

Applied Economic Insights

Impacts of Deportation on Employment, Wages, and Output in California Vegetable Production

Umesh Gautam^a and Stephen Devadoss^a^a*Texas Tech University*

JEL Codes: J21, J43, J61

Keywords: California deportation, farm-labor shortages, vegetable production

Abstract

California is the leading producer of lettuce, tomatoes, carrots, broccoli, and cauliflower, and accounts for 36.84 percent of US vegetable production, valued at \$10.5 billion. Labor-intensive sectors, such as vegetable production, endure chronic labor shortages. The deportation of undocumented workers will drastically reduce vegetable production in California because domestic workers are unwilling to take field jobs and readily bringing in guest workers is not feasible.

1 Introduction

In 2024, the United States produced approximately \$28.5 billion worth of vegetables, with California contributing 36.84 percent, valued at \$10.5 billion (USDA-NASS 2024). California is the leading producer of lettuce, tomatoes, carrots, broccoli, and cauliflower (California Department of Food and Agriculture 2024). Policymakers believe that deporting unauthorized immigrants will increase wages and employment opportunities for native-born Americans, but the literature does not support this claim. For instance, Devadoss and Luckstead (2008) found that the employment of one additional immigrant worker resulted in a minimal displacement of native-born workers and had an insignificant effect on native-born wages.

The unauthorized immigrant population in California was estimated at 1.8 million in 2022; of these, 1.45 million were in the California labor force, comprising 7.2 percent of its labor force (Passel and Krogstad 2024). In recent years, about half of the California farm workforce were undocumented workers (Rutledge et al. 2024), and about 5 percent were guest workers (Martin and Rutledge 2025).

Immigration and Customs Enforcement (ICE) raids of produce farms in California caused undocumented farmworkers to flee, disrupting farm operations (Garcia 2025). Many immigrant farmworkers are not coming to work as they are scared of ICE raids. As the Trump administration implements a policy of mass deportation, labor-intensive vegetable production in California is expected to be adversely affected. As unauthorized workers are deported, the demand for substitute inputs (low-skilled native-born and guest workers) is expected to increase, and demand for complement inputs (high-skilled workers, materials, and capital) is expected to decrease, resulting in higher wages and employment for low-skilled workers and lower wages and employment for high-skilled workers. However, the magnitude of these effects is an empirical question. Furthermore, the removal of undocumented farm workers and the decline in the employment of high-skilled workers, materials, and capital will lower vegetable output. We estimate the impacts of the repatriation of undocumented farm workers on wages, employment, and output in vegetable production in California.

2 Data

We choose the vegetable market in California because this state is the leading producer of vegetables. We consider the year 2023, the most recent year for which the data is available. Data for wages and employment of various types of workers (low-skilled native-born, H-2A, undocumented, and high-skilled), demand elasticity of low-skilled workers, supply elasticity of low-skilled native-born and guest workers, and adverse effect wage rate (AEWR) are obtained from various sources.¹

The US Bureau of Labor Statistics (BLS) reports average annual employment and wage payments for vegetable production in California in its quarterly census of employment and wages, which contains private and state establishments. On average, annual employment in California vegetable production is 27,295, including both low- and high-skilled workers (BLS 2023).² According to the USDA Economic Research Service (2025), 87 percent of the farm workforce in the United States in 2023 was nonsupervisory. Applying this information to the total workforce (27,295) in vegetable production in California leads to 23,747 low-skilled workers and 3,548 (13 percent) high-skilled workers.

About half of the farm workforce in California is unauthorized (Rutledge et al. 2024). Because vegetable and fruit productions are labor-intensive and these sectors employ more undocumented workers than other farm crops, we assume that about 60 percent of the total workers employed were undocumented in California vegetable production in 2023, resulting in 16,377 of these workers. Following Costa (2023), we assume that guest workers account for 15 percent of the average annual employment, which results in 4,094 of these workers. Subtracting 16,377 undocumented and 4,094 H-2A workers from the average annual employment of 23,747 low-skilled workers yields 3,276 domestic low-skilled workers.

In California, AEWR was \$18.65 per hour (Migration Dialogue 2024), which can be higher than the wage received by undocumented workers, which accounts for most of the workforce. However, employing unauthorized workers has its own risk because of domestic enforcement, which can lead to fines for employers. Therefore, we use \$18.65 as the common wage rate for H-2A, native-born, and undocumented workers.

Several studies have examined the supply and demand elasticities for low-skilled farm labor in the United States. Using data spanning 27 years (1989–2016), Li and Reimer (2021) estimated the labor supply elasticity to be inelastic at 0.538. Espey and Thilmany (2000), in a comprehensive review, reported that demand elasticity for hired farm workers ranged from 0.22 to -4.42 , with a mean value of -0.74 and a median value of -0.54 . Devadoss and Luckstead (2008) utilized a supply elasticity of 0.5 and a demand elasticity of -2 in their benchmark analysis.

In line with these empirical findings, our baseline analysis employs a supply elasticity of 0.4 for low-skilled native-born workers, 0.5 for guest workers, and a demand elasticity of -2 for low-skilled native-born workers. We also conduct sensitivity analyses by varying these elasticities to assess their effects on the model's endogenous variables. Drawing from Devadoss and Luckstead (2008) and Subedi and Giri (2024), we allocate total production costs as follows: low-skilled labor 28 percent, high-skilled labor 20 percent, materials 35 percent, and capital 17 percent.

¹ The AEWR is the minimum wage that will not lower the employment opportunities for US workers (Luckstead and Devadoss 2019).

² Average annual employment is defined as full-time equivalent jobs. For this study, we assume that average annual employment is the same as the total number of workers, which means that deporting one unauthorized worker is the same as eliminating one full-time equivalent job.

3 Empirical Analysis

We utilize a model of vegetable production that employs six inputs: three types of low-skilled workers (native-born, H-2A, and unauthorized), high-skilled workers, materials, and capital.³ For the baseline analysis, we use the elasticities indicated above to analyze the effects of deporting undocumented workers on the earnings of all inputs and the value of vegetable production. Table 1 presents the estimated effects of deporting 1,000 undocumented workers on the employment and wages of native-born and guest workers.⁴

Table 1. Estimated effects of deportation of 1,000 undocumented workers on employment and wages for native-born and guest workers

Replacement Effect on Domestic Workers	Replacement Effect on Guest Workers	Wage Effect on Low-Skilled Workers
25.76	40.25	1.96%

Note: We use the supply elasticity of 0.4 for domestic workers and 0.5 for guest workers, and the demand elasticity of 2.0 for low-skilled workers.

The removal of 1,000 undocumented workers leads to an increase in the employment of low-skilled native-born workers by only 26 and raises their annual wage rate by just 1.96 percent, suggesting negligible changes. These small effects align with findings from previous studies. Clemens, Lewis, and Postel (2018) reported that the removal of unauthorized immigrants has a positive but minimal impact on native-born employment and wages. Similarly, Devadoss and Luckstead (2008) estimated that the influx of new immigrants in vegetable production only slightly reduces native-born employment and wages, largely because native-born workers are generally unwilling to undertake the demanding physical labor required in agricultural production.

H-2A workers can potentially fill the positions vacated by deported unauthorized workers. However, our findings indicate that deporting 1,000 undocumented workers increases the employment of H-2A workers by only 40. This limited response reflects the rigidities in the H-2A hiring process: Employers must initiate a lengthy application process well before the season begins, provide housing and transportation, and demonstrate that no domestic workers are available. These constraints make H-2A hiring less responsive in the short run, even when wages rise.

The wage increases for guest workers mirror those of low-skilled native-born workers, as all low-skilled laborers are considered perfect substitutes in this analysis. Since the combined increase in native-born and guest worker employment is only 66, the removal of 1,000 undocumented workers ultimately reduces total employment in California's vegetable production by 934. This substantial reduction underscores the risk of severe labor shortfalls in the industry if unauthorized workers are deported, as Gutiérrez-Li (2025) suggests a drastic reduction in agricultural labor supply due to mass deportation.

The loss of 1,000 undocumented workers leads to an annual output reduction of \$36.23 million in California's vegetable sector. This finding is consistent with Rutledge and Mérel (2023), who observed that a 10 percent decrease in the farm labor force results in a decline of approximately 4.2 percent in agricultural output across California's top ten fruit and vegetable producing counties. These results highlight the need for policymakers to carefully weigh the consequences of removing undocumented

³ The theoretical model developed in this paper builds upon Devadoss and Luckstead (2008) by incorporating three types of low-skilled workers—domestic, H-2A (guest), and undocumented—along with high-skilled labor, materials, and capital, within a constant elasticity of substitution (CES) production framework, and then calibrated the results.

⁴ We focus on the removal of 1,000 workers, as deporting all unauthorized workers from California's vegetable sector is not practical. However, the framework can be easily adapted to analyze the impact of deporting different numbers of workers, such as 10,000.

workers when crafting immigration policies, given the significant implications for labor supply, wages, and overall agricultural production.

Guest workers contribute substantially to California's vegetable production, generating an estimated \$158.81 million annually (calculated as the number of guest workers multiplied by the average annual wage per worker). This underscores the crucial role of expanding guest worker employment to address the labor shortages created by the repatriation of undocumented workers. Despite high labor demand in this sector, employment of low-skilled domestic workers remains low, as most prefer higher-paying or less laborious jobs outside of agriculture. Our analysis shows that deporting 1,000 undocumented workers leads to only a minimal increase in domestic worker employment, highlighting the need for a significant expansion of the guest worker program to prevent output losses from labor scarcity. This recommendation aligns with recent policy discussions, including President Trump's position that undocumented farm workers should leave the country and return through legal channels (Gamboa 2025).

We also perform sensitivity analyses using alternative values for the supply elasticity of native-born workers (0.75) and guest workers (1.0), and demand elasticity (0.75). In these sensitivity analyses, the maximum possible increases in employment for low-skilled native-born and guest workers are 101 and 168, respectively. At these levels, wage increases in response to the repatriation of undocumented workers are smaller, as the labor supply becomes more responsive. Additionally, when we vary the demand elasticity of low-skilled workers, the expansion in employment for both native-born and guest workers is more limited since employers are more sensitive to wage increases. With higher demand elasticity, the rise in wage rates is also muted.

Suppose unauthorized workers comprise only 40 percent of the total workforce in vegetable production. The deportation of 1,000 of these workers results in a modest increase of 1.88 percent in the wage rate for low-skilled workers. Employment rises by 66 for low-skilled domestic workers and by 39 for guest workers. While the increase in employment is higher for domestic workers—owing to their larger share in the remaining workforce, which yields a higher replacement coefficient compared to guest workers—the overall magnitude of employment gains remains relatively small.

Overall, our results indicate that the maximum possible increase in the annual wage for low-skilled native-born and guest workers is only 5.27 percent when the supply elasticities for native-born and guest workers are 0.1 and 0.2, respectively, and the demand elasticity is set at 0.75.

Next, we analyze the impact of deporting a single undocumented worker on the earnings of other production factors and the overall value of vegetable production (see Table 2). With the AEW set at \$18.65, a low-skilled worker in California's vegetable sector earns an annual wage of \$38,792, an amount that reflects the loss in output from the removal of one undocumented worker. Even after accounting for the partial replacement by low-skilled native-born and guest workers, the annual decline in vegetable production value per deported worker is \$36,231, because native-born and guest workers replace only 0.026 and 0.040, respectively, of one deported undocumented worker. Overall, the total annual contribution of all low-skilled workers to vegetable production is approximately \$921 million, calculated as the number of low-skilled workers multiplied by their average annual wage.

With replacement coefficients of 0.0257 for native-born workers and 0.0402 for guest workers, the repatriation of one additional undocumented worker leads to annual earnings gains of \$3,499 for low-skilled native-born workers, \$4,685 for guest workers, and \$12,493 for remaining undocumented workers, reflecting increased demand for their labor.

In vegetable production, high-skilled workers such as field supervisors, quality assurance technicians, and agronomists oversee or coordinate the work of low-skilled laborers. When a substantial portion of undocumented workers is removed, the productivity and operational necessity of some high-skilled roles diminish. As low-skilled undocumented workers complement high-skilled workers in vegetable production, the removal of one undocumented worker results in an earnings loss of \$5,032 for

each high-skilled worker. Likewise, the earnings associated with materials and capital decrease by \$8,806 and \$4,277, respectively, as overall vegetable output declines following the removal of undocumented workers. Ultimately, as noted above, vegetable production in California declines by \$36,231 due to one additional deportation.

Table 2. Distributional impacts of deporting one undocumented worker: factor earnings and production value (in \$)

Variables	Values (\$)
Decline in vegetable production	36,230.71
Total low-skilled workers	20,676.64
Domestic workers	3,498.72
Guest workers	4,684.93
Existing undocumented workers	12,492.97
High-skilled workers	-5,032.72
Materials	-8,806.07
Capital	-4,277.25

Note: The computation of the values in this table is based on the replacement coefficient of 0.0257 for domestic workers and 0.0402 for guest workers, supply elasticity of 0.4 for domestic workers and 0.5 for guest workers, and demand elasticity of 2.0 for low-skilled workers.

The increase in the earnings of native-born workers is lower than that of guest workers because the replacement coefficient is lower for the former than for the latter. The increase in existing undocumented workers' earnings is smaller relative to domestic workers, because undocumented workers have the wage-reduction effect but not the replacement effect. The three inputs (high-skilled workers, materials, and capital) lose due to the deportation of undocumented workers because these workers do the physical labor—such as fertilizer application, pesticide spraying, and vegetable harvesting—and complement the US high-skilled workers, materials, and capital.

There are 16,377 undocumented workers employed in California's vegetable production sector in 2024. In the extreme scenario in which half of these workers are deported, employment among low-skilled native-born and guest workers rises by 211 and 330, respectively. However, this large-scale removal results in a modest increase of 16.10 percent in the annual wage for each low-skilled worker, while significantly impacting California's vegetable production, reducing annual output by \$297 million.

4 Summary and Policy Implications

The chronic labor scarcity in vegetable production will only deepen under mass deportation policies: removing 1,000 undocumented workers leads to negligible upticks in native-born (26) and guest (40) employment and small wage (1.96 percent) increases but substantial overall employment (934) and output (\$36.23 million) loss. Given native-born workers' widespread reluctance to take farm jobs, policymakers should consider streamlining and expanding the guest-worker program so that farmers will not face bureaucratic delays. A well-functioning guest-worker program would increase the labor supply and meet the needs of vegetable production so that farmers can produce vegetables without facing labor shortfalls.

About the Authors: Umesh Gautam is a graduate student in the Department of Agricultural and Applied Economics, Texas Tech University, Lubbock, TX. Stephen Devadoss is the Emabeth Thompson Endowed Professor in the Department of Agricultural and Applied Economics, Texas Tech University, Lubbock, TX (Corresponding Author Email: stephen.devadoss@ttu.edu).

Acknowledgments: The authors acknowledge the helpful comments of two reviewers.

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DOI: <https://doi.org/10.71162/aeed.358040>

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