

# How Do College-Educated Immigrants Affect US Firms and Workers?

By [Nicolas Morales](#)

## Economic Brief

May 2024, No. 24-15

We study the impact of hiring a college-educated immigrant through the H-1B lottery on the performance and hiring behavior of U.S. firms. When firms win the H-1B lottery, they expand in terms of employment and revenues. Lottery winners are also more likely to stay active. The firms that benefit the most from immigrant workers are small, high-productivity firms. A majority of existing workers at the firm benefit from being exposed to an H-1B coworker, but there are interesting dynamics across different types of workers that we further elucidate.

---

The economic impact of immigration is heatedly debated in academic and policy circles, and a key piece of this puzzle is how immigrants affect firms and workers in the U.S. The impact on firms is particularly relevant, as many visa programs in the U.S. are employer sponsored and firms are responsible for selecting which workers can come work in the country. Despite its policy relevance, answering this question has proved challenging due to two main issues.

The first issue is the "endogeneity" issue. Immigrants tend to locate in growing labor markets, which tend to also be where high-productivity firms are located. For instance, if we see a firm growing in terms of employment and productivity and also hiring immigrants, it is hard to say if the firm grows *because* it hired immigrants or if the firm would have grown regardless.

The second issue is that it is difficult to obtain firm-level data on the number of immigrants and natives employed for a sufficiently large number of firms to perform a comprehensive analysis on this issue.

In my recent working paper "[The Impact of Immigration on Firms and Workers: Insights From the H-1B Lottery](#)" — co-authored with Parag Mahajan, Kevin Shih, Mingyu Chen and Agostina Brinatti — we overcome both of these issues by combining a rich administrative dataset from the Census Bureau on U.S. firms and workers with the results of the 2007 H-1B visa lottery.

## What Is the H-1B Program?

The H-1B visa program is the primary program for U.S. companies to hire college-educated foreign-born workers. Since its introduction in the 1990s, the program has been predominantly used by companies in the information technology sector. The program is employer sponsored, so firms are responsible for selecting workers, paying application fees and providing evidence that they would not receive lower wages than comparable American workers. Visas are granted for three years with the possibility of renewal for an additional three years. After that, workers can be sponsored for a green card and stay working in the U.S. permanently.

The program has a quota of 65,000 slots for private sector companies each year, plus an additional 20,000 slots for those workers who obtained graduate degrees from U.S. institutions. Applications are awarded on a first-come, first-serve basis starting every April.

However, if the number of applications immediately exceeds the cap, all applications go through a lottery system, where applications are drawn until the visa cap is met. 2007 was the first time all H-1B applications were assigned through a lottery. This happened again in 2008 and has occurred every year since 2014.

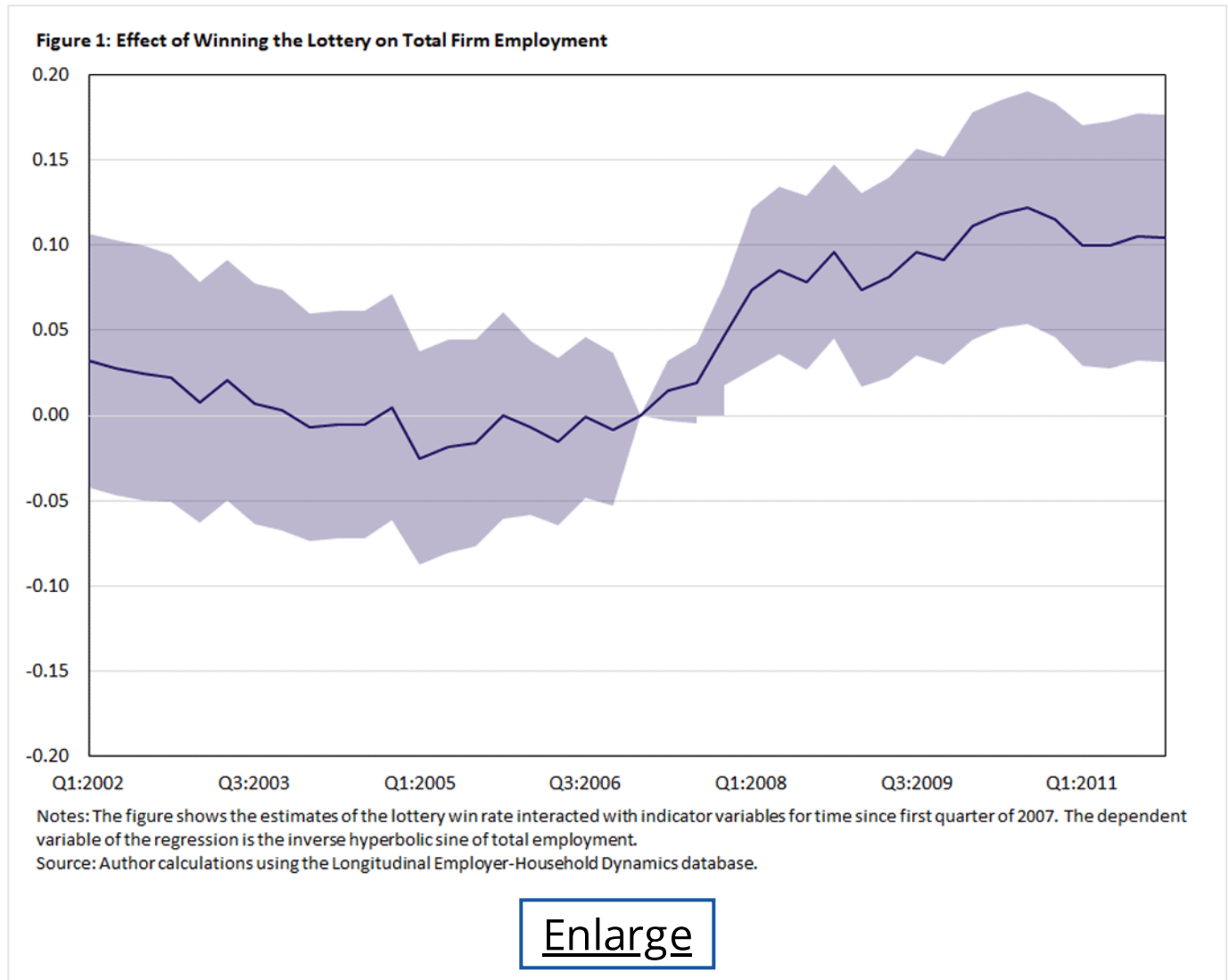
The lottery provides a unique opportunity to deal with the endogeneity issue mentioned earlier. We can compare two firms with similar characteristics where one firm "wins" the H-1B lottery and hires the foreign-born worker it applied for while the other firm "loses" the lottery and has its visa application rejected. We can then compare how winners and losers are impacted over time in terms of performance, hiring behavior and survival.

Most firms in our sample applied for only one H-1B visa in 2007, so our results will be mostly driven by small applicants. The [Longitudinal Employer-Household Dynamics](#) dataset (accessible through the Census Bureau) allows us to obtain information on the universe of firms and workers for 25 U.S. states. We match lottery outcomes to this dataset and obtain information on revenues, employment composition and career trajectories of workers employed at firms that participate in the H-1B lottery.

## Lottery Effects on Total Employment

We begin our analysis by studying the differences in total employment between winners and losers after the lottery occurs. Figure 1 shows the results for an event-study regression that compares employment for winning and losing firms over time. We condition for industry, size and firm-level time-invariant characteristics. Our key measure of

the lottery outcome is the "win rate," which is the ratio between successful H-1B applications relative to total applications for a given firm. We focus on firms that participated in the lottery for the regular cap of 65,000 slots, as the masters cap did not have a lottery in 2007. The purple line represents the estimates for the percent difference in total employment between a firm that wins all of its lottery applications and a firm that loses all of its lottery applications. The shading represents 95 percent confidence intervals.



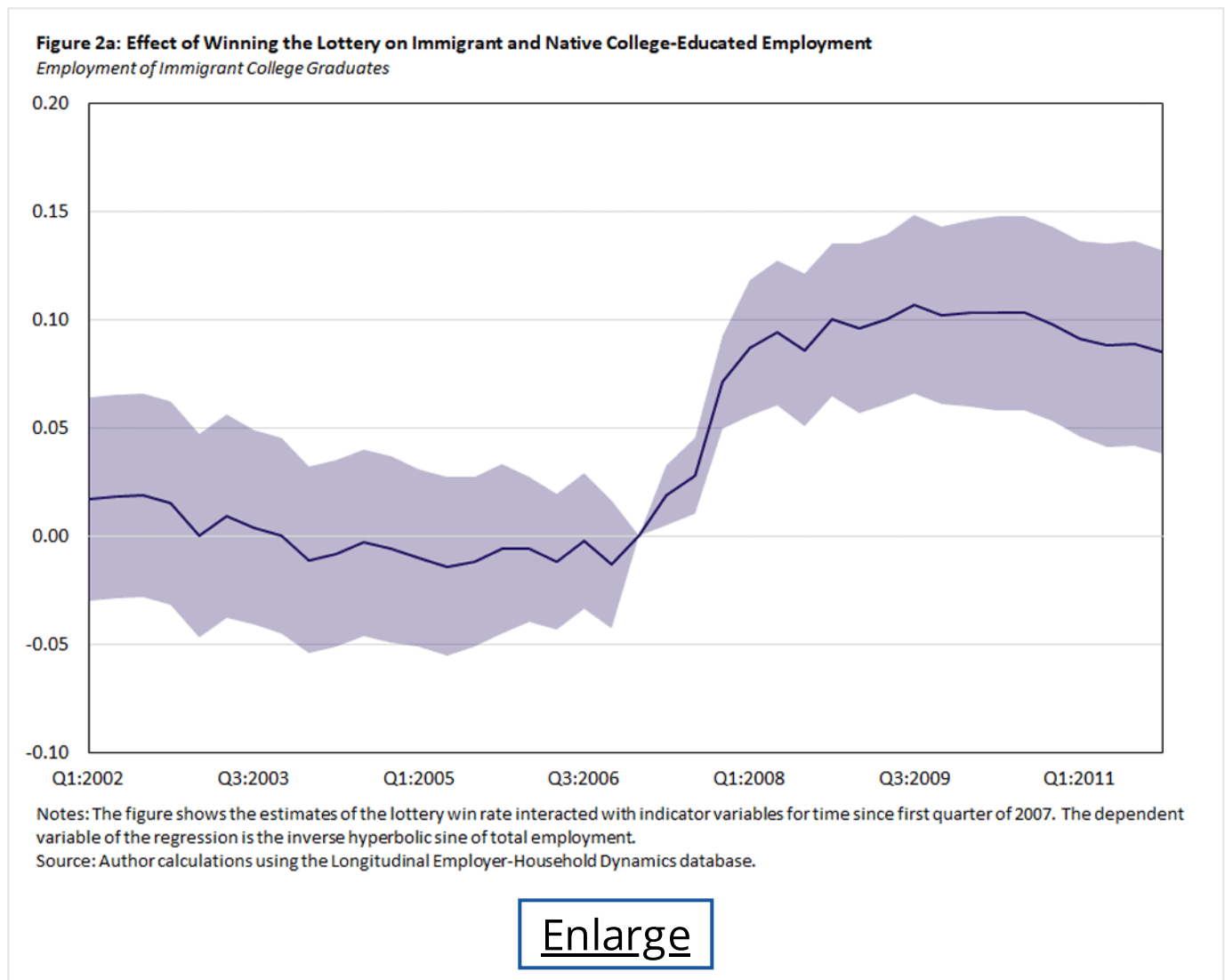
Before 2007, the year of our sample, we can see that winners and losers did not have statistically different levels of employment growth. This is a necessary condition for our argument that winners and losers were not already following different trends before the lottery. Thus, we can interpret the observed differences between winners and losers after the lottery as a consequence of getting H-1B workers through the lottery.

After 2007, we can see that winners experienced a higher employment growth than losers. To put these numbers into context, we find that one additional H-1B win increases employment for the winning firm by 0.83 workers relative to a losing firm. This implies that losing firms were not able to fully recover from the loss of employment from the lottery even five years after the lottery occurred.

When looking at firms of different sizes, we find that small firms (between one and 10 employees) expand the most when winning the lottery. This suggests that small firms might be particularly constrained by a lack of domestic talent, hence they depend more on the lottery to expand employment. Similarly, high-productivity firms that pay high wages expanded the most when winning the lottery. This suggests that firms with a higher need for skilled workers might have more trouble finding appropriate substitutes for the lost H-1B workers.

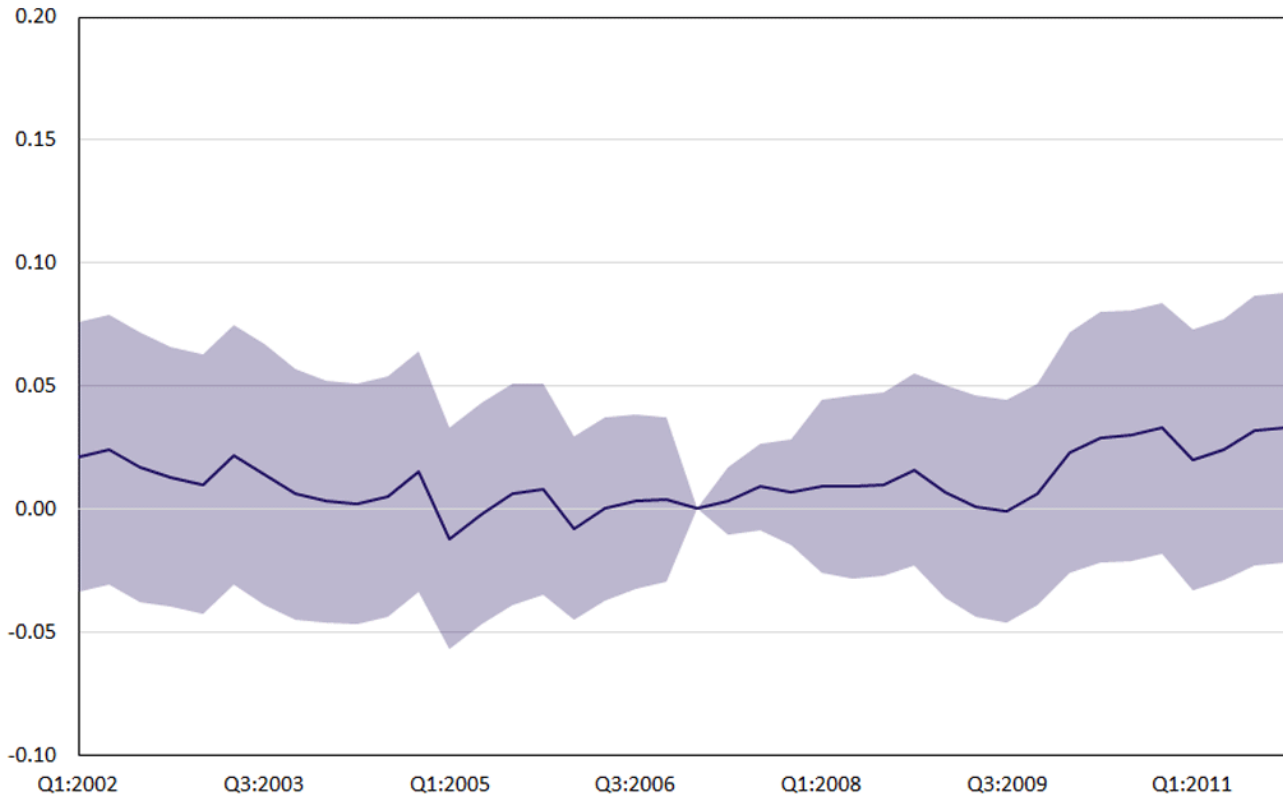
## Lottery Effects on Employment Composition

As a second step, we can use the richness of our data to study whether additional H-1B wins change the employment compositions of firms. One concern of policymakers is that the availability of immigrants can crowd out similarly skilled natives, who are more likely to compete with newly hired immigrants in the labor market. In Figures 2a and 2b, we plot the event study results for the employment of college-educated immigrants (Figure 2a) and college-educated natives (Figure 2b).



**Figure 2b: Effect of Winning the Lottery on Immigrant and Native College-Educated Employment**

*Employment of Native College Graduates*



Notes: The figure shows the estimates of the lottery win rate interacted with indicator variables for time since first quarter of 2007. The dependent variable of the regression is the inverse hyperbolic sine of total employment.

Source: Author calculations using the Longitudinal Employer-Household Dynamics database.

[Enlarge](#)

As shown in Figure 2a, winners and losers were not following different trends in terms of college-educated immigrant employment before the lottery occurred. However, as expected, winners experience an increase in the employment of college-educated immigrants relative to the losers after the lottery. The increase is for less than one worker, indicating that losers are able to get some immigrants as replacements when they lose the H-1B lottery.

In Figure 2b, we see that winners and losers do not experience different changes in college-educated native employment after the lottery takes place. This finding implies that additional immigrants do not seem to displace similarly educated natives.

When narrowing the focus to firms that pay higher wages and have higher productivity, we even see winners hiring more college-educated natives. One potential reason is that high-productivity firms might be constrained by not having appropriate talent to grow the firm. Once that constraint is relaxed through the H-1B program, they can expand in all types of employment. For all firms, we also find that lottery winners hire more non-college graduates than lottery losers.

## **Lottery Effects on Revenue and Payroll**

As a final set of firm-level results, we also find that winning firms expand in terms of revenues and payroll relative to losing firms. Interestingly, we find that winning the H-1B lottery helps firms stay in business. Firms that win all their lottery applications are 2.3 percent more likely to survive five years after the lottery takes place compared to firms that lose all their lottery applications. This indicates that immigrants hired through the H-1B program might be crucial for some firms to stay afloat.

## **What Happens to Workers at the Firm Prior to the Lottery?**

Our firm-level results indicate that winning the lottery helps firms expand in terms of employment and revenues, as well as improve their likelihood of survival. As a final analysis, we look into how the career trajectories of workers employed at the firms that participate in the lottery change after the lottery occurs. We focus on employees working in 2006 for firms with less than 100 employees that participated in the 2007 H-1B lottery. We focus on those firms because they effectively hire more immigrants after winning the lottery. We sort employees by observed characteristics such as nativity, tenure, age and education, and we study how their wages and employment at the firm change after the lottery occurs.

We find that non-college graduates at winning firms experience a wage increase of 3.1 percent relative to non-college graduates at losing firms. This suggests that non-college workers — who generally perform tasks that complement those done by H-1B workers — receive a positive effect from their firm winning the lottery.

Similarly, we find that college-educated natives and immigrants who are under 40 years old and have low tenure at the firm experience wage gains of between 4 percent and 5 percent after their firm wins the lottery. These workers might end up working on the same teams as the newly hired H-1B workers and learn from them once their firm wins the lottery.

Finally, we do find negative effects for natives who are college graduates, are younger than 40 and have high tenure at the firm. Members of this group experience 5.4 percent lower wages and have a 3.6 percentage-point-lower probability of staying at the firm when working at a lottery winner relative to those in the same group working for lottery losers. However, this group represents only 4 percent of the workers in our sample, so most workers actually experience positive effects from having an H-1B coworker.

## **Conclusion**

We provide new evidence on the impact of immigration on firms and workers. We find that when firms access college-educated immigrants through the H-1B lottery, they expand in terms of size and revenues, and they increase their survival probability. These benefits seem to come at little expense of native workers, since changes in the total employment of that group do not appear to be different between winners and losers. Small, high-

productivity firms benefit the most from winning the H-1B lottery, as these firms might be using the H-1B program to find workers they wouldn't be able to find in the local labor market. Also, most workers benefit from having an H-1B coworker, as many of those working at winning firms experience higher wage growth than those working at losing firms.

---

Nicolas Morales is an economist in the Research Department of the Federal Reserve Bank of Richmond.

---

This article may be photocopied or reprinted in its entirety. Please credit the author, source, and the Federal Reserve Bank of Richmond and include the italicized statement below.

*Views expressed in this article are those of the author and not necessarily those of the Federal Reserve Bank of Richmond or the Federal Reserve System.*



## Topics

---

[Human Capital and Labor](#)

[Production and Investment](#)

---

## Subscribe to Economic Brief

Receive a notification when Economic Brief is posted online.

By submitting this form you agree to the [Bank's Terms & Conditions and Privacy Notice](#).

Email Address

Subscribe

---

 **Contact Us**

---

**RC Balaban**  
(804) 697-8144

© 1997-2024 Federal Reserve Bank of Richmond