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 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. 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.

Keywords: H-1B Lottery, Foreign Labor, Startup Firms, Political Economy.
JEL Classification Codes: J15; J61; K37; M41; M48.

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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, Hshieh, 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 (Kraus and Stromsten 2012; Shroff, Sun, White, and Zhang 2013). Unfortunately, U.S. workers with technical financial-accounting skills are scarce. Indeed, demand for accounting workers in the U.S. has historically outpaced supply (Mortimer 2003, Demski 2007, AICPA 2013, Madsen 2015), and a recent shortage of domestic accounting workers has elevated the issue to crisis levels (Ellis 2022; 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 all other occupations.

If high-skilled foreign accounting workers provide value to U.S. startup firms, acting as complements to scarce domestic accounting labor (Aobdia, Srivastava, and Wang 2018), 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. Further, if a key reason 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 should demand foreign accounting workers at a higher rate in the years that immediately precede their initial public offerings. We test for both of 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 from 2008 to 2021. Because H-1B lottery win rate 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 2.0 H-1B workers in a year, however, the aggregate lottery win rate for a firm-year appears to provide a close proxy for individual H-1B 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 2nd 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 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 affect 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 high-skilled foreign accounting workers at a higher rate in the years immediately preceding an initial public offering. This finding regarding 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 contribute to startup firms' technical innovation (Kerr and Lincoln 2010; Chen et al. 2021; Dimmock et al. 2021), the timing of startup firms' demand for different *types* of H-1B workers varies across their 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 firms-specific information (Kraus and Stromsten 2012). 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 applied to hire foreign accounting workers and that had higher H-1B lottery win rates were 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. 2021). 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 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 individuals with salaries in the top quartile of our sample. 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, Messer, and Siemer 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. 2021). 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. policy makers 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 affects startup outcomes, and the *timing* of H-1B visa awards affects the ability of startups to go public.

Second, our study contributes to the literature on the intersection of labor economics and accounting. Specific to our study on immigration and accounting, studies examines 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 accounting 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).[1] 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 Information

The H-1B visa program is available to U.S. firms to temporarily hire educated (i.e., bachelor's degree or higher) foreign workers in occupations that require highly specialized knowledge. H-1B visas grant permission to foreign workers to enter the United States and work for domestic firms for an initial period of up to three years. The H-1B visas then can be renewed

[1] The severity of the accounting labor shortage may possibly worsen in the coming years as the age of the U.S. population rises. 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).

for an additional three years, after which the worker and the firm must seek an alternative arrangement for the worker to continue 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.[2] If the Department of Labor certifies the 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 1st through September 30th). Since 2004, the quota has been capped at 65,000 visas per fiscal year for specialized foreign workers, and at 20,000 visas for individuals who hold a master's degree or PhD (i.e., there is a total of 85,000 H-1B visas available each year). Firms may file LCAs up to six months before an employment starting date and the applications typically take a week to process. The USCIS begins to process the applications during the H-1B filing period (April 1st through April 5th of each year) and continues to process them 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 will receive an H-1B visa in a two-phase process. First, the USCIS conducts a lottery to assign

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

the 20,000 H-1B visas available to master's and PhD degree holders. Second, the USCIS pools all workers together, regardless of their advanced educations, 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 would be entered in the second lottery if they were not selected in the first lottery.

It is important to note one potential limitation of H-1B studies. Although H-1B visas are linked to specific employers, workers can change employers subject to USCIS approval. These transfers do not count against the H-1B visa quota and are not subject to the lottery. Prior research on the economic significance of these transfers is mixed. On the one hand, Hunt and Xie (2019) find that 13.7 percent of H-1B workers change employers over a two-year period, concluding that H-1B workers enjoy similar job mobility as domestic workers. On the other hand, Wang (2021) finds that job changes increase only after H-1B workers achieve permanent residency through firm sponsorship, suggesting that employers enjoy some power to retain their foreign workers during the years the H-1B visa is considered active. In this study, we filter the LCA data to consider only new workers that have not transferred employers. These filters are in line with those used in Dimmock et al. (2021) and are discussed further in Section 3.

3. Data and Sample Selection

We collect data for our sample from several different sources. First, we obtain data on firms' H-1B worker applications (i.e., LCAs) from the Department of Labor.[3] 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

[3] For detailed information on the LCA data, refer to the following website: https://www.dol.gov/agencies/eta/foreign-labor/performance.

data include the status of each LCA (i.e., certified for further consideration by the USCIS, denied, or withdrawn).[4]

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 fiscal year.[5] It is important to note that this H-1B win data lists the lottery results at the *firm* level instead of the *H-1B application* level. This is a common limitation in H-1B studies (e.g., Dimmock et al. 2021).

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 data set covered more than 233,000 firms and more than 633,000 events, including investor and VC-backed funding rounds, acquisitions, and IPO events. The Crunchbase data include firm names, addresses, NAICS industry codes, and financial information on key startup events.

To construct our sample of firm-year observations, we limit the data to only 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 year 2008-2009, and then 2014 to 2021. We then follow Dimmock et al. (2022) and begin with a set of 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. Next, we use the reported startup firm names and addresses in Crunchbase to match firms with the H-1B data. We then retain

[4] 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.

[5] 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.

only firms that applied for at least one H-1B worker.[6] 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 industries (Panel B.1). Results are reported for all firm-years in Column 1 and then for only firm years where startups applied for at least one accounting worker in Columns 2-4. Additionally, Table 1 Panel A.3 reports the distribution of startup firm-years in our sample by worker occupation. Panel A.3, Columns 2-4 then report the frequency of H-1B visa applications by each respective 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 based on whether a firm applied for one or more H-1B visas in a firm-year.

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 2nd 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.

[6] 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 93 to 95.7 percent of new H-1B workers in their late-sample years. As such, we follow the same sampling screens in this study. Additionally, for sample years 2017 and on, we simply filter the LCA data using the provided indicator for new H-1B workers.

4. Research Design

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

$$Outcome = \beta_0 + \beta_1 \text{Win Rate} + \beta_2 \textit{\# of H-1B Applications} + \beta_3 \textit{Win Rate} \times \textit{\# of H-1B Applications} + \sum \beta_k \text{Controls} + \varepsilon$$

where *Outcome* captures four different dependent variables, which are measured as 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.[7] *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.[8] Additionally, *# of H-1B Applications* capture the number of H-1B application for a firm-year in total *(# of Total H-1B applications*), for only accounting workers (*# of Accounting H-1B applications*), and for only non-accounting workers (*# of Non-Accounting H-1B applications*). Our main variable of interest is the *Win Rate*×*# of H-1B Applications* interaction. We describe Controls below and provide variable definitions in Appendix A. In

[7] 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. We define a successful acquisition (*Acquired*) following prior literature. In order for an acquisition to be considered a "successful exit" from the private market, the firm must have been acquired for at least $25M, inflation adjusted (Bernstein et al. 2016). Acquisitions made under this threshold often result in a loss to investors (Metrick and Yasuda 2011).

[8] 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.

alternative form, we predict that β_3 is positive when *# 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, measured as of March 31st each year, directly prior to each H-1B visa lottery (Dimmock et al. 2021). These attributes include the number of financing rounds that a startup firm has participated in [*log (number rounds financing)*], the amount of money raised [*log(amount raised prior)*], the length of time since a firm's first and last financing rounds [*log(months since first round)* and *log(months since last round)*], and the average annual salary of the applicants sponsored by a firm [*log(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 and control variables, in aggregate (Panel A) and then partitioned based on firm-years with lottery win rates above and below the sample median (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.[9] This salary leads to a *Salary Over Prevailing Wage* ratio of 1.15, which suggests that startup firms 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 has completed an average of 2.11 prior financing rounds, has received an average of $62.3M from the financing rounds, and its first and last

[9] 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).

financing rounds were 55.4 and 99.5 months ago respectively. Lastly, and importantly, in Panel B we see that firms with higher H-1B lottery win rates are more likely to successfully exist the private market and are more likely to receive funding. 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 contrast, in our multivariate analyses, we provide 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 firm IPO outcomes.

5.2 Multivariate Results

Our linear regressions examine the effect of winning H-1B visa lotteries on various startup firm outcomes. In all of our main analyses, we present the results in the following manner: Model 1 considers *Win Rate* along with the baseline set of controls and fixed effects; Model 2 adds an interaction between the number of workers applications and the lottery win rate; Models 3 and 4 repeats these regressions for only accounting workers; Models 5 and 6 repeats these regressions for non-accounting workers; and Models 7 and 8 consider both accounting and non-accounting interactions together.

5.2.1 H-1B Accounting Workers and External Financing

We first consider the impact of winning H-1B lotteries on the likelihood of receiving external funding in a three-year, post-lottery window. Table 3 presents our results. In all models that consider only lottery win rates (i.e., no interactions), the coefficient are positive and significant. This suggests that firms that win an H-1B lottery are more likely to receive additional funding than firms that lose. Further, the economic magnitude of the result is significant. For example, the coefficient in Model 2 implies that a one-standard deviation increase in *Win Rate* is

associated with a 1.87 percent increase in the likelihood that a firm receives external funding. Interestingly, in models that add interaction terms, only the coefficient on the accounting workers interaction is significant (p-value 0.051), which suggests that foreign accounting workers contribute to firm funding success. Thus, our findings add to prior research on the usefulness of foreign workers by examining a specific type of worker that contributes to startup firm success.

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

Next, we consider three alternative firm-level outcome variables: *Successful Exit, Acquisitions,* and *IPOs. Successful Exit* is an indicator for firms that have an outcome event that allows them to exit the private market by either acquisition or initial public offering. Prior research considers these events as measures of startup firm success (Hochberg et al. 2007; Sorensen 2007; Kerr et al. 2014; Berstein et al. 2016; Dimmock et al. 2021). Additionally, *Acquisitions* and *IPOs* are separate indicator variables for firms that are acquired or have an IPO in the three years following an H-1B lottery.

Table 4 presents our results on the effect of winning workers in the H-1B lottery and the likelihood of successfully exiting the private market. In models that only consider *Win Rate* alone, only the model including all occupations is significant at the 10 percent level. However, when we include the interaction between winning the H-1B lottery and applied workers, we find interesting results. Across all models of worker types, we find statistically positive results at the 5 percent level and the economic magnitude of these results is significant. For example, a one-standard deviation increase in the interaction term is associated with 1.39 percent (4.72 percent) [1.01 percent] increase in the probability of successfully exiting the market in the three-year post-lottery period for all workers. This result suggests that all types of foreign workers are involved in helping startup firms exit the market after an H-1B lottery.

Next, we consider which of these results is the most significant across the three worker types. To analyze this, we perform significance tests that compare the three regression coefficients among the three groups of regressions. In untabulated results, we find that the coefficient on the accounting workers interaction is significantly larger than the coefficient on the non-accounting workers interaction (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. We next break up the *Successful Exit* outcome to consider each exit outcome (i.e., *Acquisition* and *IPO*) 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. In models that only consider *Win Rate* alone, all models are insignificant. However, when we include the interaction between winning the H-1B lottery and applied worker types, we find interesting results. Similar to previous tests for the accounting workers, we find a positive and significant coefficient on the interaction term at the 10 percent level (*p-value* 0.0515), 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 10 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. In models that only consider *Win Rate* alone, both models including all occupations and models looking at only accountants are significant at the 10

percent level. However, when we include the interaction between winning the lottery and applied workers, we find interesting results. 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 devidation increase in the interaction term is associated with 1.32 percent (4.22 percent) [1.00 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.

Next, we consider which of these results is the most significant across the three worker types. Similar to above analyses, we perform significance tests to compare the regression coefficients among the three groups to see if we can make a claim about the differences among the worker types in the amount of value they provide for an initial public offering. In untabulated results, we find that the coefficient on the accounting workers interaction is significantly larger than the coefficient on the non-accounting workers interaction (5 percent level). Again, this result suggests that even though all types of foreign workers contribute to startups go public, accounting workers appear to help significantly more than other workers.

In summary, the main analyses above show the magnitude of 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, we find insignificant results. This suggests that in the years leading up to an IPO, startup firms, on average, do not change their overall hiring practices of high-skilled foreign workers. 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 (Kraus and Stromsten 2012).

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 2021). 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 (Kraus and Stromsten 2012). Additionally, when analysts are assigned to an IPO event, Pisciotta (2021) 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 *Absolute Mean* Difference in analyst forecasts, which is the absolute difference in the year-end consensus 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 or 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. Column 1 and 2 report the results for our analyst forecast error tests and Columns 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 significantly negative relationship (*p-value* < 0.01) between firms winning H-1B accounting workers and their analyst forecast error and dispersion. When we consider the non-accountant sample (Columns 2 and 4), however, the results are insignificant. This suggests that winning non-accounting foreign workers does not have a significant influence on analyst forecast quality post-IPO.

It is important to note that while Pisciotta (2021) finds that higher analyst workloads from IPO assignments may cause analysts to simply go along with the consensus forecast to save time, he also finds that this causes significantly higher forecast errors, on average. In our study, however, while we do find less dispersion among analysts in their IPO valuations, these analysts also have significantly lower forecast errors in firms that hire foreign accountants through the H-1B lottery, which highlights the value that high-skilled foreign accounting workers are able to provide in the IPO process.

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, because we only want to consider *new* H-1B workers and the early years of our sample do not have an indicator for these workers, 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 they cause us to retain 91 percent of all new workers.[10] 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 Rate* might not be truly exogenous if the variable is predictable using lagged 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 or 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

[10] 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.

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 individuals with salaries in the top quartile of our sample. In untabulated analyses, we continue to find that our results hold with this alternative definition 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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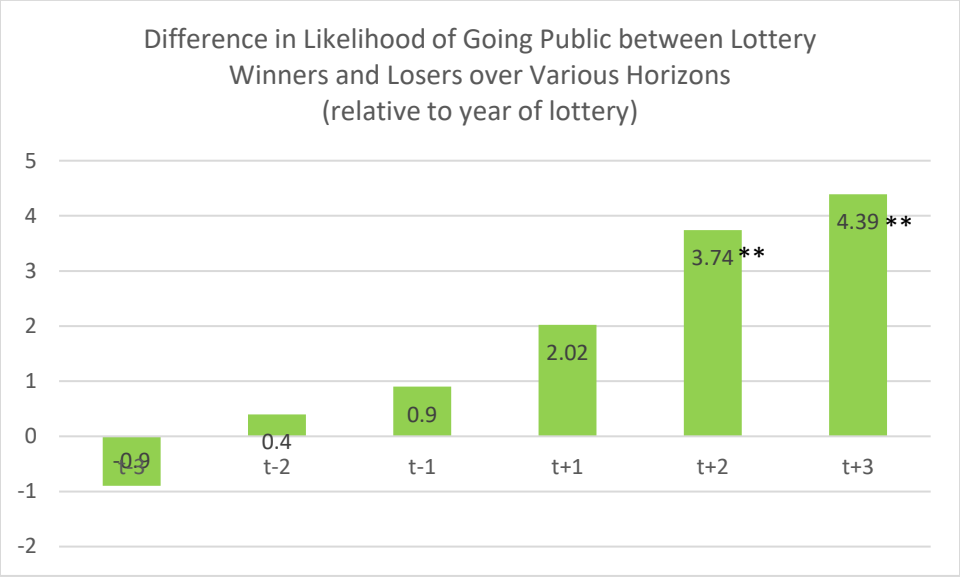
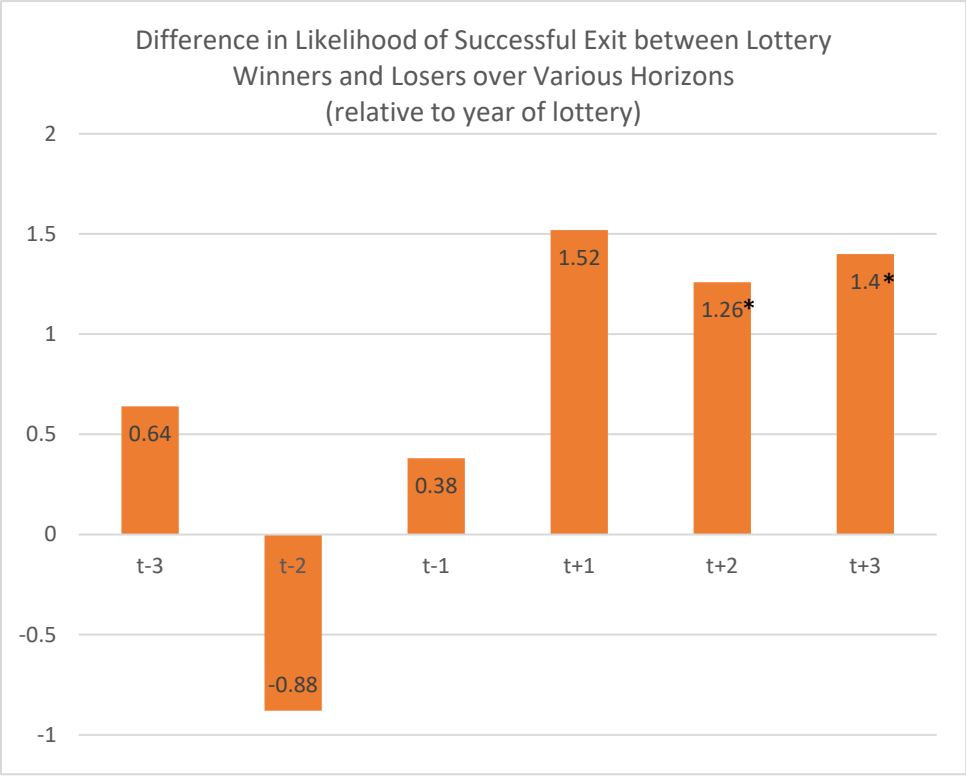
Appendix A
Variable Definitions

# of H-1B Applications	Number of H-1B Applications is the number of H-1B applicants filed on a Labor Condition Application by a firm in a year.
# of Accounting H-1B Applications	Number of Accounting H-1B Applications is the number of H-1B applicants filed on a Labor Condition Application by a firm in a year.
Win Rate	Win Rate is the number of H-1B visas a firm wins through the lottery in a year divided by the number of applicants.
Win Any	Win Any is an indicator that equals one if a firm wins at least one H-1B visa through the lottery that year.
Salary	Salary is the average annual salary of the applicants sponsored by a firm in a year.
Salary/Prevailing Wage	Salary/Prevailing Wage is the average ratio of salary to prevailing wage reported in the LCA applications.
Number of Prior Financing Rounds	Number of Prior Financing Rounds is the number of funding rounds a firm receives before the lottery.
Prior Amount Raised	Prior Amount Raised is the total amount of funds raised before the lottery.
Time Since First Round	Time Since First Round is the number of months between the first round of funding and the lottery.
Time Since Last Round	Time Since Last Round is the number of months between the most recent round of funding and the lottery.
Funded	Funded is an indicator that equals 100 if a firm receives subsequent external funding in the three years following the lottery and zero otherwise. This variable is also broken out by each post-lottery year.
Acquired	Acquired is an indicator that equals 100 if a firm is acquired in the three years following the lottery and zero otherwise. This variable is also broken out by each post-lottery year.
Successful Exit	Successful Exit is an indicator variable that equals 100 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. This variable is also broken out by each post-lottery year.
IPO	IPO is an indicator variable that equals 100 if the firm goes public in the three years following the lottery and zero otherwise. This variable is also broken out by each post-lottery year.

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





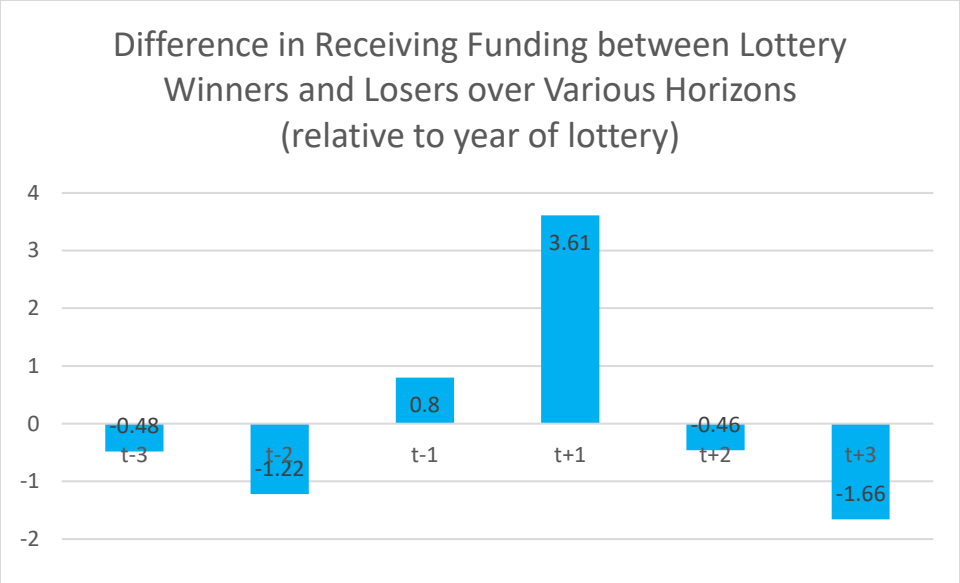

Difference in Receiving Funding between Lottery Winners and Losers over Various Horizons (relative to year of lottery)
4
3
2
1
0
-1
-2
-0.48
t-3
t-2
-1.22
0.8
t-1
3.61
t+1
-0.46
t+2
t+3
-1.66

Table 1: Visa Application Breakdown

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

Year	Firm-Years with One or More H-1B Visa Applications	Firm-Years with One or More **Accounting** H-1B Visa Applications	% of Firm-Years with One or More **Accounting** H-1B Visa Applications	Average Number of **Accounting** H-1B Visas Applied for by Year
2008	471	45	9.6%	2.00
2009	900	64	7.1%	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
	4,877	**1,439**	**29.5%**	**2.07**

Panel A.2: H1-B Visa Applications by Industry

Industry	Firm-Years with One or More H-1B Visa Applications	Firm-Years with One or More **Accounting** H-1B Visa Applications	% of Firm-Years with One or More **Accounting** H-1B Visa Applications	Average Number of **Accounting** H-1B Visas Applied for by Industry
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 Services	1,639	509	31.1%	1.55
Management of Companies and Enterprises	68	18	26.5%	1.50
Admin, Support, Waste Mgmt, & Remediation Services	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
Accomodation 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
	4,877	**1,439**	**29.5%**	**2.07**

Panel A.3: H1-B Visa Applications by Job Title

Job Title	Firm-Years with One or More H-1B Visa Applications by Job Title	% of Firm-Years with One or More H-1B Visa Applications by Job Title	Average Number of H-1B Visas Applied for by Job Title
Computer Occupations	1,726	35.4%	84.12
Financial Specialists / Accountants	**1,439**	**29.5%**	**2.07**
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 1 presents a descriptive breakdown of H-1B Visa application types. Panel A.1 presents a break down of visa applications by year for firms that apply for at least one H-1B worker and for firms that apply for at least one *Accounting* H-1B worker as well as their associated percentages and averages by year. Panel A.2 presents a break down of visa applications by industry (based on 2-digit NAICS code) for firms that apply for at least one H-1B worker and for firms that apply for at least one *Accounting* H-1B worker as well as their associated percentages and averages by industry type. Panel A.3 presents a break down of visa applications by job title description for firms that apply for at least one H-1B worker as well as their associated percentages and averages by year.

Table 2: Summary Statistics of H-1B Startup Firms

Panel A: Descriptives for All Startup Firms Filing LCA

Variable	# Obs.	Mean	Std. Dev.	25th Percentile	Median	75th Percentile
Labor Condition Application Information						
Number of H-1B Applications	4,877	6.58	14.57	1.00	2.00	5.00
Number of Accounting H-1B Applications	4,877	2.07	2.84	0.00	0.00	4.00
Win Rate	4,877	0.34	0.41	0.00	0.11	0.71
Salary ($)	4,877	87,190	26,126	68,279	85,000	102,253
Salary/Prevailing Wage	4,877	1.15	0.16	1.05	1.12	1.21
Crunchbase Startup Information						
Number of Prior Financing Rounds	4,877	2.11	2.27	0.00	1.00	3.00
Prior Amount Raised ($M)	4,877	62.30	16.40	0.00	11.00	50.50
Time Since First Round (months)	4,877	99.50	76.20	39.00	83.00	145.00
Time Since Last Round (months)	4,877	55.40	58.70	12.00	34.00	79.00
Funded (t, t+2)	4,877	0.34	0.47	0.00	0.00	1.00
Successful Exit (t, t+2)	4,877	0.09	0.28	0.00	0.00	0.00
IPO (t, t+2)	4,877	0.04	0.18	0.00	0.00	0.00
Acquired (t, t+2)	4,877	0.12	0.33	0.00	0.00	0.00

Panel B: Difference of Means for Firms with Low and High Win Rates

		Low Win Rate		High Win Rate		
Variable		Mean	Std. Dev.	Mean	Std. Dev.	Difference of Means
Startup Outcomes						
IPO (t, t+2)	4,877	0.03	0.16	0.04	0.21	[-3.44]***
IPO (t+1)	4,877	0.01	0.09	0.02	0.14	[-3.18]***
IPO (t+2)	4,877	0.01	0.09	0.02	0.12	[-2.31]**
IPO (t+3)	4,877	0.01	0.10	0.01	0.11	[-0.97]
Successful Exit (t, t+2)	4,877	0.07	0.25	0.10	0.30	[-4.20]***
Successful Exit (t+1)	4,877	0.05	0.22	0.07	0.25	[-1.31]
Successful Exit (t+2)	4,877	0.05	0.22	0.06	0.24	[-2.38]**
Successful Exit (t, t+3)	4,877	0.04	0.23	0.54	0.00	[-1.73]*
Funded (t, t+2)	4,877	0.32	0.47	0.35	0.48	[-2.38]**
Acquired (t, t+2)	4,877	0.11	0.32	0.13	0.33	[-1.59]
Acquired (t+1)	4,877	0.04	0.20	0.04	0.20	[0.21]
Acquired (t+2)	4,877	0.04	0.19	0.05	0.21	[-1.52]
Acquired (t+3)	4,877	0.03	0.18	0.04	0.20	[-1.43]
Labor Condition Application Information						
Salary ($)	4,877	86,021	27,460	88,361	24,670	[-1.48]
Salary/Prevailing Wage	4,877	1.15	0.17	1.16	0.14	[-0.37]
Startup Controls						
Number of Prior Financing Rounds	4,877	2.04	2.20	2.22	2.32	[-1.77]*
Prior Amount Raised ($M)	4,877	57.10	175.00	67.60	152.00	[-0.57]
Time Since First Round (months)	4,877	92.99	71.65	105.92	79.89	[-3.07]***
Time Since Last Round (months)	4,877	53.53	56.45	57.35	60.74	[-1.52]

Please Note: Table 2 reports the summary statistics for our sample of firm-years. The sample includes start-up firms with non-missing data in Crunchbase that sponsor H-1B petitions in fiscal years 2008, 2009, and 2014 through 2021 where a computer randomized lottery determined which LCA applications would be approved with an H-1B visa.

Panel A presents the summary statistics for all startup firms applying for at least one H-1B worker through a LCA in a given year. Panel B partitions the sample into firms that have a high win rate (top tercile) of H-1B workers through an LCA in a given year as compared to those firms that had low win rates (bottom tercile) of H-1B workers in a given year and reports a univariate comparison of the groups.

Variable Definitions: *Number of H-1B Applications* is the number of H-1B applicants filed on a Labor Condition Application by a firm in a year. *Number of Accounting H-1B Applications* is the number of H-1B applicants in a business-related field (i.e. accounting/financial positions) filed on a Labor Condition Application by a firm in a year. *Win Rate* is the number of H-1B visas a firm wins through the lottery in a year divided by the number of applicants. *Win Any* is an indicator that equals one if a firm wins at least one H-1B visa through the lottery that year. *Salary* is the average annual salary of the applicants sponsored by afirm in a year. *Salary/Prevailing Wage* is the average ratio of salary to prevailing wage reported in the LCA applications. *Number 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. *Time Since First Round* is the number of months between the first round of funding and the lottery. *Time Since Last Round* is the number of months between the most recent round of funding and the lottery. *Funded* 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* 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. *IPO* is an indicator variable that equals 1 if the firm goes public in the three years following the lottery and zero otherwise. *Acquired* is an indicator variable that equals 1 if the firm gets acquired in the three years following the lottery and zero otherwise.

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

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	All LCA's		Accounting LCA's		Non-Accounting LCA's		All Included	
Win Rate	**0.0456** ***	0.0384 **	**0.0461** ***	0.0403 **	**0.0465** ***	0.0421 **	**0.0467** ***	0.0455 ***
	(-0.00)	(0.02)	**(0.00)**	(0.01)	**(0.00)**	(0.0100)	**(0.00)**	(0.00)
*log(number of **Total** H-1B applications)*	(0.0286) ***	(0.0340) ***						
	(0.00)	(0.00)						
Win Rate# of **Total** H-1B applications*		**0.00127**						
		(0.15)						
*log(number of **Accounting** H-1B applications)*			-0.0041	-0.0235			0.0243 *	-0.0003
			(0.40)	(0.09)			(0.09)	(0.43)
Win Rate# of **Accounting** H-1B applications*				**0.0138** *				**0.0137** **
				(0.05)				**(0.03)**
*log(number of **Non-Accounting** H-1B applications)*					-0.0247 ***	-0.0273 ***	-0.0285 ***	-0.0008
					(0.00)	(0.00)	(0.00)	(0.11)
Win Rate# of **Non-Accounting** H-1B applications*						**0.0008**		**-0.0012**
						(0.23)		**(0.15)**
log (number rounds financing)	0.1550 ***	0.1560 ***	0.1610 ***	0.1600 ***	0.1560 ***	0.1570 ***	0.1600 ***	-0.0083 ***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
log(amount raised prior)	-0.00220	-0.00307	-0.0052	-0.0058	-0.0048	-0.0053	-0.0079 ***	0.1600 ***
	(0.90)	(0.8600)	(0.7600)	(0.7400)	-0.78	(0.7600)	(0.00)	(0.00)
log(months since first round)	-0.077 ***	(0.0772) ***	-0.0774 ***	(0.0773) ***	(0.0762) ***	-0.0758 ***	-0.00583	-0.0041
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.7400)	(0.48)
log(months since last round)	0.0861 ***	0.0862 ***	0.0744 ***	0.0751 ***	0.0854 ***	0.0854 ***	-0.075 ***	-0.0777 ***
	(0.00)	(0.00)	(0.0100)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
log(salary)	-0.0087 ***	(0.0084) ***	-0.0082 ***	-0.0080 ***	-0.0078 ***	-0.00778 ***	0.0850 ***	0.0799 ***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Industry-Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.118	0.118	0.117	0.117	0.118	0.118	0.119	0.119
Number of Observations	4,877	4,877	4,877	4,877	4,877	4,877	4,877	4,877

Note: This table reports linear regression analysis of the effect of win rate in H-1B visa lotteries on the probability of receiving subsequent funding. The dependent variable is *Funded*, which is an indicator that equals 1 if a firm receives subsequent external funding in the three years following the lottery and zero otherwise. The main independent variable is *Win Rate*, which is the number of H-1B visas a firm wins through the lottery in a year divided by the number of applicants. Column (1) includes all occupation LCA's applied for in a given year with industry-year fixed effects and the following firm controls: *log(number rounds of financing), log($ amount raised previously), log(months since first round), log(months since last round), log(number of H-1B applications),* and *log($ salary for H-1B positions)*. Column (2) includes an interaction term between the associated H-1B lottery win rate and the number all occupation LCA's applied for in the period as well as the controls and fixed effects described above. Column (3) includes all Accounting LCA's applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (4) includes an interaction term between the associated H-1B lottery win rate and the number all Accounting LCA's applied for in the period as well as the controls and fixed effects described above. Column (5) includes all Non-Accounting LCA's applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (6) includes an interaction term between the H-1B lottery win rate and the number all Non-Accounting LCA's applied for in the period as well as the controls and fixed effects described above. Column (7) includes all LCA types applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (8) includes all included interaction terms between the H-1B lottery win rate and the number of all LCA types applied for in the period as well as the controls and fixed effects.

The numbers in brackets are p-values based on standard errors clustered by firm. *p<0.10; **p<0.05, ***p<0.01.

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

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	All LCA's		Accounting LCA's		Non-Accounting LCA's		All Included	
Win Rate	**0.0159** *	-0.0280	**0.0151**	0.0066	**0.0133**	-0.0069	**0.0129**	-0.0026
	(0.09)	(0.10)	**(0.10)**	(0.29)	**(0.14)**	(0.30)	**(0.15)**	(0.42)
*log(number of **Total** H-1B applications)*	0.0096	(0.0007)						
	(0.13)	(0.45)						
Win Rate# Log of **Total** H-1B applications*		**0.0339** **						
		(0.02)						
*log(number of **Accounting** H-1B applications)*			-0.00360	(0.0350) ***			-0.0156	-0.0439 ***
			(0.41)	(0.00)			(0.17)	'(0.00)
Win Rate# Log of **Accounting** H-1B applications*				**0.115** **				**0.1070** **
				(0.01)				**(0.03)**
*log(number of **Non-Accounting** H-1B applications)*					0.0086	0.000879	0.0112 *	0.0081
					(0.10)	(0.44)	(0.06)	(0.12)
Win Rate#Log of **Non-Accounting** H-1B applications*						**0.0246** **		**0.0095**
						(0.03)		**(0.24)**
log (number rounds financing)	0.0072	0.0071	0.00318	0.0033	0.0034	0.0032	0.0014	0.0016
	(0.75)	(0.75)	(0.88)	(0.88)	(0.88)	(0.88)	(0.47)	(0.47)
log(amount raised prior)	0.0172 ***	0.0172 ***	0.0182 ***	0.0182 ***	0.0174 ***	0.0174 ***	0.0176 ***	0.0176 ***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
log(months since first round)	0.0127	0.0123	0.0141	0.0140	0.0140	0.0136	0.0147	0.0144
	(0.35)	(0.36)	(0.31)	(0.30)	(0.31)	(0.32)	(0.14)	(0.15)
log(months since last round)	-0.0151	-0.0148	-0.0151	-0.0152	-0.0163	-0.0161	-0.0166 *	-0.0166 *
	(0.14)	(0.15)	(0.1400)	(0.14)	(0.11)	(0.12)	(0.05)	(0.06)
log(salary)	0.0178	0.0186	0.0217	0.0215	0.0217	0.0226	0.0216	0.0217
	(0.40)	(0.38)	(0.31)	(0.31)	(0.32)	(0.30)	(0.16)	(0.16)
Industry-Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.044	0.046	0.043	0.045	0.044	0.046	0.045	0.049
Number of Observations	4,877	4,877	4,877	4,877	4,877	4,877	4,877	4,877

Note: This table reports linear regression analysis of the effect of win rate in H-1B visa lotteries on the probability of successfully exiting the private market. The dependent variable is *Successful Exit*, which is an indicator that equals 1 if a firm successfully exits the private market in the three years following the lottery and zero otherwise, whether that be from acquisition or IPO. The main independent variable is *Win Rate,* which is the number of H-1B visas a firm wins through the lottery in a year divided by the number of applicants. Column (1) includes all occupation LCA's applied for in a given year with industry-year fixed effects and the following firm controls: *log(number rounds of financing), log($ amount raised previously), log(months since first round), log(months since last round), log(number of H-1B applications)*, and *log($ salary for H-1B positions)*. Column (2) includes an interaction term between the associated H-1B lottery win rate and the number all occupation LCA's applied for in the period as well as the controls and fixed effects described above. Column (3) includes all Accounting LCA's applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (4) includes an interaction term between the associated H-1B lottery win rate and the number all Accounting LCA's applied for in the period as well as the controls and fixed effects described above. Column (5) includes all Non-Accounting LCA's applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (6) includes an interaction term between the H-1B lottery win rate and the number all Non-Accounting LCA's applied for in the period as well as the controls and fixed effects described above. Column (7) includes all LCA types applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (8) includes all included interaction terms between the H-1B lottery win rate and the number of all LCA types applied for in the period as well as the controls and fixed effects.

The numbers in brackets are p-values based on standard errors clustered by firm. *p<0.10; **p<0.05, ***p<0.01.

Table 5: H-1B Lottery *Win Rate* and the Probability of Acquisition in Three Years Following the Lottery

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	All LCA's		Accounting LCA's		Non-Accounting LCA's		All Included	
Win Rate	**0.0040**	0.0081	**0.0032**	0.0013	**0.0026**	0.0067	**0.0018**	0.0045
	(0.33)	(0.20)	**(0.36)**	(0.44)	**(0.39)**	(0.51)	**(0.42)**	(0.32)
*log(number of **Total** H-1B applications)*	0.0011	0.0041						
	(0.41)	(0.24)						
Win Rate# of **Total** H-1B applications*		**-0.0007 ***						
		(0.052)						
*log(number of **Accounting** H-1B applications)*			-0.0217 ***	-0.0278 ***			-0.0304 ***	-0.0387 ***
			(0.00)	(0.00)			(0.00)	(0.00)
Win Rate# of **Accounting** H-1B applications*				**0.0052 ***				**0.0080 **
				(0.05)				**(0.02)**
*log(number of **Non-Accounting** H-1B applications)*					0.0021	0.0044	0.0070 *	0.0098 *
					(0.31)	(0.17)	(0.08)	(0.03)
Win Rate# of **Non-Accounting** H-1B applications*						**-0.0007 ***		**-0.0009 ***
						(0.06)		**(0.05)**
log (number rounds financing)	-0.0024	-0.0029	-0.0069	-0.0067	'-0.0042	-0.0047	-0.0081	-0.0084
	(0.88)	(0.85)	(0.66)	(0.66)	(0.79)	(0.76)	(0.30)	(0.29)
log(amount raised prior)	0.0087 ***	0.0086 ***	0.0094 ***	0.0094 ***	0.0082 ***	0.0081 ***	0.0086 ***	0.0085 ***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
log(months since first round)	0.0039	0.0043	0.0055	0.0053	0.0047	0.0052	0.0062	0.0065
	(0.65)	(0.61)	(0.52)	(0.53)	(0.59)	(0.55)	(0.24)	(0.22)
log(months since last round)	-0.0002	-0.0005	-0.0006	-0.0006	'-0.0014	-0.0018	-0.0021	-0.0025
	(0.97)	(0.92)	(0.91)	(0.92)	(0.82)	(0.77)	(0.37)	(0.35)
log(salary)	0.0254	0.0254	0.0272	0.0273	0.0305 *	0.0306 *	0.0305 **	0.0307 **
	(0.13)	(0.13)	(0.10)	(0.11)	(0.07)	(0.07)	(0.03)	(0.03)
Industry-Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.027	0.028	0.029	0.029	0.028	0.028	0.031	0.032
Number of Observations	4,877	4,877	4,877	4,877	4,877	4,877	4,877	4,877

Note: This table reports linear regression analysis of the effect of win rate in H-1B visa lotteries on the probability of being Acquired in the next three years following the lottery. The dependent variable is *Acquired*, which is an indicator that equals 1 if a firm gets acquired for more than $25M (in 2008-inflation adjusted dollars) in the three years following the lottery and zero otherwise. The main independent variable is *Win Rate*, which is the number of H-1B visas a firm wins through the lottery in a year divided by the number of applicants. Column (1) includes all occupation LCA's applied for in a given year with industry-year fixed effects and the following firm controls: *log(number rounds of financing), log($ amount raised previously), log(months since first round), log(months since last round), log(number of H-1B applications),* and *log($ salary for H-1B positions)*. Column (2) includes an interaction term between the associated H-1B lottery win rate and the number all occupation LCA's applied for in the period as well as the controls and fixed effects described above. Column (3) includes all Accounting LCA's applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (4) includes an interaction term between the associated H-1B lottery win rate and the number all Accounting LCA's applied for in the period as well as the controls and fixed effects described above. Column (5) includes all Non-Accounting LCA's applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (6) includes an interaction term between the H-1B lottery win rate and the number all Non-Accounting LCA's applied for in the period as well as the controls and fixed effects described above. Column (7) includes all LCA types applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (8) includes all included interaction terms between the H-1B lottery win rate and the number of all LCA types applied for in the period as well as the controls and fixed effects.

The numbers in brackets are p-values based on standard errors clustered by firm. *p<0.10; **p<0.05, ***p<0.01.

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

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	All LCA's		Accounting LCA's		Non-Accounting LCA's		All Included	
Win Rate	**0.0120** *	-0.0295 **	**0.0121** *	0.0045	**0.0108**	-0.0092	**0.0112** *	**-0.0062**
	(0.07)	(0.04)	**(0.07)**	(0.27)	**(0.11)**	(0.14)	**(0.09)**	**(0.23)**
*log(number of **Total** H-1B applications)*	0.0088	-0.0010						
	(0.12)	(0.41)						
Win Rate# Log of **Total** H-1B applications*		**0.0321** **						
		(0.02)						
*log(number of **Accounting** H-1B applications)*			0.0192	-0.0086			0.0161	-0.0081
			(0.10)	(0.20)			(0.14)	(0.24)
Win Rate# Log of **Accounting** H-1B applications*				**0.1030** **				0.0927 **
				(0.02)				(0.0400)
*log(number of **Non-Accounting** H-1B applications)*					0.00657	-0.0011	0.0039	(0.0003)
					(0.14)	(0.39)	(0.25)	(0.47)
Win Rate# Log of **Non-Accounting** H-1B applications*						**0.0243** **		0.0131 *
						(0.02)		(0.0900)
log (number rounds financing)	0.0076	0.0075	0.0082	0.0084	0.0054	0.0053	0.0075	0.0077
	(0.64)	(0.65)	(0.62)	(0.61)	(0.74)	(0.75)	(0.32)	(0.32)
log(amount raised prior)	0.0091 ***	0.0091 ***	0.0093 ***	0.0092 ***	0.0097 ***	0.0098 ***	0.0095 ***	0.0096 ***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
log(months since first round)	0.0095	0.0091	0.0093	0.0092	0.0100	0.0096	0.0092	0.0088
	(0.40)	(0.41)	(0.41)	(0.41)	(0.39)	(0.40)	(0.21)	(0.21)
log(months since last round)	-0.0155 *	-0.0152 *	-0.0151 *	-0.0151 *	-0.0154 *	-0.0152 *	-0.0151 **	-0.0150 **
	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)	(0.08)	(0.03)	(0.03)
log(salary)	-0.0067	-0.0059	-0.0048	-0.0049	-0.0079	-0.0070	(0.0079)	-0.0076
	(0.64)	(0.68)	(0.74)	(0.73)	(0.60)	(0.64)	(0.30)	(0.30)
Industry-City-Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.035	0.042	0.035	0.038	0.035	0.042	0.036	0.043
Number of Observations	4,877	4,877	4,877	4,877	4,877	4,877	4,877	4,877

Note: This table reports linear regression analysis of the effect of win rate in H-1B visa lotteries on the probability of the firm exiting the private market via IPO. The dependent variable is *IPO*, which is an indicator that equals 1 if a firm goes public via IPO in the three years following the lottery and zero otherwise. The main independent variable is *Win Rate*, which is the number of H-1B visas a firm wins through the lottery in a year divided by the number of applicants. Column (1) includes all occupation LCA's applied for in a given year with industry-year fixed effects and the following firm controls: *log(number rounds of financing), log($ amount raised previously), log(months since first round), log(months since last round), log(number of H-1B applications),* and *log($ salary for H-1B positions)*. Column (2) includes an interaction term between the associated H-1B lottery win rate and the number all occupation LCA's applied for in the period as well as the controls and fixed effects described above. Column (3) includes all Accounting LCA's applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (4) includes an interaction term between the associated H-1B lottery win rate and the number all Accounting LCA's applied for in the period as well as the controls and fixed effects described above. Column (5) includes all Non-Accounting LCA's applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (6) includes an interaction term between the H-1B lottery win rate and the number all Non-Accounting LCA's applied for in the period as well as the controls and fixed effects described above. Column (7) includes all LCA types applied for in a given year as well as the associated win rate and all controls and fixed effects described above. Column (8) includes all included interaction terms between the H-1B lottery win rate and the number of all LCA types applied for in the period as well as the controls and fixed effects.

The numbers in brackets are p-values based on standard errors clustered by firm. *p<0.10; **p<0.05, ***p<0.01.

Table 7 - LCA Worker Composition in Years Leading up to IPO

Variable	Accounting LCA's	All LCA's	Non-Accounting LCA's
Intercept	-0.9380	-48.0201 ***	-47.0804 ***
	(0.28)	(0.00)	(0.00)
IPO (t-1)	**0.4400 ** **	3.0711	2.6321
	(0.01)	(0.17)	(0.20)
IPO (t-2)	-0.0880	5.102	5.1913
	(0.28)	(0.12)	(0.11)
IPO (t-3)	-0.1750	4.217	4.3904
	(0.16)	(0.19)	(0.18)
Controls?	Yes	Yes	Yes
Industry-Year Fixed Effects?	Yes	Yes	Yes
R-Squared	0.0812	0.1415	0.1400
Number of Observations	4,877	4,877	4,877

This table presents the worker composition of applied H-1B workers through LCA in each of the years leading up to a firm's successful IPO event. The sample is further partitioned between all applied for LCA's, Accounting LCA's, and Non-Accounting LCA's. *IPO (t-1)* represents the year leading up to the IPO event. *IPO (t-2)* represents the two years leading up to the IPO event and *IPO (t-3)* represents the three years leading up to the IPO event. All other controls and fixed effects are considered in the model but left untabulated for presentation purposes.

The numbers in brackets are p-values based on standard errors clustered by firm. *p<0.10; **p<0.05, ***p<0.01.

Table 8: Successful IPO and Analyst Accuracy

Variable	Analyst Accuracy Dependent Variables			
	Absolute Mean Difference		Analyst Dispersion	
	Accounting LCAs	Non-Accounting LCAs	Accounting LCAs	Non-Accounting LCAs
Win Rate	-0.335	-0.3311	-0.0162	-0.0627 ***
	-0.40	(0.21)	(0.51)	(0.00)
*log(number of **Accounting** H-1B applications)*	0.6000 **		0.0388 **	
	-0.01		(0.02)	
Win Rate# Log of **Accounting** H-1B applications*	**-0.8061 *** **		**-0.0114 ** **	
	(0.00)		**(0.04)**	
*log(number of **Non-Accounting** H-1B applications)*		0.3521 **		0.0239 **
		(0.02)		(0.02)
Win Rate# Log of **Non-Accounting** H-1B applications*		**-0.3041**		**0.0665 ** **
		(0.35)		**(0.02)**
# of Analysts	-0.0088	-0.0088	-0.0005	-0.0005
	-0.54	(0.54)	(0.58)	(0.58)
Big N Auditor	1.4671 ***	0.6511	0.0219	-0.0953 **
	(0.00)	(0.38)	(0.34)	(0.04)
Size	0.0477	0.0437	0.0042	0.0032
	(0.36)	(0.36)	(0.24)	(0.33)
ROA	1.5222 **	1.5221 **	0.0981 **	0.0981 **
	(0.02)	(0.02)	(0.02)	(0.02)
CFO	-3.6393 ***	-3.6390 ***	-0.2340 **	-0.2341 **
	(0.00)	(0.00)	('0.02)	(0.02)
Altman Z-Score	0.0000	0.0000	0.0000	0.0000
	(0.11)	-0.11	(0.23)	(0.23)
Leverage	0.1412 **	0.21	0.0113 ***	0.0399 ***
	(0.02)	(0.14)	(0.00)	(0.00)
MTB	-0.0148 **	-0.0111 *	-0.0008 **	0.0011 **
	(0.02)	(0.08)	(0.04)	(0.02)
CapEx	7.3821 **	7.3820 **	0.3670 *	0.3671 *
	(0.04)	-0.04	(0.06)	(0.06)
Litigation Risk	0.4394 **	1.0481 ***	0.0352 ***	0.0710 ***
	(0.02)	(0.00)	(0.00)	(0.00)
Standard Deviation of Earnings	0.0015	0.0020	0.0000	-0.0008 **
	(0.28)	(0.69)	(0.85)	(0.04)
Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R-Squared	0.407	0.4619	0.4525	0.4618
Number of Observations	1,439	1,439	1,439	1,439

Notes.This table reports linear regression analysis of the effect of firms engaging in a successful IPO on analyst accruacy. In Columns (1) through (4), the dependent variables are analyst accuract measures common in the literature. *Absolute Mean Difference* is computed as the absolute difference between analysts' forecast of earnings and actual earnings. *Analyst Dispersion* as the standard deviation of the analysts' valuations scaled by the period end share price of the firm. Data comes from the I/B/E/S Summary Unadjusted file from WRDS. All specifications include industry and year fixed effects and controls for various financial reporting quality measures backed by prior research. In untabulated analyses, the findings are also robust when controlling for the standard deviation of returns instead of the standard deviation of earnings. The numbers in brackets are the p-values based on standard errors clustered by firm. *p<0.10; **p<0.05, ***p<0.01.