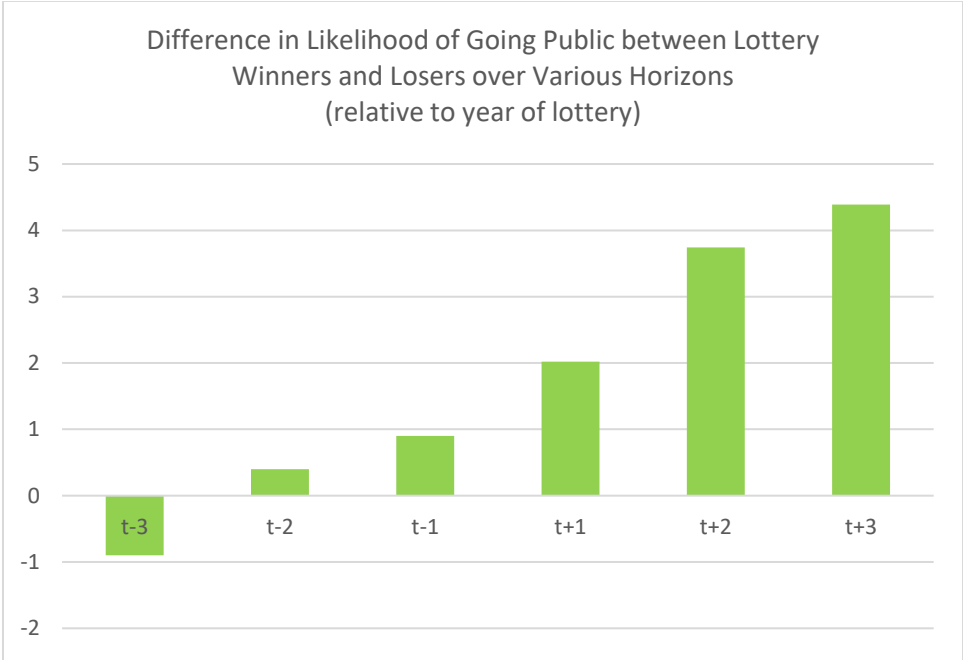
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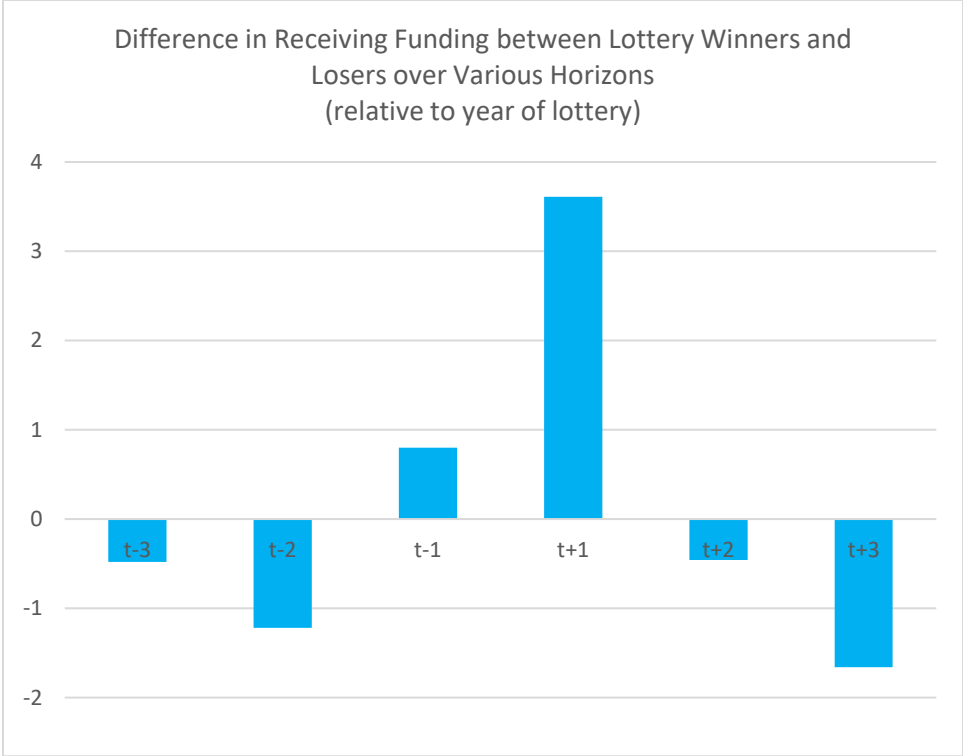
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**Appendix A**  
**Variable Definitions**

<i>Funded</i>	An indicator that equals 1 if a firm receives subsequent external funding in the three years following the lottery, and zero otherwise.
<i>Acquired</i>	An indicator that equals 1 if a firm is acquired for at least \$25 million (in 2008 inflation-adjusted dollars) in the three years following the lottery, and zero otherwise.
<i>Successful Exit</i>	An indicator variable that equals 1 if the firm goes public or is acquired for at least \$25 million (in inflation-adjusted dollars) in the three years following the lottery and zero otherwise.
<i>IPO</i>	An indicator variable that equals 1 if the firm goes public in the three years following the lottery and zero otherwise.
<i>Win Rate</i>	The number of H-1B visas a firm wins through the lottery in a year divided by the number of the firm's applications.
<i>No. of H-1B Applications</i>	The number of H-1B applicants filed on a Labor Condition Application by a firm in a year.
<i>No. of Accounting H-1B Applications</i>	The number of H-1B applicants filed by a firm for an accounting-related field (i.e. accounting/financial positions) on a Labor Condition Application in a year.
<i>Number of Prior Financing Rounds</i>	The number of funding rounds a firm receives before the lottery.
<i>Prior Amount Raised</i>	Total amount of funds raised before the lottery (in millions).
<i>Time Since First Round</i>	The number of months between the first round of funding and the lottery.
<i>Time Since Last Round</i>	The number of months between the most recent round of funding and the lottery.
<i>Salary</i>	The average annual salary of the applicants sponsored by a firm in a year.

**Figure 1: Differential Trends of Startup Success in Pre- and Post-Lottery Windows**





**Table 1: H-1B Visa Application Breakdown by Firm-Year**

**Panel A.1: H-1B Visa Applications by Year**

<b>Year</b>	<b>Firm-Years with One or More H-1B Visa Applications</b>	<b>Firm-Years with One or More <u>Accounting</u> H-1B Visa Applications</b>	<b>% of Firm-Years with One or More <u>Accounting</u> H-1B Visa Applications</b>	<b>Average Number of <u>Accounting</u> H-1B Visas Applied for by Year</b>
2008	659	229	34.7%	2.00
2009	712	245	34.4%	2.12
2014	390	164	42.1%	2.78
2015	403	173	42.9%	2.82
2016	415	174	41.9%	1.98
2017	439	183	41.7%	2.11
2018	446	194	43.5%	1.47
2019	444	158	35.6%	1.71
2020	454	156	34.4%	1.61
2021	515	128	24.9%	2.17
	<b>4,877</b>	<b>1,439</b>	<b>29.5%</b>	<b>2.07</b>

**Panel A.2: H-1B Visa Applications by Industry**

<b>Industry</b>	<b>Firm-Years with One or More H-1B Visa Applications</b>	<b>Firm-Years with One or More <u>Accounting</u> H-1B Visa Applications</b>	<b>% of Firm-Years with One or More <u>Accounting</u> H-1B Visa Applications</b>	<b>Average Number of <u>Accounting</u> H-1B Visas Applied for by Industry</b>
Mining	68	20	29.4%	2.36
Utilities	88	26	29.5%	2.50
Construction	76	20	26.3%	2.07
Manufacturing	829	183	22.1%	2.09
Wholesale Trade	129	49	38.0%	1.89
Retail Trade	275	45	16.4%	2.37
Transportation and Warehousing	86	27	31.4%	2.08
Information	632	215	34.0%	1.99
Finance and Insurance	238	70	29.4%	1.88
Real Estate Rental and Leasing	87	31	35.6%	2.40
Professional, Scientific, and Technical Svcs	1,639	509	31.1%	1.55
Management of Companies and Enterprises	68	18	26.5%	1.50
Admin, Support, Waste Mgmt, & Remediation Svcs	114	37	32.5%	1.88
Educational Services	139	63	45.3%	2.51
Health Care and Social Assistance	125	31	24.8%	2.41
Arts, Entertainment, and Recreation	70	26	37.1%	1.00
Accommodation and Food Services	71	25	35.2%	1.98
Other Services (except Public Administration)	75	21	28.0%	2.08
Public Administration	68	23	33.8%	2.33
	<b>4,877</b>	<b>1,439</b>	<b>29.5%</b>	<b>2.07</b>

**Panel A.3: H-1B Visa Applications by Job Title**

<b>Job Title</b>	<b>Firm-Years with One or More H-1B Visa Applications by Job Title</b>	<b>% of Firm-Years with One or More H-1B Visa Applications by Job Title</b>	<b>Average Number of H-1B Visas Applied for by Job Title</b>
Computer Occupations	1,726	35.4%	84.12
<b>Financial Specialists / Accountants</b>	<b>1,439</b>	<b>29.5%</b>	<b>2.07</b>
Engineers	198	4.1%	43.72
Mathematical Science Occupations	114	2.3%	51.74
Life Scientists	70	1.4%	64.07
Business Operations Specialists	57	1.2%	37.26
Other Sales and Related Workers	18	0.4%	90.00
Operations Specialties Managers	17	0.3%	66.06
Healthcare Diagnosing or Treating Practitioners	17	0.3%	59.35
Lawyers	15	0.3%	1.20

**Table 2: Descriptive Statistics**

**Panel A: Full Sample of Firm-Years**

Variables	N	Mean	S.D.	25%	Median	75%
<u>Startup Outcomes</u>						
<i>Funded</i> <sub>(t, t+2)</sub>	4,877	0.34	0.47	0.00	0.00	1.00
<i>Successful Exit</i> <sub>(t, t+2)</sub>	4,877	0.09	0.28	0.00	0.00	0.00
<i>Acquired</i> <sub>(t, t+2)</sub>	4,877	0.12	0.33	0.00	0.00	0.00
<i>IPO</i> <sub>(t, t+2)</sub>	4,877	0.06	0.18	0.00	0.00	0.00
<u>H-1B Lottery Variables</u>						
<i>No. of H-1B Applications</i>	4,877	6.58	14.57	1.00	2.00	5.00
<i>No. of Accounting H-1B Applications</i>	4,877	2.07	2.84	0.00	0.00	4.00
<i>Win Rate</i>	4,877	0.34	0.41	0.00	0.11	0.71
<u>Control Variables</u>						
<i>No. of Prior Financing Rounds</i>	4,877	2.11	2.27	0.00	1.00	3.00
<i>Prior Amount Raised</i>	4,877	62.30	16.40	0.00	11.00	50.50
<i>Months Since First Round</i>	4,877	99.50	76.20	39.00	83.00	145.00
<i>Months Since Last Round</i>	4,877	55.40	58.70	12.00	34.00	79.00
<i>Salary</i>	4,877	87,190	26,126	68,279	85,000	102,253

**Panel B: Subsamples of Firm-Years by Low and High Win Rates**

Variables	High Win Rate (Top Tercile)		Low Win Rate (Bottom Tercile)		t-stat for Diff.
	Mean	S.D.	Mean	S.D.	
<u>Startup Outcomes</u>					
<i>Funded</i> <sub>(t, t+2)</sub>	0.35	0.48	0.32	0.47	[2.38]**
<i>Successful Exit</i> <sub>(t, t+2)</sub>	0.10	0.30	0.07	0.25	[4.20]***
<i>Acquired</i> <sub>(t, t+2)</sub>	0.13	0.33	0.11	0.32	[1.59]
<i>IPO</i> <sub>(t, t+2)</sub>	0.06	0.21	0.03	0.16	[3.44]***
<u>Control Variables</u>					
<i>No. of Prior Financing Rounds</i>	2.22	2.32	2.04	2.20	[1.77]*
<i>Prior Amount Raised</i>	67.60	152.00	57.10	175.00	[0.57]
<i>Months Since First Round</i>	105.92	79.89	92.99	71.65	[3.07]***
<i>Months Since Last Round</i>	57.35	60.74	53.53	56.45	[1.52]
<i>Salary</i>	88,361	24,670	86,021	27,460	[1.48]

Panel A presents the descriptive statistics for the full sample of startup firms applying for at least one H-1B worker in a given fiscal year. Panel B presents the descriptive statistics with the sample partitioned by firms with high and low H-1B lottery win rates (top tercile vs. bottom tercile). The t-stats for the differences in means are reported in the last column. Variable Definitions: *Funded*<sub>(t,t+2)</sub> is an indicator that equals 1 if a firm receives subsequent external funding in the three years following the lottery, and zero otherwise. *Successful Exit*<sub>(t,t+2)</sub> is an indicator variable that equals 1 if the firm goes public or is acquired for at least \$25 million (in 2008 inflation-adjusted dollars) in the three years following the lottery, and zero otherwise. *Acquired*<sub>(t,t+2)</sub> is an indicator variable that equals 1 if the firm gets acquired for at least \$25 million (in 2008 inflation-adjusted dollars) in the three years following the lottery, and zero otherwise. *IPO*<sub>(t,t+2)</sub> is an indicator variable that equals 1 if the firm goes public in the three years following the lottery, and zero otherwise. *No. of H-1B Applications* is the total number of H-1B applicants filed on a Labor Condition Application by a firm in a fiscal year. *No. of Accounting H-1B Applications* is the number of H-1B applicants in an accounting-related field (i.e. accounting/financial positions) filed on a Labor Condition Application by a firm in a fiscal year. *Win Rate* is the number of H-1B visas a firm wins through the lottery in a fiscal year divided by the number of the firm's applications. *No. of Prior Financing Rounds* is the number of funding rounds a firm receives before the lottery. *Prior Amount Raised* is the total amount of funds raised before the lottery. *Months Since First Round* is the number of months between the first round of funding and the lottery. *Months Since Last Round* is the number of months between the most recent round of funding and the lottery. *Salary* is the average annual salary of the applicants sponsored by a firm in a fiscal year. \*, \*\*, \*\*\* Indicate the difference in means is statistically significant at the 10, 5, and 1 percent levels using two-tailed tests.



**Table 3: H-1B Lottery Win Rate and the Probability of Receiving Subsequent Funding**

$$\text{Model: } Funded_{(t, t+2)} = \beta_1 \text{Win Rate} + \beta_2 \text{No. of H-1B Applications} + \beta_3 \text{Win Rate} \times \text{No. of H-1B Applications} + \sum \beta_k \text{Controls} + \text{Industry FE} + \text{Year FE} + \varepsilon$$

	<b>Pred.</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<i>Win Rate</i>		0.0384 ** (0.02)	0.0421 *** (0.01)	0.0403 *** (0.01)	0.0455 *** (0.00)
<i>No. of Total H-1B Applications</i>		-0.0340 *** (0.00)			
<i>Win Rate × No. of Total H-1B applications</i>		<b>0.0139</b> <b>(0.34)</b>			
<i>No. of Non-Accounting H-1B Applications</i>			-0.0273 *** (0.00)		-0.0008 (0.11)
<i>Win Rate × No. of Non-Accounting H-1B Applications</i>			<b>0.0071</b> <b>(0.39)</b>		<b>0.0004</b> <b>(0.41)</b>
<i>No. of Accounting H-1B Applications</i>				-0.0235 (0.09)	-0.0003 (0.43)
<i>Win Rate × No. of Accounting H-1B Applications</i>	(+)			<b>0.0231</b> ** <b>(0.02)</b>	<b>0.0238</b> *** <b>(0.01)</b>
<i>No. Prior Financing Rounds</i>		0.1560 *** (0.00)	0.1570 *** (0.00)	0.1600 *** (0.00)	-0.0083 *** (0.00)
<i>Prior Amount Raised</i>		-0.0031 (0.86)	-0.0053 (0.76)	-0.0058 (0.74)	0.1600 *** (0.00)
<i>Months Since First Round</i>		-0.0772 *** (0.00)	-0.0758 *** (0.00)	-0.0773 *** (0.00)	-0.0041 (0.48)
<i>Months Since Last Round</i>		0.0862 *** (0.00)	0.0854 *** (0.00)	0.0751 *** (0.00)	-0.0777 *** (0.00)
<i>Salary</i>		-0.0084 *** (0.00)	-0.0078 *** (0.00)	-0.0080 *** (0.00)	0.0799 *** (0.00)
Industry F.E.		Yes	Yes	Yes	Yes
Year F.E.		Yes	Yes	Yes	Yes
R-Squared		0.118	0.118	0.117	0.119
Number of Observations		4,877	4,877	4,877	4,877

The dependent variable is  $Funded_{(t, t+2)}$ , an indicator that equals 1 if a firm receives subsequent external funding in the three years following the H-1B lottery, and zero otherwise. *Win Rate* is the number of H-1B visas a firm wins through the lottery in a fiscal year divided by the number of applications. *No. of Total H-1B Applications* is the total number of H-1B applicants filed on a Labor Condition Application by a firm in a fiscal year. *No. of Non-Accounting H-1B Applications* is the number of H-1B applicants in a non-accounting field filed on a Labor Condition Application by a firm in a fiscal year. *No. of Accounting H-1B Applications* is the number of H-1B applicants in an accounting-related field (i.e. accounting/financial positions) filed on a Labor Condition Application by a firm in a fiscal year. See Appendix A for additional variable definitions. \*, \*\*, \*\*\* Indicate the estimated coefficient is statistically significant at the 10, 5, and 1 percent levels, respectively, using a one-tailed test when a prediction is indicated and a two-tailed test otherwise. Continuous variables are demeaned for ease of interpretation. Standard errors are clustered by firm.

**Table 4: H-1B Lottery Win Rate and the Probability of a Successful Exit**

**Model:**  $Successful\ Exit_{(t,t+2)} = \beta_1 Win\ Rate + \beta_2 No.\ of\ H-1B\ Applications + \beta_3 Win\ Rate \times No.\ of\ H-1B\ Applications + \sum \beta_k Controls + Industry\ FE + Year\ FE + \varepsilon$

	<b>Pred.</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<i>Win Rate</i>		-0.0280 (0.10)	-0.0069 (0.30)	0.0066 (0.29)	-0.0026 (0.42)
<i>No. of Total H-1B Applications</i>		-0.0007 (0.45)			
<i>Win Rate × No. of Total H-1B applications</i>		<b>0.0391</b> * <b>(0.06)</b>			
<i>No. of Non-Accounting H-1B Applications</i>			0.0009 (0.44)		0.0081 (0.12)
<i>Win Rate × No. of Non-Accounting H-1B Applications</i>			<b>0.0273</b> * <b>(0.08)</b>		<b>0.0058</b> <b>(0.36)</b>
<i>No. of Accounting H-1B Applications</i>				-0.0350 *** (0.00)	-0.0439 *** (0.00)
<i>Win Rate × No. of Accounting H-1B Applications</i>	(+)			<b>0.176</b> *** <b>(0.01)</b>	<b>0.1710</b> ** <b>(0.02)</b>
<i>No. Prior Financing Rounds</i>		0.0071 (0.75)	0.0032 (0.88)	0.0033 (0.88)	0.0016 (0.47)
<i>Prior Amount Raised</i>		0.0172 *** (0.00)	0.0174 *** (0.00)	0.0182 *** (0.00)	0.0176 *** (0.00)
<i>Months Since First Round</i>		0.0123 (0.36)	0.0136 (0.32)	0.0140 (0.30)	0.0144 (0.15)
<i>Months Since Last Round</i>		-0.0148 (0.15)	-0.0161 (0.12)	-0.0152 (0.14)	-0.0166 * (0.06)
<i>Salary</i>		0.0186 (0.38)	0.0226 (0.30)	0.0215 (0.31)	0.0217 (0.16)
<i>Industry F.E.</i>		Yes	Yes	Yes	Yes
<i>Year F.E.</i>		Yes	Yes	Yes	Yes
<i>R-Squared</i>		<b>0.046</b>	<b>0.046</b>	<b>0.045</b>	<b>0.049</b>
<i>Number of Observations</i>		4,877	4,877	4,877	4,877

The dependent variable is  $Successful\ Exit_{(t,t+2)}$ , an indicator that equals 1 if a firm successfully exits the private market via acquisition of IPO in the three years following the lottery, and zero otherwise. *Win Rate* is the number of H-1B visas a firm wins through the lottery in a fiscal year divided by the number of applications. *No. of Total H-1B Applications* is the total number of H-1B applicants filed on a Labor Condition Application by a firm in a fiscal year. *No. of Non-Accounting H-1B Applications* is the number of H-1B applicants in a non-accounting field filed on a Labor Condition Application by a firm in a fiscal year. *No. of Accounting H-1B Applications* is the number of H-1B applicants in an accounting-related field (i.e. accounting/financial positions) filed on a Labor Condition Application by a firm in a fiscal year. See Appendix A for additional variable definitions. \*, \*\*, \*\*\* Indicate the estimated coefficient is statistically significant at the 10, 5, and 1 percent levels, respectively, using a one-tailed test when a prediction is indicated and a two-tailed test otherwise. Continuous variables are demeaned for ease of interpretation. Standard errors are clustered by firm.

**Table 5: H-1B Lottery Win Rate and the Probability of Being Acquired**

$$\text{Model: } Acquired_{(t, t+2)} = \beta_1 \text{Win Rate} + \beta_2 \text{No. of H-1B Applications} + \beta_3 \text{Win Rate} \times \text{No. of H-1B Applications} + \sum \beta_k \text{Controls} + \text{Industry FE} + \text{Year FE} + \varepsilon$$

	<b>Pred.</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<i>Win Rate</i>		0.0081 (0.20)	0.0067 (0.51)	0.0013 (0.44)	0.0045 (0.32)
<i>No. of Total H-1B Applications</i>		0.0041 (0.24)			
<i>Win Rate</i> × <i>No. of Total H-1B applications</i>		<b>-0.0031</b> ** (0.04)			
<i>No. of Non-Accounting H-1B Applications</i>			0.0044 (0.17)		0.0098 * (0.03)
<i>Win Rate</i> × <i>No. of Non-Accounting H-1B Applications</i>			<b>-0.0032</b> ** (0.03)		<b>-0.0040</b> *** (0.00)
<i>No. of Accounting H-1B Applications</i>				-0.0278 *** (0.00)	-0.0387 *** (0.00)
<i>Win Rate</i> × <i>No. of Accounting H-1B Applications</i>	(+)			<b>0.0052</b> ** (0.03)	<b>0.0075</b> ** (0.04)
<i>No. Prior Financing Rounds</i>		-0.0029 (0.85)	-0.0047 (0.76)	-0.0067 (0.66)	-0.0084 (0.29)
<i>Prior Amount Raised</i>		0.0086 *** (0.00)	0.0081 *** (0.00)	0.0094 *** (0.00)	0.0085 *** (0.00)
<i>Months Since First Round</i>		0.0043 (0.61)	0.0052 (0.55)	0.0053 (0.53)	0.0065 (0.22)
<i>Months Since Last Round</i>		-0.0005 (0.92)	-0.0018 (0.77)	-0.0006 (0.92)	-0.0025 (0.35)
<i>Salary</i>		0.0254 (0.13)	0.0306 * (0.07)	0.0273 (0.11)	0.0307 ** (0.03)
Industry F.E.		Yes	Yes	Yes	Yes
Year F.E.		Yes	Yes	Yes	Yes
R-Squared		0.028	0.028	0.029	0.032
Number of Observations		4,877	4,877	4,877	4,877

The dependent variable is  $Acquired_{(t, t+2)}$ , an indicator that equals 1 if a firm is acquired for at least \$25M (inflation-adjusted) in the three years following the H-1B lottery, and zero otherwise. *Win Rate* is the number of H-1B visas a firm wins through the lottery in a fiscal year divided by the number of applications. *No. of Total H-1B Applications* is the total number of H-1B applicants filed on a Labor Condition Application by a firm in a fiscal year. *No. of Non-Accounting H-1B Applications* is the number of H-1B applicants in a non-accounting field filed on a Labor Condition Application by a firm in a fiscal year. *No. of Accounting H-1B Applications* is the number of H-1B applicants in an accounting-related field (i.e. accounting/financial positions) filed on a Labor Condition Application by a firm in a fiscal year. See Appendix A for additional variable definitions. \*, \*\*, \*\*\* Indicate the estimated coefficient is statistically significant at the 10, 5, and 1 percent levels, respectively, using a one-tailed test when a prediction is indicated and a two-tailed test otherwise. Continuous variables are demeaned for ease of interpretation. Standard errors are clustered by firm.

**Table 6: H-1B Lottery Win Rate and the Probability of IPO**

$$\text{Model: } IPO_{(t,t+2)} = \beta_1 \text{Win Rate} + \beta_2 \text{No. of H-1B Applications} + \beta_3 \text{Win Rate} \times \text{No. of H-1B Applications} + \sum \beta_k \text{Controls} + \text{Industry FE} + \text{Year FE} + \varepsilon$$

	<b>Pred.</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<i>Win Rate</i>		-0.0295 (0.04)	-0.0092 (0.14)	0.0045 (0.27)	-0.0062 (0.23)
<i>No. of Total H-1B Applications</i>		-0.0010 (0.41)			
<i>Win Rate</i> × <i>No. of Total H-1B applications</i>		<b>0.0475</b> ** (0.02)			
<i>No. of Non-Accounting H-1B Applications</i>			-0.0011 (0.39)		-0.0003 (0.47)
<i>Win Rate</i> × <i>No. of Non-Accounting H-1B Applications</i>			<b>0.0359</b> ** (0.03)		<b>0.0176</b> (0.12)
<i>No. of Accounting H-1B Applications</i>				-0.0086 (0.20)	-0.0081 (0.24)
<i>Win Rate</i> × <i>No. of Accounting H-1B Applications</i>	(+)			<b>0.1846</b> *** (0.01)	<b>0.1760</b> ** (0.02)
<i>No. Prior Financing Rounds</i>		0.0075 (0.65)	0.0053 (0.75)	0.0084 (0.61)	0.0077 (0.32)
<i>Prior Amount Raised</i>		0.0091 *** (0.00)	0.0098 *** (0.00)	0.0092 *** (0.00)	0.0096 *** (0.00)
<i>Months Since First Round</i>		0.0091 (0.41)	0.0096 (0.40)	0.0092 (0.41)	0.0088 (0.21)
<i>Months Since Last Round</i>		-0.0152 * (0.06)	-0.0152 * (0.08)	-0.0151 * (0.07)	-0.0150 ** (0.03)
<i>Salary</i>		-0.0059 (0.68)	-0.0070 (0.64)	-0.0049 (0.73)	-0.0076 (0.30)
Industry F.E.		Yes	Yes	Yes	Yes
Year F.E.		Yes	Yes	Yes	Yes
R-Squared		0.042	0.042	0.038	0.043
Number of Observations		4,877	4,877	4,877	4,877

The dependent variable is  $IPO_{(t,t+2)}$ , an indicator that equals 1 if a firm exits the private market via IPO in the three years following the lottery, and zero otherwise. *Win Rate* is the number of H-1B visas a firm wins through the lottery in a fiscal year divided by the number of applications. *No. of Total H-1B Applications* is the total number of H-1B applicants filed on a Labor Condition Application by a firm in a fiscal year. *No. of Non-Accounting H-1B Applications* is the number of H-1B applicants in a non-accounting field filed on a Labor Condition Application by a firm in a fiscal year. *No. of Accounting H-1B Applications* is the number of H-1B applicants in an accounting-related field (i.e. accounting/financial positions) filed on a Labor Condition Application by a firm in a fiscal year. See Appendix A for additional variable definitions. \*, \*\*, \*\*\* Indicate the estimated coefficient is statistically significant at the 10, 5, and 1 percent levels, respectively, using a one-tailed test when a prediction is indicated and a two-tailed test otherwise. Continuous variables are demeaned for ease of interpretation. Standard errors are clustered by firm.

**Table 7: H-1B Worker Applications in Years Leading up to IPO**

**Model:**  $No. \text{ of } H-1B \text{ Applications}_t = \beta_1 IPO_{(t-1)} + \beta_2 IPO_{(t-2)} + \beta_3 IPO_{(t-3)} + \sum \beta_k Controls + \text{Industry FE} + \text{Year FE} + \varepsilon$

	<i>No. of Total H-1B Applications<sub>t</sub></i>	<i>No. of Non-Accounting H-1B Applications<sub>t</sub></i>	<i>No. of Accounting H-1B Applications<sub>t</sub></i>
	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>
<i>IPO<sub>(t-1)</sub></i>	3.0711 (0.17)	2.6321 (0.20)	<b>0.4400 **</b> <b>(0.01)</b>
<i>IPO<sub>(t-2)</sub></i>	5.1020 (0.12)	5.1913 (0.11)	-0.0880 (0.28)
<i>IPO<sub>(t-3)</sub></i>	4.2170 (0.19)	4.3904 (0.18)	-0.1750 (0.16)
Controls	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes
Year F.E.	Yes	Yes	Yes
R-Squared	0.142	0.140	0.081
Number of Observations	4,877	4,877	4,877

The dependent variable is *No. of H-1B Applications*, which is measured in three different ways. *No. of Total H-1B Applications* is the total number of H-1B applicants filed on a Labor Condition Application by a firm in a fiscal year. *No. of Non-Accounting H-1B Applications* is the number of H-1B applicants in a non-accounting field filed on a Labor Condition Application by a firm in a fiscal year. *No. of Accounting H-1B Applications* is the number of H-1B applicants in an accounting-related field (i.e. accounting/financial positions) filed on a Labor Condition Application by a firm in a fiscal year. *IPO<sub>(t-1)</sub>*, *IPO<sub>(t-2)</sub>*, and *IPO<sub>(t-3)</sub>* are indicators that equal 1 if a firm exits the private market via IPO in one, two, and three years following the lottery, and zero otherwise. See Appendix A for additional variable definitions. \*, \*\*, \*\*\* Indicate the estimated coefficient is statistically significant at the 10, 5, and 1 percent levels, respectively, using two-tailed tests. Continuous variables are demeaned for ease of interpretation. Standard errors are clustered by firm.

**Table 8: Successful IPOs and Analyst Forecasts**

**Model:**  $\text{Analyst Forecast Outcomes} = \beta_1 \text{Win Rate} + \beta_2 \text{No. of H-1B Applications} + \beta_3 \text{Win Rate} \times \text{No. of H-1B Applications} + \sum \beta_k \text{Controls} + \text{Industry FE} + \text{Year FE} + \varepsilon$

	Pred.	Forecast Error		Forecast Dispersion	
		Model 1	Model 2	Model 3	Model 4
<i>Win Rate</i>		-0.3311 (0.21)	-0.3350 (0.40)	-0.0627 *** (0.00)	-0.0162 (0.51)
<i>No. of Non-Accounting H-1B Applications</i>		0.3521 ** (0.02)		0.0239 ** (0.02)	
<i>Win Rate × No. of Non-Accounting H-1B Applications</i>		<b>-0.3041</b> <b>(0.35)</b>		<b>0.0665</b> ** <b>(0.02)</b>	
<i>No. of Accounting H-1B Applications</i>			0.6000 ** (0.01)		0.0388 ** (0.02)
<i>Win Rate × No. of Accounting H-1B Applications</i>	(-)		<b>-0.8061</b> *** <b>(0.00)</b>		<b>-0.0114</b> ** <b>(0.02)</b>
<i>No. of Analysts</i>		-0.0088 (0.54)	-0.0088 (0.54)	-0.0005 (0.58)	-0.0005 (0.58)
<i>Big N Auditor</i>		0.6511 (0.38)	1.4671 (0.00)	-0.0953 ** (0.04)	0.0219 (0.34)
<i>Size</i>		0.0437 (0.36)	0.0477 (0.36)	0.0032 (0.33)	0.0042 (0.24)
<i>ROA</i>		1.5221 ** (0.02)	1.5222 ** (0.02)	0.0981 ** (0.02)	0.0981 ** (0.02)
<i>CFO</i>		-3.6390 *** (0.00)	-3.6393 *** (0.00)	-0.2341 ** (0.02)	-0.2340 ** (0.02)
<i>Altman Z-Score</i>		0.0000 (0.11)	0.0000 (0.11)	0.0000 (0.23)	0.0000 (0.23)
<i>Leverage</i>		0.2100 (0.14)	0.1412 ** (0.02)	0.0399 *** (0.00)	0.0113 *** (0.00)
<i>MTB</i>		-0.0111 * (0.08)	-0.0148 ** (0.02)	0.0011 ** (0.02)	-0.0008 ** (0.04)
<i>CapEx</i>		7.3820 ** (0.04)	7.3821 ** (0.04)	0.3671 * (0.06)	0.3670 * (0.06)
<i>Litigation Risk</i>		1.0481 *** (0.00)	0.4394 ** (0.02)	0.0710 *** (0.00)	0.0352 *** (0.00)
<i>Standard Deviation of Earnings</i>		0.0020 (0.69)	0.0015 (0.28)	-0.0008 ** (0.04)	0.0000 (0.85)
Industry F.E.		Yes	Yes	Yes	Yes
Year F.E.		Yes	Yes	Yes	Yes
R-Squared		0.462	0.407	0.462	0.453
Number of Observations		1,434	1,434	1,434	1,434

The dependent variables are *Forecast Error* and *Forecast Dispersion*. *Forecast Error* is the absolute difference in the year-end consensus mean analyst forecast and a firm's actual earnings for the period, scaled by each firm's year-end stock price. *Forecast Dispersion* is the standard deviation of analyst forecasts, scaled by each firm's year-end stock price. *Win Rate* is the number of H-1B visas a firm wins through the lottery in a fiscal year divided by the number of applications. *No. of Total H-1B Applications* is the total number of H-1B applicants filed on a Labor Condition Application by a firm in a fiscal year. *No. of Non-Accounting H-1B Applications* is the number of H-1B applicants in a non-accounting field filed on a Labor Condition Application by a firm in a fiscal year. *No. of Accounting H-1B Applications* is the number of H-1B applicants in an accounting-related field (i.e. accounting/financial positions) filed on a Labor Condition Application by a firm in a fiscal year. See Appendix A for additional variable definitions. \*, \*\*, \*\*\* Indicate the estimated coefficient is statistically significant at the 10, 5, and 1 percent levels, respectively, using a one-tailed test when a prediction is indicated and a two-tailed test otherwise. Continuous variables are demeaned for ease of interpretation. Standard errors are clustered by firm.