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**Does the Restriction Policy of
High-skill Immigrants Benefit
Native Workers?**

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Does the restriction policy of high-skill immigrants benefit native workers?[†]

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Abstract

To protect native workers, discussions on immigration restrictions have emerged. However, limited studies have analyzed the economic impact of such restrictions on native workers. Past literature demonstrated a small effect of immigration restrictions on the labor outcomes of native workers, attributing it to capital substitution. Notably, this analysis focused on restrictions on low-skilled immigrants. Past literature of theoretical analysis highlighted that labor scarcity affects labor outcomes differently based on the substitutability of labor and capital. Anticipating a distinct impact, this paper examined the restriction of skilled immigrants exploiting the H-1B visa restrictions after 2004. The analysis, using triple differences estimation, revealed a significantly positive impact on labor outcomes of natives. Additionally, the visa restrictions positively impacted capital accumulation. These results suggest that the shortage of skilled labor supply induced capital accumulation. Nevertheless, capital investment could not fully adjust to the lack of labor supply, resulting in improved labor outcomes for natives.

Keywords: Immigration; Labor Economics; Labor Policy; Technological Change

JEL classification: J15; J18; J22; J31; J44; J61; O33

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1 Introduction

Immigrant influx has risen annually, potentially impacting native labor outcomes. Consequently, many countries are deliberating on immigrant restrictions to safeguard native workers. Notably, the U.S. restricts skilled immigrants' H-1B work visas for this purpose. The U.K. government has a manifesto aimed at decreasing immigrant influx.

These restriction policies aim to protect the native workers, several studies revealed that the immigrant influx negatively impacts the native labor outcomes. Numerous studies, through empirical analysis, have demonstrated that the labor supply shocks from immigration lead to a decrease in wages and employment rates (Borjas, 2003; Dustmann et al., 2017; Borjas, 2017). Moreover, the skill level of immigrants determines the substitution between natives and immigrants and the effect of the labor supply shock (Ottaviano and Peri, 2012).

This restriction aims to eliminate labor supply shocks from immigration, anticipating an increase in wages and employment rates for native workers. However, existing research suggests that these restrictions may not lead to improved labor outcomes. Clemens et al. (2018) revealed that immigrant restrictions do not enhance native labor outcomes when labor scarcity induces capital investment, based on empirical analysis. Acemoglu (2010) supported this by theoretical analysis, demonstrating that labor scarcity triggers endogenous capital investment. This result indicates that the restriction policy faults the protection of the native workers. Nevertheless, this analysis targets agricultural immigrants. The impact of restrictions on skilled immigrants is not revealed. Abramitzky et al. (2023) also estimated the impact of immigrant restriction by exploiting the quota restriction in the 1920s in the United States, and they showed the restriction-induced capital intensive.

Clemens et al. (2018) lacked variation in immigrants' skill levels and occupations owing to the focus on Mexican seasonal farmworkers through the bracero exclusion. Therefore, it cannot reveal the impact of restrictions on skilled and other industries. This study addresses the gap by exploring how restrictions on skilled immigrants impact native labor outcomes. Acemoglu (2010) demonstrated that labor scarcity induces endogenous technical advancement only if labor and capital are substitutable. Hence, the characteristics of immigrants may determine the impact of restriction policies. This study empirically analyzes the impact of restricting skilled immigrants.

Theoretical predictions regarding the impact on native labor outcomes are ambiguous. When the demand for skilled natives is downward, visa restrictions enhance the native labor outcomes. However, in the presence of endogenous technological advances, where labor demand is upward or flat, the lack of skilled labor supply may not improve native labor outcomes. This study aims to estimate whether the effect is adequate by exploiting the restriction of the H-1B visa restriction.

This study exploited H-1B visa restrictions to assess the impact of restricting skilled immigrants on native labor outcomes. The U.S. restricts the cap of H-1B visas for skilled immigrants to protect native workers, reducing the annual quota from 195,000 to 65,000 in fiscal year 2004.

This study compares native labor outcomes before 2003 and after 2004, considering for-profit and non-profit research institutions to estimate the impact of H-1B restriction. The estimators are interpreted as the Triple Differences estimators.

This study has three key contributions.

First, this paper demonstrates the impact of restrictions on skilled immigrants, including labor scarcity and technical change. The complex channels and ambiguous impact of the restriction are explored, with empirical analysis revealing a positive impact on native labor outcomes.

Second, the study delineates the channel through capital estimation. While the restriction policy aims to protect native workers, existing research revealed that skilled immigrants improve native labor outcomes by fostering innovation, leading to long-term economic growth. Evaluating the policy's adequacy requires understanding its impact on native labor outcomes as well as short-term effects. The study reveals a positive impact on capital accumulation owing to the restriction of skilled immigrants, suggesting that such restrictions do not hinder long-term economic growth.

Third, the study estimates the industry's heterogeneity. The current empirical analysis does not elucidate the relationship between technological change and labor scarcity in various industries. This study addresses this gap in the relationship between other occupations and labor scarcity using the immigrant restriction, targeting many industries.

This paper is organized as follows. The first section briefly overviews the H-1B visa and the visa restriction, while the second section describes the data utilized for the estimation. Subsequently, the third section analyses the restriction by the Triple Difference. Furthermore, it estimates the capital accumulation and checks the mechanism. Conclusions are drawn in the final section.

2 Background

Previous studies highlighted a positive impact on the United States. [Ghosh et al. \(2014\)](#) indicated that skilled immigrants foster innovation, while [Kemeny and Cooke \(2017\)](#) demonstrated that skilled immigrants enhance diversity, positively impacting individuals' annual income. Skilled immigrants contribute to cognitive mobility, known for its positive effect ([Borjas and Doran, 2015](#); [Ganguli, 2015](#)). Conversely, [Fougère and Rainville. \(2011\)](#) simulated skilled immigrants' impact using Canadian data, revealing a potential reduction

in skilled native labor outcomes. Therefore, restriction policies may mitigate these labor supply shocks, potentially improving labor outcomes.

In the U.S., the H-1B visa program permits skilled immigrants to enter the labor market. Skilled immigrants can be employed for as long as three years and can extend their stay up to six years. An immigrant must meet one of these criteria: 1. Possess a degree higher than the United States baccalaureate or foreign equivalent; 2. Hold any required licenses or official permissions for the occupation; 3. Have the equivalent of the required degree for the specialty occupation acquired through education, training, and experience. Occupations include computer system analysis and programmers, physicians, and accounting ([Citizenship and Services, 2008](#)). The H-1B application and approval process is as follows. Employers can submit applications to the Labor Department up to months before the intended employment date of the H-1B worker. The Employment and Training Administration (ETA) approves the application within seven days if it is complete and accurate. Subsequently, employers submit the H-1B petition with the application to U.S. Citizenship and Immigration Services (USCIS). The employer must include information for the H-1B workers and the employer's identification number on the application. If the position requires the skills petitioned for, and the nonimmigrant possesses the necessary qualifications, USCIS adjudicates and approves the petition. Outside the U.S., the H-1B nonimmigrant applies to the Department of State for a visa, and upon arrival, the Department of State issues an H-1B visa for admission at the port of entry. Employers offer benefits on par with those provided to the U.S. workers. They are required to pay either the local prevailing wage or the employer's actual wage ([Office, 2006](#)). Typically, H-1B approvals are for Science, Technology, Engineering, and Mathematics (STEM) workers. In 2003, 28 % worked in the Computer System Design and Related Services, and rising to 36 % in 2004 ([Citizenship and Services, 2008](#)).

The economic impact of the H-1B program on the U.S. has garnered attention. [Kerr et al. \(2015\)](#) demonstrated that H-1B workers increased the employment of native workers from 1995 to 2008. [Kerr and Lincoln \(2010\)](#) highlighted an increase in the number of science and engineering workers among immigrants and natives in the U.S. owing to the H-1B program.

The U.S. restricts H-1B visas for skilled immigrants to protect native workers. The annual cap decreased from 195,000 to 65,000 in the fiscal year (FY) 2004. Notably, the restriction does not apply to colleges, universities, and non-profit research institutions. [Figure 1](#) illustrates the annual cap changes.

The restriction impacted the labor supply of skilled immigrants. [Mayda et al. \(2018\)](#) showed that this H-1B visa restriction reduces the new hiring of new H-1B workers in for-profit firms using triple difference estimation. The merit of this restriction on

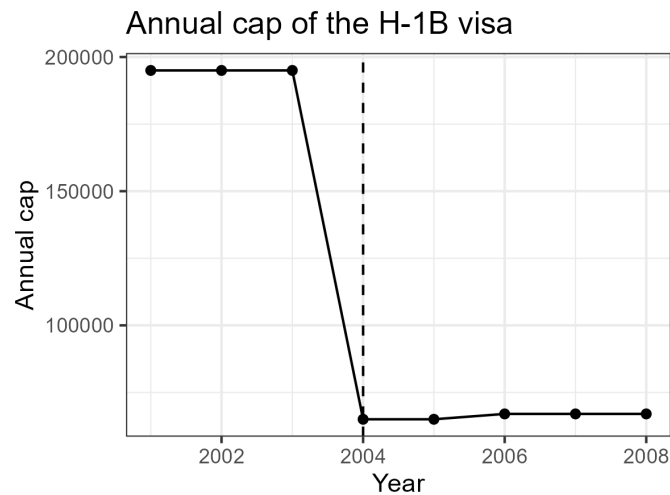


Figure 1: Source: American Immigration Council.

studying skilled immigrants affect all occupations without non-profit research institutions. [Mayda et al. \(2018\)](#) showed that the H-1B visa restriction reduced new H-1B hiring by 18-14 %. [Sparber \(2019\)](#) estimated the substitution between new H-1B workers and established H-1B workers. Foreign students often study in American undergraduate education to be employed in the U.S. H-1B visa is one of the gateways to employment in the United States([Kato and Sparber, 2013](#)). Therefore, the H-1B restriction indirectly reduced immigrant workers by this channel.

Restricting skilled immigrants carries significant implications. Existing research indicates that immigration-induced labor supply shock led to reduced wages and employment rates ([Borjas, 2003](#); [Dustmann et al., 2017](#); [Borjas, 2017](#)). Conversely, the H-1B visa restriction shifted the labor supply curve toward the leftward, anticipating an increase in wages and employment rates, given a downward-sloping labor supply curve. However, these restrictions may not improve the wages and employment rates if the positive spillover of skilled immigrants is absent or if the labor supply is flat or upward, as technological advances adjust to the shortage of labor supply([Acemoglu, 2010](#); [Clemens et al., 2018](#)).

This study exploited skilled immigrant restriction to estimate its impact. First, it estimated the impact of the restriction on wages and the employment rate of native workers to clarify its impact on the labor outcomes of native workers. Second, the study analyzed the impact of capital accumulation to distinguish channels. If the restriction negatively impacts the wages and employment of native workers, the study cannot distinguish between positive spillover, cognitive mobility, or technical advancement. If positive spillover dominates, it is expected that the restriction does not affect capital accumulation. If cognitive mobility dominates, the restriction is expected to reduce capital accumulation. If technical advance dominates, the restriction is expected to increase capital accumulation.

3 Data and Empirical Strategy

This study utilizes the American Community Survey (ACS) data spanning 2001 – 2008 to estimate the impact on wages and employment rate of native workers (Steven Ruggles and Sobek, 2020). The ACS provides individual-level data on employment status, wages, and citizenship status.

The study restricts the sample age to 18 – 64 years for the analysis of economic impacts on the labor outcomes of natives, excluding individuals with military service or schooling. Native and immigrant individuals are distinguished based on their citizenship status. Immigrants are defined as non-citizens or naturalized U.S. citizens.

Moreover, this study aggregates individual data to skill cell-industry-state level data as follows. Individuals are grouped based on their education data. I divide the individual into four education groups by their education: high school graduate (with less than 12 years of completed schooling), high school graduate (with 12 years of schooling), some college graduate (with between 13 and 15 years of schooling), and college graduate (with at least 16 years of schooling). Subsequently, the study categorizes individuals into 13 industries using IND1990 to create cell-industry-state data for each education level.¹

To evaluate the impact of the restriction on capital accumulation, this study employs the Yes-capital data (El-Shagi and Yamarik, 2019). This dataset computes state-by-state private capital stock, serving as the source for capital stock data in the study’s analysis. The Yes-capital data operate at the state-level. Subsequently, the study converts the data utilized in the main estimation into state-level data. The state-level immigrant rate is then computed as the mean value of the treated industry in the empirical analysis of the capital investment.

Owing to the potential upward bias from reverse causality when using the immigrant rate in the same calendar year (Smith, 2012), this study addresses this by using the immigrant rate in 2000 as the immigrant intensity of the cell. It excludes samples that do not include individuals in the cell in 2000. The immigrant ratio $p_{i,j,2000}$ is calculated in a cell group and skill cell-state i , industry j , in 2000. $p_{i,j,2000} = I_{i,j,2000} / (N_{i,j,2000} + I_{i,j,2000})$. Table 1 provides summary statistics for state-cell level characteristics. Table 1 indicates that the immigrant rate in 2000 was approximately 9 %, with an average capital stock of \$ 297 million.

This study utilizes the immigrant rate in 2000 as the variation in restriction levels for its estimation, assuming that cells with a high immigrant rate in 2000 were more impacted

¹The following 13 industries include the following: 1. Agriculture, Forestry, and Fisheries; 2. Mining; 3. Manufacturing; 4. Transportation, Communications, and Other public utilities; 5. Wholesale trade of durable goods; 6. Wholesale trade of nondurable goods; 7. Retail trade; 8. Finance, Insurance, and real estate; 9. Business and repair services; 10. Personal services; 11. Entertainment and recreation services; 12. Professional and related services; and 13. Public administration.

Table 1: Descriptive statistics

Statistic	N	Mean	St. Dev.	Min	Max
<i>Labor variable:</i>					
Employment	22,890	-0.238	0.178	-2.079	0.000
Weekly wage	20,259	6.410	0.518	3.030	9.582
Immigrant rate	22,890	0.093	0.145	0.000	1.000
Treat	22,890	0.140	0.347	0	1
High Intensive	22,890	0.476	0.499	0	1
<i>Capital variable:</i>					
Capital	408	297.094	362.157	23.091	2,464.009
Post	408	0.625	0.485	0	1
Immigrany rate	408	0.098	0.078	0.005	0.376
Immigrany rate high intensive	408	0.112	0.090	0.003	0.406

Source: Labor American Community Survey conducted by IPUMS and the Yes-capital data. The sample is native individuals, age 18–65, and in the labor force. The outcome variables are the logarithm of the weekly wage and the logarithm of the employment rate. The unit of Capital is a million dollars.

by the restriction after 2004. To assess the validity of this assumption, this study examined the relationship between the change in the immigrant rate after 2004 and the rate in 2000 in the restricted cell. Figure 2 illustrates a downward relationship between the change in the immigrant rate and the rate in 2000. This plot suggests that cells with a high immigrant rate in 2000 decreased after 2004 owing to the restriction of the H-1B visa.

The H-1 B applicant rate for individuals with less than a Bachelor’s degree is approximately 2%. The study employed the triple-difference estimation as follows: considering cells with less than a Bachelor’s degree as the control group, this study estimated the following equation to explore the impact of restriction on the wages and employment of native workers:

$$y_{i,j,e,t} = \beta \times p_{i,j,e,2000} \times \mathbb{1}'_{i,j,e,t} + \theta_{ije} + \theta_t + \epsilon_{i,j,e,t}, \quad (1)$$

where $\mathbb{1}'_{i,j,e,t}$ is indicator function that equals one when the education level e is higher than a Bachelor’s degree in an H-1B restricted industry, and after 2004. $y_{i,j,e,t}$ represents labor outcomes (the mean log of weekly wage or employment rate). Under the parallel trend assumption, this estimator is interpreted as the continuous DiD estimation. θ_{ijr} and θ_t represents fixed effects for cell group, state i , education level, and industry j , calendar year t , respectively. This estimation only considers the labor substitution between native workers and immigrants in the same education level and industry (Ottaviano and Peri,

Decreasing of Immigrant influx on the restricted industries

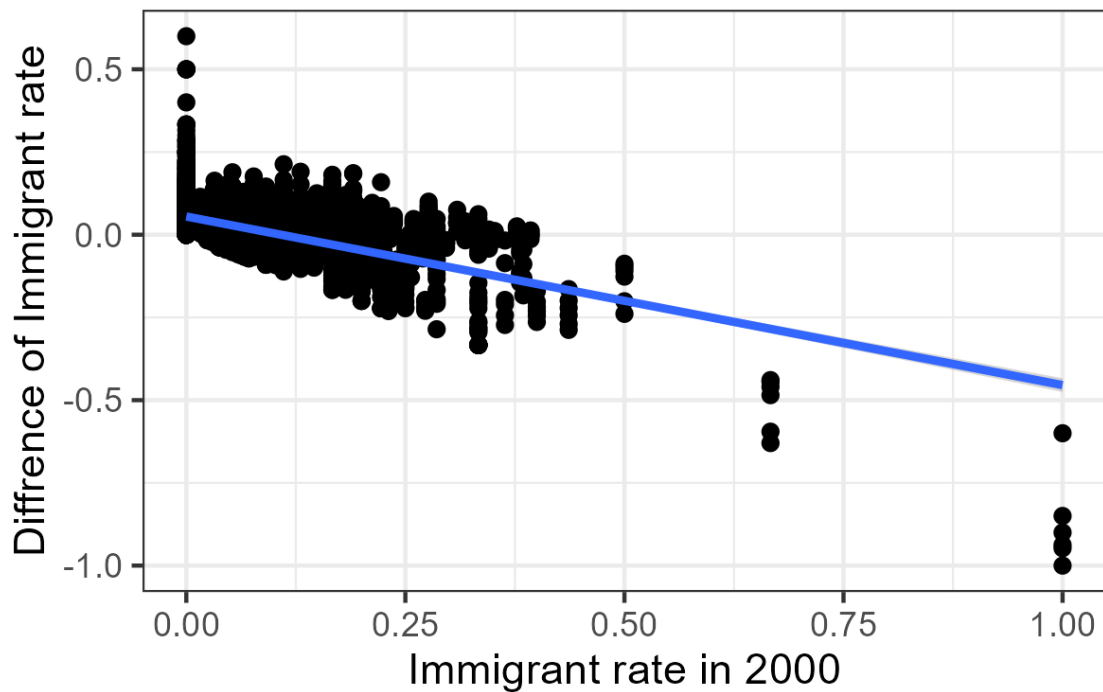


Figure 2: Source: American Comunitry Survey conducted by IPUMS. The sample comprises native individuals aged 18–65 year in the labor force. The point demonstrates the relationship between the change in immigrant rate after 2004 and the rate in 2000 in the restricted cell, specifically focusing on individuals with education levels of more than a college degree and excluding those in the education or public industry.

2012).

When the labor demand curve is downward, the immigrant influx reduces the natives' labor outcome. Conversely, the immigrant restriction raised the labor outcomes of natives. In this case, β in equation (1) is positive. However, theoretical models incorporating technological change may induce a flat-labor demand, wherein the restriction does not increase native wages. Therefore, the theoretical analyses render it ambiguous whether β in equation (1) is positive or negative from the theoretical analyses. The study estimated β using the triple differences method and interpreted it as the impact of the restriction on the labor outcomes of natives.

4 Results

In this section, the study estimates H-1B visa restrictions on both labor outcomes and capital accumulation. Firstly, I estimated the impact of restrictions on wages and the employment rate of native workers. Secondly, I test the impact of the restriction on capital accumulation. Finally, I test the robustness of the announcement effect and industrial heterogeneity.

First, this study empirically analyzed the impact of immigrant restrictions on the labor outcomes of native workers. Table 2 presents the results for Equation (1). The estimation indicates a positive effect beyond the immigration inflow. Standard errors, clustered by state and education level, accompany the results. The third row corresponds to the parameter of interested β in Equation (1).

Column 1 demonstrates the impact of the H-1B restriction on weekly wages, with β at 0.649, which is 1% significant. Column 2 illustrates the impact on the employment rate, with a value of β of 0.125, which is 1% significant. The estimation results revealed that the restriction protected the native workers and increased the labor outcomes. The results differ from the estimated results of Clemens et al. (2018), and this difference merges from the substitutability of skilled immigrant and capital (Acemoglu, 2010). Chen (2015) found that restrictions of skilled immigrants increased the literacy of immigrants, suggesting heightened substitutability after the restrictions. However, the impact on labor outcomes was predominantly influenced by the negative supply shock.

Based on Borjas (2003); Aydemir and Borjas (2007); Edo and Rapoport (2019), the study calculates the elasticity of substitution by the equation $(1 - p_{it}) \times \beta$, where β denotes a total impact of the immigrant influx on the wage of natives. From Column 2 of Table 2, the total impact in treatment groups is obtained as $\beta = 0.649$ by parameters of p_{it}

Table 2: The result of the OLS Regression

	<i>Dependent variable:</i>	
	Weekly wage (1)	Employment (2)
Treat	0.564*** (0.022)	0.167*** (0.007)
Immigrant rate \times Treat	0.649*** (0.203)	0.125** (0.054)
Observations	20,259	22,890
R ²	0.266	0.112
Adjusted R ²	0.158	-0.001
F Statistic	3,195.084*** (df = 2; 17668)	1,285.907*** (df = 2; 20299)

Note:

*p<0.1; **p<0.05; ***p<0.01

Source: American Comunitry Survey conducted by IPUMS. The sample is native individuals, age 18–65, and in the labor force. The outcome variable is the logarithm of the weekly wage and the logarithm of employment rate. All regressions include state, industry, and education-fixed effect and year-fixed effect. Standard errors clustered by state.

(first row) and $p_{it} \times \mathbb{1}$. The wage elasticity from the average immigrant in each skill cell, denoted as $\bar{p} = 0.093$, is calculated as $(1 - \bar{p})^2 \times \beta \simeq 0.82 \times 0.649 \simeq 0.534$. This indicates that a 10 % increase in the number of immigrants in a specific state-skill group in 2000 is associated with a 5.34 % increase in the weekly wage of native workers in the same group. Additionally, the employment elasticity regarding immigrants is approximately 0.10%. The elasticity regarding immigrants in the pre-period is positive for both weekly wages and employment rates.

Next, the study conducts an event study to identify the impact of immigration restrictions on native labor outcomes over time and to test the parallel trend assumption. If the parallel trend assumption is violated, the estimation results are biased.

The study estimates the following equation:

$$y_{i,j,t} = \sum_{t \neq 2003} \beta_t \times p_{i,j,2000} \times \mathbb{1}'_{i,j,t} + \theta_{ij} + \theta_t + \gamma_{i,j,t}. \quad (2)$$

The figures depict the point estimates β_t and 95 % confidence intervals around β_t for each year-specific coefficient. The reference year is 2003, representing the last year before the H-1B restriction. Standard errors are clustered by education, state, and industry levels.

Figure 3 represents the event study for a weekly wage, and figure 4 shows for em-

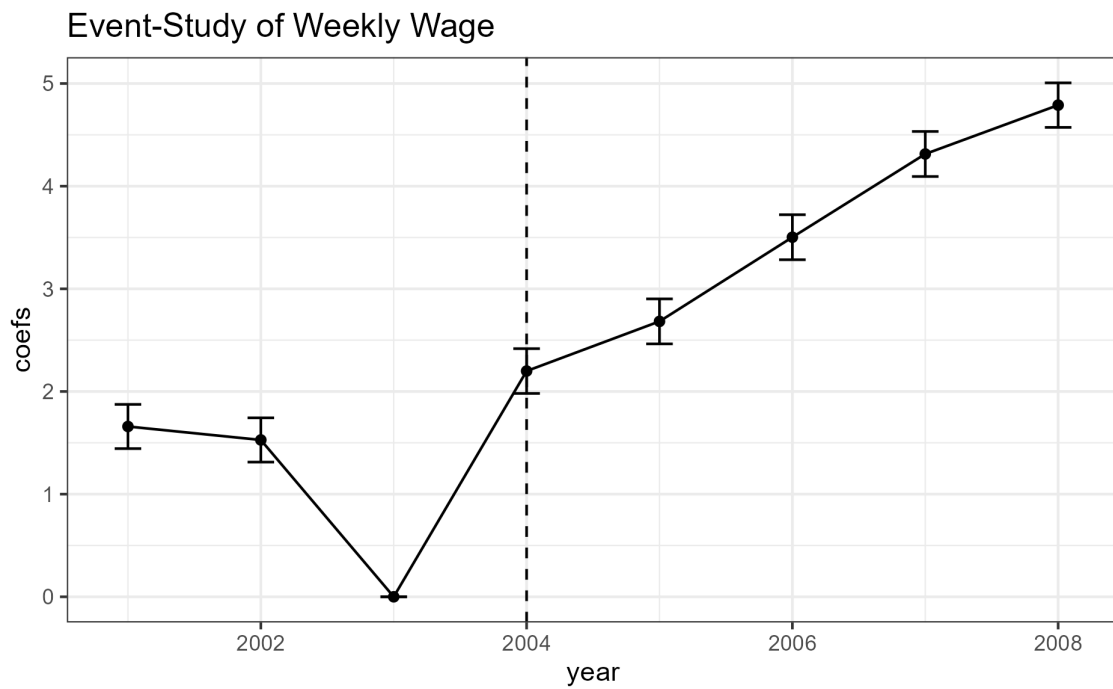


Figure 3: Source: The American Community Survey conducted by IPUMS. The sample is native, age 18-65, and in the labor force. The base year is 2002. The dots and bars represent the point estimators and 95 confidence intervals. The outcome variable is the logarithm of the weekly wage.

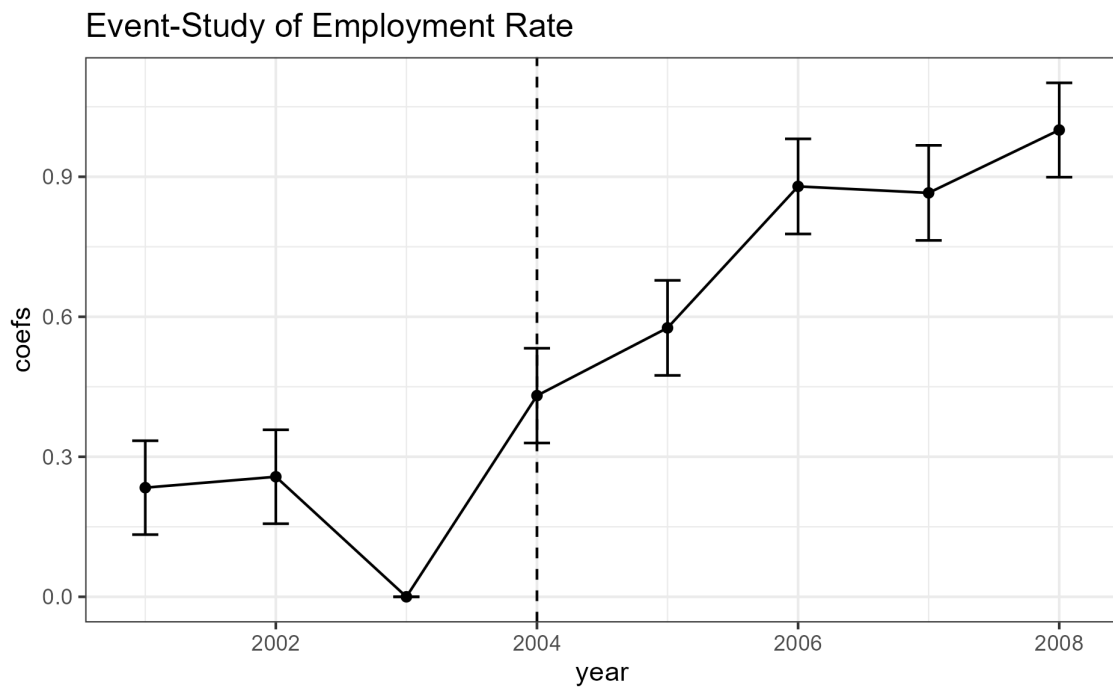


Figure 4: Source: The American Community Survey conducted by IPUMS. The sample is native, age 18-65, and in the labor force. The base year is 2002. The dots and bars represent the point estimators and 95 confidence intervals. The outcome variable is the logarithm of the employment rate.

ployment rate. In both figures 3 and 4, the parameters in 2001 and 2002 are significantly positive. Therefore, the estimation results in Table 2 may represent a lower bound. While acknowledging potential bias in the main estimation, the results consistently show a positive trend, and the interpretation of the estimation results remains unchanged. These findings indicate that the restriction on immigrants positively impacted the native labor outcomes in 2004, and this positive effect persisted from 2004-2008. These results align with the outcomes observed in the Triple Difference estimation. The positive effects were both immediate and sustained, extending through the year 2008.

Next, the study explores the impact of restriction on capital to analyze its mechanism on labor outcomes. In the presence of substitutability between labor and capital, Acemoglu (2010) demonstrates that labor promotes capital substitution with a theoretical framework. To investigate whether restrictions on H-1B visa caps drive this capital substitution, the study examines data on the amount of capital per state. Conversely, restrictions may impede innovation and hinder capital accumulation (Ghosh et al., 2014; Borjas and Doran, 2015; Ganguli, 2015; Kerr and Lincoln, 2010). The study aims to estimate the impact of skilled immigrant restrictions on capital accumulation.

Owing to the data limitation, the yes-capital data only provides state-level data. Therefore, the study computes the immigration rate in the treated occupation in 2000 $p_{i,occ,2000}$, and conducts the DiD estimation as follows estimation equation.

$$y_{i,t} = \beta \times p_{i,occ,2000} \times \mathbb{1}'_{i,t} + \theta_i + \theta_t + \epsilon_{i,j,t} \quad (3)$$

where $\mathbb{1}'_{i,t}$ denotes an indicator function considering one calendar year is after 2004.

Table 3: The result of the OLS Regression(capital)

	<i>Dependent variable:</i>
	Capital
Immigrant rate × Post	681.452** (299.190)
Observations	408
R ²	0.213
Adjusted R ²	0.082
F Statistic	94.509*** (df = 1; 349)

Note: *p<0.1; **p<0.05; ***p<0.01
Source: Yes-capital data. All regressions include state and year-fixed effect. Standard errors clustered by state. The unit of Capital is a million dollars.

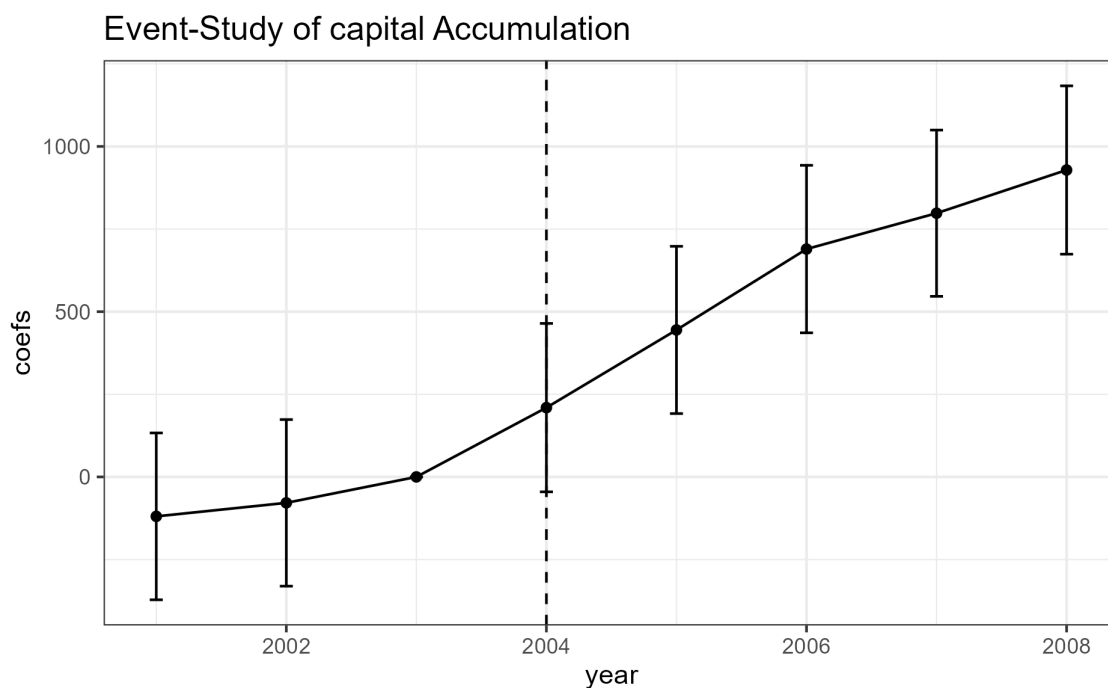


Figure 5: Source: Yes-capital data. The base year is 2002. The dots and bars represent the point estimators and 95 confidence intervals. The unit of Capital is a million dollars.

Table 3 represents the estimation results of Equation (3). The parameter β is positive (681) and significant at the 1 % level. This result indicates that a more restricted state accumulated capital, aligning with findings in Clemens et al. (2018). The point estimator indicates that a 1% increase in 2000 led to a \$ 6.81 million increase in capital stock after the restriction.

Following this, the study conducts an event study to identify the temporal impact of immigration restrictions on capital investment.

The study estimates the following equation:

$$y_{i,t} = \sum_{t \neq 2003} \beta_t \times p_{i,occ,2000} \times \mathbb{1}'_{i,t} + \theta_i + \theta_t + \gamma_{i,t}. \quad (4)$$

where $y_{i,t}$ means the value of investment in state i and calendar year t .

Figure 5 shows the result of the event study. These figures plot the point estimates β_t and 95 % confidence interval around β_t for each year-specific coefficient. The reference year is 2003. Standard errors are clustered by state level.

The parameters of β_t in Equation 4 before 2004 are not significantly different from zero, indicating the validity of the parallel trend assumption in capital estimation. After the restriction, the parameters of β_t in Equation 4 exhibit a consistent and increasing trend with the increase growing each year. These findings are similar to the primary estimation of employment.

While the empirical analysis of the study focuses on short-term impacts, the results suggest that immigrant restrictions fostered capital accumulation, akin to the impact observed with the farm-workers restriction. However, capital accumulation may not fully compensate for the lack of skilled workers. However, the restriction elevated the labor outcomes of native workers despite technological advances.

Finally, the study examines the robustness of the parallel trend assumption and its applicability to immigrant-intensive industries. In both Figures 3 and 4, the reference year parameter may be lower, with parameters for other years relatively higher. This tendency could introduce an upward bias in the primary analysis results. For example, the announcement effect led to an increase in immigration in 2003, resulting in a labor supply shock that impacted wages and employment rates. To gauge robustness against this upward bias, the study excludes the 2003-year sample and performs the same estimation as in the main estimation. Moreover, this study assesses the industrial heterogeneity of immigrant intensity, considering the potential, considering the potential for a larger or different impact in the industries with a lot of immigrant presence before the restriction. To explore this heterogeneity, the study introduces a *high – industry* dummy when taking the industry with the immigrant rate in 2000 above the median ($p = 0.71$).² Table 4 represents the heterogeneous impact of the H-1B restriction.

Table 4 reports the results of these robustness checks. Columns 1 and 2 represent the robustness of the announcement effect, while Columns 3 and 4 illustrate the heterogeneity of the immigrant-intensive industries. Columns 1 and 2 represent that the parameter value is lower than those in Table 2. However, the point estimators for weekly wages are positive (0.37) and statistically significant at the 5% level. While the point estimator for the employment rate is not significant, but remains positive. Notably, the main analysis results may have an upward bias owing to the announcement effect. However, the positive impacts on the labor outcomes of native workers persist robustly against this bias, particularly in the case of wage impact.

²Immigrant-intensive industries, defined using the IND1990 variable provided by the ACS manufacturing, whole trade of durable goods, whole trade of nondurable goods, retail trade, business and repair services, and personal services.

Table 4: The result of the OLS Regression(Triple-difference and ommit)

	<i>Dependent variable:</i>			
	<i>Drop 2003 samples</i>		<i>Immigrant-intensive Industries</i>	
	Weekly wage	Employment	Weekly wage	Employment
Treat	0.522*** (0.021)	0.149*** (0.007)	0.486*** (0.031)	0.155*** (0.011)
Treat × Immigrant rate	0.370** (0.183)	0.044 (0.051)		
Treat×Immigrant rate			0.676* (0.345)	0.093 (0.073)
Treat×High Intensive			0.153*** (0.043)	0.024 (0.015)
Treat×Immigrant rate ×High Intensive			-0.232 (0.424)	0.020 (0.105)
Observations	17,736	20,352	20,259	22,890
R ²	0.226	0.092	0.269	0.113
Adjusted R ²	0.110	-0.025	0.161	-0.0003
F Statistic	2,254.907*** (df = 2; 15428)	909.978*** (df = 2; 18043)	1,623.160*** (df = 4; 17666)	646.379*** (df = 4; 20297)

Note:

*p<0.1; **p<0.05; ***p<0.01

Source: American Comunitry Survey conducted by IPUMS. The sample is native individuals, aged 18–65, and in the labor force. The outcome variable is the logarithm of the weekly wage and the logarithm of the employment rate. The samples whose calendar year are 2003 are dropped in Column 2 and 3. The high_ind takes 1 when the industry with the immigrant rate in 2000 above median and 0 otherwise. All regressions include state, industry, and education-fixed effect and year-fixed effect. Standard errors clustered by state.

Row 3 of Table 4 represents the β in Equation 1. The point estimates for a weekly wage are positive and significant at the 10% level, while the employment rate is positive but insignificant. Row 5 of Table 4 displays the heterogeneity of the effect of the H-1B restriction, while the estimators are positive but not significantly different from zero. These results suggest that the restriction impacts on the labor outcomes are homogeneous and are not different for the intensity regarding skilled immigrant workers.

Table 5: The result of the OLS Regression(capital, heterogeneity)

	<i>Dependent variable:</i>
	Capital
Immigrant rate in high intensive \times Post	592.772** (243.856)
Observations	408
R ²	0.213
Adjusted R ²	0.082
F Statistic	94.292*** (df = 1; 349)

Note: *p<0.1; **p<0.05; ***p<0.01
Source: Yes-capital data. All regressions include state and year-fixed effect. Standard errors clustered by state. The unit of Capital is a million dollars.

Next, this study assesses the impact of capital accumulation on immigrant-intensive industries. It computes the average immigrant rate in these industries in 2000 and estimates Equation 3. Figure 5 shows the result. Figure 5 presents the results, indicating an impact of 593.6 at a 1% level significance level. This result suggests that the restriction on skilled immigrants also led to increased capital accumulation in immigrant-intensive industries; however, but at a lower level than the overall impact.

In summary, the results from Table 4 and 5 indicate robust, estimation outcomes regarding the announcement effect. Additionally, minimal to no heterogeneity is observed in the impacts across immigrant-intensive industries.

5 Conclusion

Immigration restrictions have been discussed worldwide to protect native workers. However, few studies have analyzed the economic impact of immigration restrictions on native workers.

[Clemens et al. \(2018\)](#) demonstrates that the Mexican Bracero Exclusion does not increase the labor outcomes of native firm workers. Nevertheless, this analysis is limited to seasonal agricultural workers, migrants, and natives. These results are in line with [Acemoglu \(2010\)](#). [Acemoglu \(2010\)](#) developed a theoretical framework for labor scarcity and capital accumulation. [Acemoglu \(2010\)](#) concluded that labor scarcity induces capital accumulation, and labor scarcity does not increase labor outcomes when labor and capital are substitutes. Otherwise, labor scarcity does not cause capital accumulation when labor and capital are complementary. Therefore, native workers may be impacted differentially by the characteristics of the restricted immigrants (e.g., education level).

The H-1B visa is a work visa for highly educated immigrants in the United States. To analyze restrictions on skilled immigrants, this study empirically estimated the impact of exploiting the limit of a maximum number of H-1B visas per year.

The study conducted the Triple differences estimation. The estimation results show that the H-1B restriction raised the weekly wage and employment rate. Moreover, [Acemoglu \(2010\)](#) suggests that labor scarcity induces capital accumulation when labor and capital are substitutes. This study employs the Yes-capital data and estimates the relationship between the 2000 immigrant rate and capital acculturation. The estimation result implies that States with a higher rate of immigrants as of 2000 have accumulated more capital.

The estimation results of labor outcomes and capital accumulation suggest that the H-1B visa restriction fostered capital accumulation, but the accumulation does not reduce the labor outcomes.

The study reveals that the H-1B restriction policy improved natives' labor outcomes. It demonstrates the restriction fostered capital investment similar to [Acemoglu \(2010\)](#). These results suggest that contrary to the farm-workers restriction, capital accumulation could not fully adjust the impact in the case of the H-1B restriction. The results suggest that immigrant restrictions have a different impact depending on immigrant characters, and further empirical analyses must be studied.

Three limitations exist in this study.

First, the study only estimates the short-term impact of H-1B visa restrictions. It reveals that the restriction of skilled immigrants fosters capital investment. This capital investment may change product components, and this change affects the labor demand of skilled natives in the long term.

Second, this study was limited by the supply-side change. The study analyzes the labor demand side due to visa restrictions. However, it has not been able to analyze the changes in demand on the firm side or the changes in output ([Clemens et al., 2018](#)). Nevertheless, [Ghosh et al. \(2014\)](#) report the H-1B restriction reduced the firm's sales. This reduction suggests that both capital investment and output reduction could not fully adjust

the immigrant restriction. Therefore, structural estimation and state- and industry-specific data can be used to address this limitation.

Third, this study estimates the impact of visa restrictions on capital accumulation. Nevertheless, owing to data limitations, the study cannot analyze heterogeneity regarding capital characteristics. [Webb \(2019\)](#) demonstrates that different occupations are relevant to robots, software, and AI. There may be a similar relationship between the industry and each technology.

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