THE EFFECTS OF ONGOING INTERNAL IMMIGRATION ENFORCEMENT ON THE U.S. AGRICULTURAL LABOR SUPPLY

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Abstract

This article examines the impact of immigration enforcement on the U.S. agricultural labor supply using a novel empirical approach that leverages time and geographic variation in immigration-related arrests. Unlike previous research that has relied on specific policy changes, we demonstrate that unexpected increases in enforcement intensity have a temporary but costly impact on labor supply decisions among non-citizen farmworkers. Analyzing Current Population Survey data and immigration-related arrest records, we find that unexpected increases in immigration arrests decrease labor force participation (LFP) among non-citizen farmworkers by up to 3.2 percentage points and reduce weekly work hours by as much as 17% per month. These effects translate to a 1.3 percentage point decline in LFP and a 6.6% reduction in weekly hours worked across the agricultural workforce during months experiencing heightened immigration enforcement. Our results suggest that localized enforcement exerts downward pressure on immigrant populations even during periods when policies are not activated, affecting more areas of the country where labor-intensive agriculture dominates.

JEL Codes: J15, J21, J43, J61

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1 Introduction

The U.S. agricultural sector faces a persistent labor shortage, where farmers nationwide routinely struggle to find enough workers from one growing season to the next (Zahniser et al., 2018). Not only does this shortage put upward pressure on wages, but it also threatens the sustainability of farm operations and potentially compromises national food security (Richards, 2018; Bronars, 2015). While the drivers of agricultural labor shortages are complex, spanning multiple factors, it is closely tied to outdated U.S. immigration policies and aggressive immigration enforcement (Economic Research Service, 2024). Despite the persistent need for labor in agriculture—a sector that attracts few domestic workers—immigration remains a highly contentious topic in national debates, leading to a patchwork of immigration policies at all level of government.

Given the counterproductive relationship between immigration enforcement and agricultural labor supply, numerous studies have examined the impact of specific immigration policy changes on agricultural workforce (Luo et al., 2023; Luo and Kostandini, 2022; Charlton and Kostandini, 2021; Kostandini et al., 2014). However, less attention has been paid to the effects of ongoing immigration enforcement during periods between major policy shifts. This gap in the literature is significant, as the day-to-day implementation of existing policies can substantially influence labor availability and farm operations. Understanding these continuous effects is crucial for a comprehensive assessment of how immigration enforcement shapes agricultural labor markets and farm productivity in the U.S.

In this paper, we aim to fill this gap by using a novel approach that utilizes immigration-related arrests to assess immediate shifts in labor supply within the agriculture sector. Building on Rubalcaba et al. (2024a)'s approach, we leverage the month-to-month patterns in immigration-related arrests conducted by Immigration Customs and Enforcement (ICE) agents to pinpoint exogenous enforcement shocks unanticipated by workers. Specifically, we identify exogenous change in ICE arrests when the contemporaneous level of arrests deviates from arrest trends. By applying this strategy, we are able to evaluate the causal impact of ongoing enforcement actions on labor supply in agriculture.

Using data from the Current Population Survey and ICE arrests between 2014 and 2018, we

evaluate the impact of these shocks on agriculture labor supply at the intensive and extensive margins. From our analysis, we find that an unexpected shock in arrests decreases the labor force participation among non-citizen farmworkers by as much as 3.2 percentage points and the number of hours they work by up to 17% — an impact shown to be stronger for women's labor force participation. Over the five-year period of observation, we calculate these reductions in labor supply to be valued at approximately $11.68 billion.[2] Our findings offer new insights into immigrant farmworkers' labor supply behavior, illuminating the month-to-month effects of immigration enforcement. While previous studies have primarily examined permanent labor supply shifts resulting from policy changes, our research reveals that even temporary fluctuations in the enforcement environment can significantly impact labor supply decisions in the short term. Uncovering this dynamic relationship between enforcement activities and agricultural labor markets contributes to a more comprehensive picture of how ongoing interior immigration enforcement actions affect the U.S. farming sector.

We demonstrate that our primary results are robust across several model specifications, examining the reliability of our findings. We conduct a series of falsification and placebo simulation tests to evaluate our empirical strategy. These tests help rule out alternative explanations and strengthen the causal interpretation of our results. Additionally, we provide evidence that the labor supply response does not anticipate enforcement shocks. This lack of anticipation supports our assertion that these shocks are indeed exogenous from the perspective of farmworkers, bolstering the validity of our identification strategy.

Furthermore, our analysis reveals that the impact of enforcement shocks on labor supply is short-lived, lasting approximately one month. This transient effect shows that immigration enforcement can cause significant short-term disruptions in agricultural labor supply, which can occur several times over a growing season. These additional findings reinforce the robustness of our primary results and offer nuanced insights into the temporal dynamics of how immigration enforcement affects agricultural labor markets.

This article relates to recent literature in agricultural economics that has studied the relationship between immigration policies and farm outcomes. For example, Charlton and Kostandini

[2] Adjusted to 2017 dollars

(2021) looked at the impact of 287(g) agreements on the dairy industry. Similarly, Kostandini et al. (2014) found evidence that 287(g) programs had an effect on farmworker wages, input and output producer choices, and farm profitability, while Ifft and Jodlowski (2022) concluded that these programs limited technological advancements. Luo and Kostandini (2022) and Luo et al. (2023) provide evidence that E-Verify adoption led to a significant decline in the farmworker population. One of our main contributions is that, unlike previous studies, our findings are not specific to a singular immigration enforcement policy. Instead, we focus on what Amuedo-Dorantes and Antman (2022) refers to as a *de facto* measure of enforcement, which arises even in the absence of policy variation.

Within the domain of immigration enforcement and control, it's essential to distinguish between immigration policies (*de jure*) and enforcement intensity (*de facto*). Implementing federal or state policies may only change workers' behavior if enforced. Additionally, there are a host of other factors that may mediate enforcement intensity, such as sanctuary county policies implemented by local law enforcement agencies. Our approach circumvents this concern as we do not analyze any specific policy. Instead, we rely on ICE arrests, allowing us to capture the real-world impact of immigration enforcement as experienced by workers.

While other studies have shed light on the impacts of *de facto* measures of enforcement (Amuedo-Dorantes and Antman, 2022; Rubalcaba et al., 2024a), our paper is the first to extend this analysis to evaluate the effects of immigration enforcement actions on agricultural labor markets. In contrast, most of the existing work has studied the impact of the implementation of immigration policies, as explained above, or ignored the agricultural sector altogether. To our knowledge, there are only two other papers focusing on immigration enforcement actions, and they both focused on different outcome variables than we do. Rubalcaba et al. (2024a) analyzed the effects of enforcement arrests on the youth labor supply of Hispanic individuals living in mixed-status households. Amuedo-Dorantes and Antman (2022) used Google searches on immigration deportations to analyze labor supply not specific to agriculture.

Overall, the findings of this paper are informative of the broad implications that immigration enforcement actions can have. With this paper, we aim to improve our understanding of the effects on farm labor availability of a mix of overlapping immigration control measures

that could have changed the behavior of undocumented workers, a sizable fraction of the farmworker population. We find that enforcement can have disruptive effects on workers' behavior even during times of policy inaction. This is important in the context of major concerns about agricultural labor shortages, which threaten the livelihoods of farmers and farmworkers, the food security of the country, and the economies of rural communities. Given the current climate of rising food prices and persistent labor shortages, examining the factors influencing agricultural production, such as labor, is increasingly important, especially as some political leaders advocate for mass deportation measures.

The rest of the article is organized as follows. Section 2 explains the contributions of this paper to the existing literature and provides context on the role of immigrant workers in U.S. agriculture. Section 3 describes the data sources. Section 4 presents and provides the rationale behind our empirical approach. The main results are presented in Section 5, while Section 6 shows the robustness of our findings. Section 7 concludes.

2 Background

2.1 Agricultural Labor Shortages

Throughout much of the 20th century, the U.S. agricultural sector benefited from a relatively plentiful supply of workers. The Bracero Program, in place between 1942 and 1964, brought millions of Mexican workers to agricultural operations in the U.S. However, the program was terminated due to concerns over worker rights violations, leading to a large influx of undocumented immigrants who filled the labor gap left by former Bracero workers (Gutierrez-Li, 2024). This source of labor led to lower farm wages and production costs, which, in turn, provided very few incentives for growers to invest in automation (Charlton and Taylor, 2016).

After the passage of the Immigration Reform and Control Act (IRCA) in 1986, many undocumented farmworkers gained legal status. However, the government started cracking down on illegal immigration, both in the interior of the country and at the Southern border. The rise in enforcement led to a sharp decline in the farm labor supply, partly explaining the current farm labor shortages. Since that time, U.S. farmers have struggled to recruit and retain an ade-

quate agricultural workforce. (Gutierrez-Li, 2021; Hertz and Zahniser, 2013). Ultimately, the persistence of labor shortages in the agriculture sector has resulted in food waste, fruits, and vegetables left rotting in fields without pickers and harvesters, and farm wages have increased in absolute terms and relative to other occupations (Economic Research Service, 2024; Richards, 2018). Despite rising wages, the agricultural sector struggles to attract domestic workers. Even during economic downturns and periods of high unemployment, American-born workers consistently avoid agricultural work as an employment option (Richards, 2018); (Luckstead et al., 2022); (Peri and Sparber, 2009).

The agricultural labor shortage stems from two key factors: a declining pool of workers willing to engage in farm work and an increased demand for fresh produce driven by economic and population growth. The farm labor scarcity problem is particularly acute for sectors like specialty crops, the green industry (indoor plants and ornamentals), and poultry and livestock, which rely heavily on labor. Altogether, the reduction in the number of farmworkers can be explained by various factors, including increased immigration enforcement and the aging out of older agricultural workers who came decades ago (Kostandini et al., 2014; Charlton and Taylor, 2016). Aside from enforcement measures, economic growth in Mexico has made workers from that country less interested in joining agriculture there or in the United States, as the gap between expected incomes in America relative to earnings in Mexico net of moving costs has narrowed (Hanson, 2006); (Kennan and Walker, 2011); (Lessem and Nakajima, 2019).

2.2 Immigrant Workers in U.S. Agriculture

Immigrant workers, both documented and undocumented, are vital to the U.S. agricultural sector, forming the backbone of the agricultural workforce and performing essential tasks that native-born workers typically avoid (Economic Research Service, 2024; Martin, 2017). These tasks include planting, harvesting, and processing crops (Zahniser et al., 2018). While the H-2A temporary agricultural worker program has grown in recent years, providing a legal pathway for seasonal foreign labor, undocumented immigrants still constitute a substantial segment of the agricultural workforce (Economic Research Service, 2024).

These workers often endure challenging conditions, including physical demands, exposure

to pesticides, and unstable employment (Holmes and Ramirez-Lopez, 2023). Despite their crucial contributions to food security and the agricultural economy, immigrant farmworkers frequently face legal uncertainties, low wages, and limited access to social services (Guild and Figueroa, 2018). This precarious situation is further complicated by immigration enforcement measures, which directly impact agricultural labor supply. The heavy reliance on immigrant labor, coupled with the challenges these workers face, underscores the complex challenge at the intersection of immigration policy and food production — highlighting the necessity for solutions that carefully balance the needs of the agricultural industry with the protection and fair treatment of immigrant workers (Castillo et al., 2021b; Zahniser et al., 2012; Stuesse, 2016).

2.3 Internal Immigration Enforcement Policies

The patchwork of policies across different government levels significantly affects undocumented farmworkers. While federal policies set overarching enforcement priorities that often change from one administration to the next, state and local governments often implement divergent measures. Some states actively cooperate with federal immigration enforcement, potentially increasing the risk for undocumented workers (Rubalcaba et al., 2024b). In contrast, others adopt sanctuary policies, limiting local law enforcement's collaboration with federal agencies and providing some protection for undocumented individuals (Martínez et al., 2018). This multi-tiered policy landscape creates substantial regional variations in the risks faced by undocumented agricultural workers. These inconsistencies not only affect individual undocumented workers' labor market participation but may also influence agricultural employers' hiring practices, particularly in regions heavily reliant on undocumented labor (Zahniser et al., 2018).

The literature has provided a mounting of evidence to support the notion that immigration enforcement policies have a significant impact on labor market outcome among foreign-born workers (East et al., 2023; Luo et al., 2023; East and Velásquez, 2022; Luo and Kostandini, 2022; Charlton and Kostandini, 2021; Kostandini et al., 2014; Bohn et al., 2015). While these policies shape the regulatory landscape for undocumented workers, particularly in agriculture, their implementation varies widely. Federal, state, and local policies provide the framework

for controlling unauthorized immigration, but enforcement discretion leads to significant variability (Motomura, 2011). This enforcement discretion results in uneven enforcement intensity across jurisdictions, exposing undocumented farmworkers to different risks and working conditions depending on their location despite overarching policies.

Given the evolving landscape of immigration policies, understanding the actual impact of immigration enforcement on agricultural labor markets requires an examination beyond policy implementation alone. This study aims to fill this gap by examining the effects of localized enforcement actions, specifically immigration-related arrests, on farm labor supply. By focusing our analysis on the *de facto* measure of enforcement, we can provide deeper insight into the consequences of immigration enforcement on agricultural workers.

3 Data

In this section, we discuss the data and align sample selection criteria and variables of interest within the scope of our study. The data used in our analysis comes from two sources. First, to observe month-by-month labor market conditions in agriculture, we use the basic monthly files from the Current Population Survey (CPS). Second, to measure the month-by-month variation in immigration enforcement, we collect interior immigration arrests from the Transactional Records Access Clearinghouse (TRAC) at Syracuse University. For each data set, we will discuss our sample selection and limitations and provide a basic description of our sample.

3.1 Context

The primary objective of our study is to measure the impact of immigration enforcement on the labor supply among unauthorized immigrants in agriculture. A notable feature of our study is that it extends the understanding of labor supply behavior that evolves monthly following an exogenous shock to immigration enforcement. Our analysis only looks at the direct effects on the labor supply decisions of workers who are likely undocumented and hence most impacted by enforcement measures. However, it is likely that the aggregate effects on agricultural labor markets extend beyond such workers, as there could be complementarities with other workers

(like authorized immigrant laborers or the domestic workforce) who could be indirectly affected as well.

Setting our study at a month-by-month interval provides critical insights into nuanced labor patterns. The proposed approach contrasts with assessing larger-scale shifts measured using annual time intervals. While previous studies have investigated agriculture labor supply changes following the activation of a policy (Luo et al., 2023; Luo and Kostandini, 2022; Charlton and Kostandini, 2021; Kostandini et al., 2014), arguably spurring a shift in the general equilibrium, our study provides a more granular insight into the ebbs and flows of labor supply among unauthorized immigrant workers in agriculture. Within this context, we do not expect these subtle changes in labor supply to be permanent. However, we suspect they occur often and likely cause frequent but unpredictable disruptions to U.S. agricultural production.

3.2 Labor Market Data

The primary labor data used throughout our analysis comes from the Basic Monthly Files of the Current Population Survey (CPS) collected between 2014 and 2018. This dataset provides crucial insights into the socioeconomic status of American households and is one of the most comprehensive sources of information about the U.S. workforce. The Basic Monthly File of the CPS, referred to as the CPS going forward, is conducted every month for approximately 65,000 households and is designed to be nationally representative (Flood et al., 2021).

Given the focus of our study, we provide a demographic characterization of agricultural workers[3] in Table 1 for a pooled sample then split across citizens and non-citizens. While the CPS provides detailed information about individual respondents and households, one of the limitations in the CPS is that immigration status is not recorded in the survey. To address this issue, we identify likely unauthorized respondents using a combination of citizenship responses

[3]We define workers in agriculture using CPS occupation and industry codes, both based on the 2010 Census classification scheme. Specifically, we restrict our sample to first-line supervisors of farming, fishing, and forestry workers (OCC 6005), agricultural inspectors (OCC 6010), animal breeders (OCC 6020), graders and sorters, agricultural products (OCC 6040), and miscellaneous agricultural products (OCC 6050). Observations who were employed or most recently employed in these occupations need to have also reported having worked or were currently working (at the time of the interview) in one of the following industries: crop production (IND 170), animal production (IND 180), support activities for agriculture (IND 290), animal food, grain, and oil seed milling (IND 1070), fruit and vegetable preserving and specialty food manufacturing (IND 1090), dairy product manufacturing (IND 1170), and animal slaughtering and processing (IND 1180).

and education-based criteria, a method frequently employed in similar studies (East et al., 2023; East and Velásquez, 2022; Kuka et al., 2020; Amuedo-Dorantes et al., 2018; Orrenius and Zavodny, 2009). While this method may not perfectly capture unauthorized status, it provides a robust proxy for unauthorized status.

It is important to note that our sample is not limited to employed individuals. It also includes respondents who were unemployed or not in the labor force but had their last employment in agriculture. Additionally, we restricted the sample to respondents who resided in the contiguous U.S. and had no more than a high school education at the time of the survey. Table 1 contains the estimates from this sample, accounting for approximately 13,800 respondents in agriculture, and makes up the baseline sample used in our analyses throughout this study.

Overall, labor supply characteristics between citizens and non-citizens in agriculture are similar and not statistically distinguishable. Our estimates align with the literature, indicating that an overwhelming proportion of non-citizens in the agricultural workforce identify as Hispanic (Hernandez and Gabbard, 2019; Arcury et al., 2015; Habib and Fathallah, 2012). We also find that approximately one-fourth of all U.S. farmworkers are women. The representation of women in agriculture has steadily increased despite the overall decline in the total agricultural workforce (Castillo et al., 2021a). Given this workforce dynamic that cuts across genders, we examine gender-specific labor supply responses to immigration enforcement in our primary models.

3.3 Immigration Arrests and Enforcement Shocks

The TRAC data set offers the number of immigration-related arrests made monthly by ICE for each county within the U.S. between October 2014 and May 2018. While the arrest data provides a granular snapshot of interior enforcement across time and geography, the CPS does not provide identifiers for many counties. The limitation on geographical identifiers requires us to match counties to metropolitan statistical areas (MSA) or aggregate arrests up to the state level. However, when we match counties to MSAs, we are unable to retain 52 percent of the agricultural workers in our sample. Given the purpose of this study, we aggregate county-level arrests at the state level for each month across our observation period. The approach of aggre-

gating at the state spreads our measure for immigration enforcement over large geographical areas, which may be problematic for states such as California and Texas. While this is concerning, given that we may be conflating enforcement activities that are distinctly unique across the urban-rural divide, our primary identification strategy also relies on temporal variation. We explore the sensitivity of our approach to these geographical limitations in Section 6 and show that our results are robust to different specifications.

To construct the immigration enforcement shock variable, we follow the strategy developed by Rubalcaba et al. (2024a). The underlying concept motivating the approach is that immigration enforcement-related arrests follow a geographic and temporal pattern that unauthorized immigrants experience directly and indirectly, setting an expectation about immigration enforcement in their communities. Large increases in arrests above this expectation are identified as a shock and, as shown in, are orthogonal to labor supply decisions Rubalcaba et al. (2024a). The rationale behind the enforcement shock stems from the idea that individuals calibrate their expectations about immigration enforcement drawing on past experiences. This approach contends that while consistent enforcement levels may become normalized, sharp and unanticipated increases in enforcement induce a strategic response from the individual. Although enforcement shocks appear random to the public, they may be strategically planned by ICE based on undisclosed information (Parks, 2018; Leyro and Stageman, 2018; Menjívar, 2014)

The primary difference in our approach is that we aggregate immigration enforcement arrests at the state level. Thus, the immigration enforcement shock variable is constructed accordingly. For example, we use the number of arrests, $A_{l,t}$, in state l at time t, to calculate the moving average ($\mu_{l,k=6}$) and the moving standard deviation ($\sigma_{l,k=6}$) for each state. In contrast, Rubalcaba et al. (2024a) constructed these statistics for MSA's. We then standardize the number of immigration-related arrests for each state and period combination ($Z_{l,t} = \frac{A_{l,t}-\mu_{l,k=6}}{\sigma_{l,k=6}}$) to construct a discrete shock variable, $S_{l,t}$, using the following criteria:

$$S_{l,t} = \begin{cases} 0, & \text{if } Z_{l,t} < 1; \ \textit{No shock} \\ 1, & \text{if } Z_{l,t} \geq 1; \ \textit{Shock: abnormal increase in arrests} \end{cases} \tag{1}$$

From Equation 1, the shock variable turns on when the standardized number of arrests in state l at time t increases by one standard deviation above its six-month moving average. In Table 2, we provide a side-by-side comparison of state-level immigration arrests and the number of shocks observed over the period of observation. The intuition drawn from the table is that the level of arrests is highest in states along the U.S.-Mexico border, traditional immigrant receiving states, and states that have implemented aggressive "anti-immigrant policies". In contrast, the shock variable captures a slightly different reality of immigration enforcement, one that aims to pinpoint unexpected anomalies in the enforcement trends that would influence a behavioral response within the immigrant community. Studies have shown that some of the most "shocking" enforcement operations, such as workplace raids, have occurred in unsuspecting communities such as Pottsville, Iowa, and Morristown, Tennessee (Heinrich et al., 2023; Novak et al., 2017).

To emphasize this point in our study, we reconstruct the shock variable at the county level and map the total number of arrests and shocks across all counties in the contiguous U.S. Additionally, we use the 2017 Census of Agriculture data from the United States Department of Agriculture (USDA) National Agricultural Statistics Service (NASS) to overlay the number of hired farm laborers at the county level. This approach illustrates the geographical distribution of arrests and shocks separately across counties with the largest agricultural workforce. In Figure 1, we present arrest totals for each county in Panel A and the number of shocks in Panel B. While Panel A shows that counties with the most arrests are also heavily populated, Panel B shows that shocks occur in counties with some of the largest agricultural workforce. The illustration in Figure 1 suggests the shock variable captures variation in enforcement likely muted when examining arrest level.

4 Empirical Analysis

Our research approach aims to assess the impact of immigration enforcement on the labor supply within agriculture. By empirically disentangling this relationship, we gain a better understanding of the ongoing labor supply shortages in agriculture that cannot be readily backfilled

by U.S.-born workers (Richards, 2018; Zahniser et al., 2018; Gunders and Bloom, 2017). Furthermore, we aim to provide a deeper understanding of labor supply dynamics in agriculture influenced by *de facto* changes in immigration enforcement — that is, enforcement actions realized within communities that may or may not follow a change in immigration policy.

The identification strategy we employ in our model is based on two key elements. First, we use the shock variable as an exogenous measure of immigration enforcement. Second, we include an indicator for non-citizenship to define our treatment group, which we refer to as "likely undocumented" due to our sample restriction. It is important to note that unauthorized immigration status is not directly observable to the researcher, a limitation that applies not only to the CPS but to any publicly available or nationally representative data set. We acknowledge that using non-citizenship as a proxy for unauthorized immigration status is an imperfect measure, even with careful sample selection. However, we rigorously examine this potential source of bias through a series of robustness, falsification, and placebo tests in Section 6 and show that our results are likely not sensitive to this choice.

The empirical model we develop in this study identifies the impact of immigration enforcement on the farm labor supply by interacting the shock variable with the non-citizen indicator. The integrity of this strategy and causal interpretation relies primarily on the exogeneity of the shock variable. Specifically, causal inference requires that we accurately capture shocks to immigration enforcement arrests and that these shocks are exogenous to labor supply decisions among the agriculture workforce, unlike *de jure* policies that are announced in the media and through other channels. We provide empirical evidence to support this assumption, which is also supported by Rubalcaba et al. (2024a). The model used in our study is presented as follows:

$$Y_{itl} = \alpha S_{tl} + \eta C_i + \tau(S_{tl} \times C_i) + \theta_{tl} + \theta_t + \theta_y + \theta_m + X'_{itl}\beta + \mu_{itl}, \tag{2}$$

where Y_{itl} is the outcome variable for individual i observed at time t in state l. Depending on the analysis, Y_{itl} represents either labor force participation to capture labor supply at the extensive margin or the inverse hyperbolic sine transformation of the number of work hours to capture labor supply at the intensive margin. The shock variable (S_{tl}), as described in Sec-

tion 3.3, is an indicator variable capturing an exogenous change in immigration-related arrests observed at time t in state l. The variable C_i is an indicator used to define our control group. The interaction between the shock variable and the non-citizen indicator ($S_{tl} \times C_i$) is used to identify our treatment effect, which is represented by the coefficient τ.

Equation 2 includes a vector of controls (X_{itl}), which account for the respondent's age, age squared, gender, race, education level, birthplace, and the contemporaneous level of arrests in the respondent's resident state. The model also includes state-year (θ_{tl}), month$\times$year (θ_t), year (θ_y), and month (θ_m) fixed-effects to account for unobserved factors and fluctuations that may influence the agricultural labor supply not explained in the model (e.g., fluctuations in seasonal growing patterns). We cluster the standard errors at the state level and apply survey sample weights during estimation.

5 Main Results

We begin our analysis by estimating the impact of immigration enforcement on the labor supply among workers in agriculture for the pooled sample of men and women. Table 3 presents the results for the extensive and intensive margins in columns 1 and 2, respectively. At the extensive margin, our findings suggest that a shock to immigration enforcement decreases labor force participation among non-citizens by approximately 3 percentage points. Given the high rate of labor force participation among our target group, this change in labor supply represents a 3 percent decline in the non-citizen workforce in agriculture. At the intensive margin, our results suggest that a shock in immigration enforcement is responsible for a 17 percent decline in the number of weekly hours worked among the non-citizen workforce in agriculture. The estimates for labor supply at the intensive margin, as indicated in Table 3, suggest a decrease in weekly hours worked by approximately 7 hours or a change from 42 hours per week, on average, to 35 hours per week per non-citizen worker when exposed to a shock[4].

Evaluating labor supply responses across genders reveals that heightened immigration en-

[4]Given the inverse hyperbolic sine transformation of hours worked, we interpret the coefficients as semi-elasticities. However, this interpretation is an approximation, and to evaluate this, we apply Duan's smearing estimate to capture the marginal effect in terms of hours worked following the work by Norton (2022) and Duan (1983). This approach suggests that a shock to immigration enforcement resulted in a decrease in weekly hours worked by approximately 6.8 hours, which is not meaningfully different from our interpretation.

forcement reduced labor force participation among non-citizen men in agriculture by 2 percentage points and 6 percentage points among non-citizen women. At the intensive margin, we estimate that heightened immigration enforcement reduced weekly hours worked by 14 percent among men, but found no statistically significant results for our sample of women.

5.1 Changes in Hours Worked

In this section, we provide a subsequent analysis of labor supply at an intensive margin by examining the changes in hours worked for each respondent. The CPS provides various labor supply and employment questions framed in current and retrospective contexts. For instance, CPS respondents are asked how many hours they worked last week and how many hours they usually worked per week.[5] We leverage these two variables to develop a more nuanced understanding of labor supply dynamics.

We analyze the difference between the current and retrospective measures of labor supply to capture changes in hours worked last week from what respondents report as usual weekly hours worked. The difference between current and usual weekly hours worked is transformed using the inverse hyperbolic sine function to allow for zero and negative values.[6] In Table 4, we provide estimates from the pooled and gender-specific split samples.

The results suggest that a shock to immigration enforcement resulted in an approximate 15-percent decline in weekly hours worked from the usual weekly hours worked a reduction in hours worked by as much as 6.3 hours per week per non-citizen worker. We also find additional evidence to suggest that men's labor supply at the intensive margin is more responsive to a shock in enforcement. Overall, the evidence in Table 4 supports our primary findings and highlights the immediate disruptive effect of immigration enforcement on labor supply, as workers experience a sharp decrease in the number of hours they work.

[5]Note that "usual hours worked" is retrospective but over an unspecified time. This context differs from "hours worked last year," which is only surveyed in March for the Annual Social & Economic Supplement.

[6]$sinh^{-1}(\Delta y_i)$

5.2 Dynamic Labor Supply Responses

In this section, we evaluate the dynamic labor supply responses given a shock to immigration enforcement. Specifically, we examine whether the observed effects endure over time by investigating the variations in labor force participation and labor hours before and after a shock event. Following the work by Rubalcaba et al. (2024a) and Cengiz et al. (2019), we construct an event study to uncover potential anticipatory responses and treatment effect persistence. Equation (3) represents our event study model, where D_{mt}^{j} captures the interaction between the non-citizen indicator and a dynamic shock variable ($C_i \times S_{mt}^{j}$). The dynamic shock variable contains a set of indicators representing the relative period to a shock, in this case, denoted in terms of months.

$$y_{itl} = \sum_{j=-5}^{-2} \delta_j D_{tl}^{j} + \sum_{j=0}^{4} \delta_j D_{tl}^{j} + X_{itl}'\Gamma + \theta_l + \theta_t + \theta_{tl} + \mu_{itl} \tag{3}$$

Note that the period in which a shock occurs is represented as $j = 0$, and the reference category is set to the prior month ($j = -1$). Additionally, we balance the panel to 5 pre-shock periods, which include the reference period ($j = -1$), and 5 post-shock periods, which include the contemporaneous shock period ($j = 0$). The results are presented in Figure 2, along with the 90 and 95 percent confidence intervals. This empirical exercise provides evidence suggesting that labor supply at the extensive and intensive margin likely does not anticipate a shock to immigration enforcement and that the impact of an enforcement shock is short-lived, lasting about a month.

In more detail, treating each shock as an "event" allows us to capture the immediate and short-term effects of immigration enforcement actions on labor supply. This approach provides valuable insights into the specific timing and magnitude of these impacts. The immediate and temporary reactions suggest that workers return to their usual labor supply patterns once the shock subsides. This cyclical pattern underscores the transient nature of enforcement impacts on labor supply of immigrant farmworkers.

5.3 Discusion

The findings presented in Section 5 offer novel insights into the labor supply behavior of immigrant farmworkers, shedding light on how immigration enforcement influences labor supply behavior month-to-month. Unlike previous studies that focused on permanent shifts in labor supply due to policy changes, our research demonstrates that even temporary fluctuations in the enforcement environment can have significant, albeit short-term, impacts on labor supply decisions.

Our analysis shows that a shock to immigration enforcement in a given month leads to an immediate reduction in labor supply, followed by a return to baseline levels in the subsequent month. Specifically, we found that unexpected immigration arrests led to a 3.2 percentage point decrease in labor force participation and a 17% reduction in weekly hours among non-citizen farmworkers in the affected month. These effects ripple through the entire agricultural workforce, representing a 1.3 percentage point decline in overall labor force participation and a 6.5% reduction in weekly hours worked during months experiencing heightened enforcement activities. A conservative estimate, extrapolating the point estimates across all observed shock occurrences and incorporating data on the market value of agricultural products sold from the 2017 Census of Agriculture, indicates that these immigration enforcement shocks led to a significant economic impact between 2014 and 2018. Our calculations value the reductions in labor supply attributable to immigration enforcement shocks at approximately $11.68 billion. This labor supply loss represents about 0.6 percent of the $1.94 trillion in agricultural products sold over this five year period.[7] In Appendix A, we provide a state-by-state calculation of the value of the loss in labor supply due to immigration enforcement, which accounts for state-specific agriculture production and exposure to immigration enforcement shocks.

In terms of percentages, this value is modest; however, it equates to a substantial economic value when considering that this labor supply response likely occurs well beyond our period of observation. Furthermore, these estimates also implicate potential productivity loss, highlighting the tangible economic consequences of immigration enforcement fluctuations on the U.S.

[7]To calculate this extrapolation, we multiplied the estimated per-shock productivity loss by the total number of observed shocks between 2014-2018, then scaled this figure to the national level using the ratio of state-specific agricultural production to our sample's production using the 2017 Census of Agriculture.

agricultural sector. These short-term fluctuations in labor supply can disrupt agricultural productivity, leading to delays in crop harvesting and potential yield losses. Farm operators face increased uncertainty and operational complexities, necessitating rapid adaptation to sudden changes in workforce availability. Such disruptions can strain resources, complicate planning, and result in higher operational costs and reduced efficiency.

6 Robustness and Validation checks

In this section, we propose several empirical tests to assess the robustness and validity of our primary results. One potential concern is the sensitivity of our findings to economic heterogeneity and varying intensities of immigration enforcement across the U.S. To address this, we re-evaluate our primary model using different sample inclusion criteria based on the state of observation. Additionally, we recognize the possibility that within the agricultural sector, immigration enforcement might not necessarily shift the labor supply of unauthorized immigrants but could instead affect the labor supply of citizens and authorized immigrant farmworkers — resulting in a false treatment effect. We conduct a falsification test by isolating our analysis to the control group to examine this point. Lastly, we perform a placebo test by randomizing shock exposure across states in the contiguous U.S. and throughout our observation period. These tests help ensure the robustness and credibility of our results.

6.1 Robustness

Although we include several geographic and time fixed effects to control for unobserved stationary and transitory factors at the state level, there is a possibility that variation could across states that, by random chance, confound our results. The first potential source of bias arises from the heightened immigration enforcement in border states, where both ICE and Customs and Border Patrol (CBP) are most active.

The backbone of our identification strategy hinges on state-specific shifts in immigration enforcement arrests relative to the states' overall arrest trend. As shown in Table 2, the "shock" identification approach suggests measuring a treatment effect even in states with relatively low

levels of immigration-related arrests. We re-run our primary model to test for this possibility, removing respondents observed in California, Arizona, New Mexico, and Texas.

In Table 5, Panel A, results for labor force participation and hours worked results are presented for both the pooled and gender-specific samples. The estimates for the pooled sample, shown in Columns 1 and 4, align with our primary results, confirming the overall impact of immigration enforcement on labor supply. However, the analysis reveals some gender-specific nuances. Specifically, we do not find statistical significance for men at the extensive margin (Column 2). Similar to our primary results in Table 3, there is no statistical significance for women at the intensive margin (Column 5). While the labor force participation findings for men are inconsistent with our primary results, it is crucial to consider that border states account for approximately a third of our sample, which may underpower the gender-specific analysis.

In a second exercise, we restrict our analysis to the top 10 states with the highest levels of labor-intensive agricultural production. Specifically, we limit our analysis to respondents observed in Arizona, California, Florida, Georgia, Louisiana, Michigan, New York, North Carolina, Texas, and Washington[8]. This focused approach allows us to better understand the labor supply dynamics in states where crops and agricultural commodities demanding more labor are found, in contrast to other areas of the country (like parts of the Midwest), where raw crops whose production processes is highly mechanized (like corn and soybeans) are widespread. As seen in Panel B in Table 5, the negative effects of increased internal immigration enforcement shocks are stronger in states where labor-intensive agricultural operations dominate compared to the main results including the entire country. This is exactly what we would expect as in regions of the country where agricultural production is highly mechanized, only a few (often native-born or legal foreign-born workers) are needed, and we do not anticipate such workers' behavior to be impacted at all by enforcement measures. At the same time, the results underscore the fact that enforcement has stronger negative impacts on the farm labor supply in

[8]Our selection is based on the states that have consistently ranked higher in the demand for H-2A certified positions according to official data from the Office of Foreign Labor Certification of the U.S. Department of Labor. Given that a significant fraction of farmworkers in the U.S. is undocumented and off the books, it is hard to track precisely the actual demand for farmworkers in each state. However, demand for H-2A workers is a proxy for agricultural labor needs as relying on the program carriers substantial costs and producers tend to hire H-2A guest agricultural workers for crops that are still primarily harvested by hand. The states on the top 10 are where most fresh produce in America is grown, like specialty crops (fruits and vegetables) as well as animal agriculture that has not been automated.

states growing crops where workers are needed the most, thereby potentially having the highest economic impact on agricultural production.

By focusing on these key states, we provide a robustness check on the effects of immigration enforcement on labor supply in areas where the agricultural sector plays a crucial economic role and in states beyond the U.S.-Mexico border. Additionally, this targeted analysis offers more precise insights into how enforcement actions impact the labor market in the most agriculturally productive regions, providing more relevant and actionable data for policymakers and stakeholders involved in agricultural labor issues.

6.2 Falsification Tests

As a falsification test, we isolated our analysis to a control group that should theoretically be unaffected by immigration enforcement. This group comprises citizens and authorized immigrant farmworkers whose labor supply should not be directly influenced by immigration enforcement measures targeting unauthorized workers. By comparing the labor supply behavior of this control group to our primary sample, we can assess whether the observed effects are truly due to enforcement actions or if they result from other unrelated factors.

The results from our falsification test, which includes both the pooled and gender-specific split samples, are presented in Table 6. Our findings from this control group analysis showed no significant changes in labor supply. This finding reinforces the credibility of our primary results. The lack of significant labor supply shifts in the control group suggests that the observed effects in our primary analysis are attributable to a shift in the "likely unauthorized" in response to a shock to immigration enforcement.

6.3 Placebo Tests

Next, we performed a placebo test to evaluate the robustness of our treatment assignment by randomly assigning enforcement shocks across states and periods. This test simulates immigration enforcement shocks, serving as a benchmark to identify any inherent biases in our model. Our approach is to create a comprehensive distribution of placebo estimates in which we can evaluate our primary results. If our primary results were driven by random variations or model

mis-specifications, we expect the placebo to be no different than our treatment effect estimates.

The placebo exercise was achieved by randomly assigning immigration enforcement shocks across states in the contiguous U.S. and month-by-year periods and capturing the estimated placebo effect over 1,000 iterations (Rubalcaba et al., 2024a; Ando, 2015; Abadie et al., 2010). The intuition behind this method is that the 1,000 estimated placebo effects generated by random treatment assignments should form a distribution against which we can compare our actual results. In Figure 3, we illustrate the distribution of placebo estimates for labor force participation and hours worked. Our primary results from the pooled sample, presented in Table 3, fall clearly outside the 95 percent confidence interval for the placebo estimates. This outcome suggests that our primary findings are unlikely to be the result of random variations or specification errors related to the construction of the shock indicator.

The placebo test provides compelling evidence that the observed effects in our study are not artifacts of random fluctuations or methodological flaws. By demonstrating that our primary results lie well outside the distribution of placebo estimates, we reinforce the validity and robustness of our results and interpretations.

7 Conclusions

In this paper, we find that increasing internal immigration enforcement, not tied to the activation of specific policies, led to a significant reduction in the farm labor supply, both at the extensive and intensive margins. Our estimates show that the number of workers and their hours supplied to the market significantly decreased in the short run in response to deviations away from the normal level of immigration-related arrests across states.

Amidst persistent and worsening farm labor shortages, it is crucial to comprehend the effects of government policies on vital sectors such as agriculture. While efforts to diminish employers' dependence on undocumented workers are underway, their impacts are more likely to be effective in the long run. This long-term effectiveness offers a hopeful perspective. However, it is important to note that mechanization investments are substantial and take time to be brought to the market in affordable and reliable ways. Imports from Mexico also pose geopo-

litical vulnerabilities. The H-2A guest worker visa program, the legal option to bring foreign farm workers to the United States, is cumbersome, costly, and bureaucratic. In the absence of political agreements or reforms aimed at regularizing the immigration status of the existing undocumented farmworker population, it is expected that any interior and border enforcement policies will influence agricultural workers' labor market decisions and, consequently, food production in America.

The results from this paper show that immigration enforcement policies contributed to the reduction in the farm labor supply. While we focus on employment and hours due to the existing information, the implications of government policies are likely to be far-reaching and have additional unexpected consequences. Future research should explore the sensitivity of wages, output composition, and the labor supply decisions of farmers, among others, in response to tightening immigration policies targeting undocumented workers.

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Table (1) Descriptive Statistics

	Pooled (1)	Citizen (2)	Non-Citizen (3)
Individual labor outcomes			
Labor force participation	0.973	0.967	0.981
	(0.162)	(0.179)	(0.138)
Hours worked last week	40.85	39.65	42.25
	(14.96)	(16.80)	(12.33)
Individual and household characteristics			
Age	38.18	36.74	39.88
	(14.90)	(16.91)	(11.86)
Female	0.250	0.229	0.274
	(0.433)	(0.420)	(0.446)
Married	0.495	0.376	0.635
	(0.500)	(0.485)	(0.481)
Foreign-born	0.536	0.146	-
	(0.499)	(0.353)	-
Hispanic	0.600	0.298	0.958
	(0.490)	(0.457)	(0.200)
Race: Non-Hispanic			
White	0.340	0.611	0.0186
	(0.474)	(0.488)	(0.135)
Black	0.0355	0.0599	0.00660
	(0.185)	(0.237)	(0.0810)
Asian	0.0110	0.00675	0.0161
	(0.104)	(0.0819)	(0.126)
Other	0.0136	0.0247	0.000372
	(0.116)	(0.155)	(0.0193)
Observations	13,783	8,492	5,291

Note: This table presents summary statistics by citizenship observed in the basic monthly files from the Current Population Survey (CPS) collected between 2014 and 2018. The sample was restricted to those who resided in the contiguous US and had no more than a high school education at the time of the survey. Additionally, the sample was restricted to agricultural workers who were employed, on layoff, unemployed but had worked in the past, or not in the labor force but had worked in the past year. The means and proportions were estimated using the survey sample weights. The standard errors for each mean or proportion are presented below the respective estimate in parentheses.

Table (2) Immigration Enforcement - ICE arrests and shocks

Ordered by arrests			Ordered by shocks		
State	Ice arrests	Shocks	State	Ice arrests	Shocks
Texas	128,056	9	Kansas	2,144	12
California	71,148	9	Tennessee	7,542	12
Georgia	25,181	5	North Dakota	572	11
Arizona	23,936	8	Minnesota	4,642	11
Florida	19,790	11	Oklahoma	9,245	11
New York	14,095	7	Iowa	3,205	11
Pennsylvania	13,667	8	DC	3,242	11
North Carolina	11,375	7	South Dakota	923	11
New Jersey	10,710	9	Florida	19,790	11
Nevada	9,363	8	Louisiana	6,915	11

Note: This table presents immigration related arrests aggregated by states over the period of observation (2014–2018).

Table (3) Immigration enforcement & labor supply in agriculture

	Labor Force Participation			Hours Worked: $\sinh^{-1} x$		
	Pooled	Men	Women	Pooled	Men	Women
	(1)	(2)	(3)	(4)	(5)	(6)
Shock × Non-Citizen	-0.032***	-0.021***	-0.062***	-0.170**	-0.147*	-0.145
	(0.007)	(0.008)	(0.014)	(0.066)	(0.083)	(0.134)
Covariates	✓	✓	✓	✓	✓	✓
Year	✓	✓	✓	✓	✓	✓
Month	✓	✓	✓	✓	✓	✓
Year×Month	✓	✓	✓	✓	✓	✓
State×Linear-Year	✓	✓	✓	✓	✓	✓
Adj.R^2				0.102	0.102	0.075
Observations	13,783	10,432	3,348	13,783	10,432	3,348

Note: This table presents the primary results of this study, which evaluates the impact of immigration enforcement shocks on labor supply. Columns 1 through 3 contain the results from the analysis of labor force participation estimated using a linear probability model. Columns 4 through 6 contain the results from the analysis on the hours worked ($sinh^{-1}(\Delta y_i)$) model estimated using OLS. The sample was restricted to those who resided in the contiguous US and had no more than a high school education at the time of the survey. Additionally, the sample was restricted to agricultural workers who were employed, on layoff, unemployed but had worked in the past, or not in the labor force but had worked in the past year. The baseline regressions account for the respondent's age, age squared, gender, race, education level, birthplace, and the contemporaneous level of arrests in the respondent's resident state. Additionally, the models account for state-year (θ_{tl}), month×year (θ_t), year (θ_y), and month (θ_m) fixed-effects. The results in columns 2, 3, 5, and 6 were estimated using a gender-specific sample restriction. The results were estimated using the CPS sample weights. Standard errors are clustered at the state level and are shown in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table (4) Changes in hours worked from previous year

	Hours Worked: $\sinh^{-1} x$		
	Pooled	Men	Women
	(1)	(2)	(3)
Shock × Non-Citizen	-0.149**	-0.174*	-0.009
	(0.056)	(0.092)	(0.153)
Covariates	✓	✓	✓
Year	✓	✓	✓
Month	✓	✓	✓
Year×Month	✓	✓	✓
State×Linear-Year	✓	✓	✓
Adj.R^2	0.017	0.019	0.013
Observations	13,783	10,432	3,348

Note: This table presents the results from an analysis of labor supply at an intensive margin by examining the changes in hours worked for each respondent, where the change in hours worked (Δy_i) was transformed ($sinh^{-1}(\Delta y_i)$). The sample was restricted to those who resided in the contiguous US and had no more than a high school education at the time of the survey. Additionally, the sample was restricted to agricultural workers who were employed, on layoff, unemployed but had worked in the past, or not in the labor force but had worked in the past year. The baseline regressions account for the respondent's age, age squared, gender, race, education level, birthplace, and the contemporaneous level of arrests in the respondent's resident state. Additionally, the models account for state-year (θ_{tl}), month×year (θ_t), year (θ_y), and month (θ_m) fixed-effects. The results in columns 2 and 3 were estimated using a gender-specific sample restriction. The results were estimated using the CPS sample weights. Standard errors are clustered at the state level and are shown in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table (5) Robustness checks

Panel A: Contiguous States (Excluding Border States)

	Labor Force Participation			Hours Worked: $\sinh^{-1} x$		
	Pooled	Men	Women	Pooled	Men	Women
	(1)	(2)	(3)	(4)	(5)	(6)
Shock × Non-Citizen	-0.019**	-0.009	-0.063**	-0.198*	-0.210*	-0.227
	(0.008)	(0.007)	(0.028)	(0.104)	(0.111)	(0.246)
Covariates	✓	✓	✓	✓	✓	✓
Year	✓	✓	✓	✓	✓	✓
Month	✓	✓	✓	✓	✓	✓
Year×Month	✓	✓	✓	✓	✓	✓
State×Linear-Year	✓	✓	✓	✓	✓	✓
Adj.R^2				0.116	0.132	0.078
Observations	9,838	7,604	2,234	9,838	7,604	2,234

Panel B: States with labor intensive agriculture operations

	Labor Force Participation			Hours Worked: $\sinh^{-1} x$		
	Pooled	Men	Women	Pooled	Men	Women
	(1)	(2)	(3)	(4)	(5)	(6)
Shock × Non-Citizen	-0.036***	-0.024*	-0.072**	-0.246*	-0.260*	-0.003
	(0.012)	(0.013)	(0.030)	(0.130)	(0.140)	(0.325)
Covariates	✓	✓	✓	✓	✓	✓
Year	✓	✓	✓	✓	✓	✓
Month	✓	✓	✓	✓	✓	✓
Year×Month	✓	✓	✓	✓	✓	✓
State×Linear-Year	✓	✓	✓	✓	✓	✓
Adj.R^2				0.099	0.086	0.048
Observations	5,675	4,114	1,554	5,675	4,114	1,554

Note: This table presents the results from a set of robustness evaluations, where the sample was restricted using various schemes. The baseline sample was restricted to those who resided in the contiguous US and had no more than a high school education at the time of the survey. Additionally, the sample was restricted to agricultural workers who were employed, on layoff, unemployed but had worked in the past, or not in the labor force but had worked in the past year. In panel A, the sample excluded border states: California, Arizona, New Mexico, and Texas. In panel B, the sample was restricted to the following states: Arizona, California, Florida, Georgia, Louisiana, Michigan, New York, North Carolina, Texas, and Washington. In both panels, columns 1 through 3 contain the results from the analysis of labor force participation estimated using a linear probability model. In both panels, columns 4 through 6 contain the results from the analysis on the hours worked ($sinh^{-1}(\Delta y_i)$) model estimated using OLS. The baseline regressions account for the respondent's age, age squared, gender, race, education level, birthplace, and the contemporaneous level of arrests in the respondent's resident state. Additionally, the models account for state-year (θ_{tl}), month×year (θ_t), year (θ_y), and month (θ_m) fixed-effects. The results in columns 2, 3, 5, and 6 in both panels were estimated using a gender-specific sample restriction. The results were estimated using the CPS sample weights. Standard errors were estimated using robust standard errors, given that there are too few clusters. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

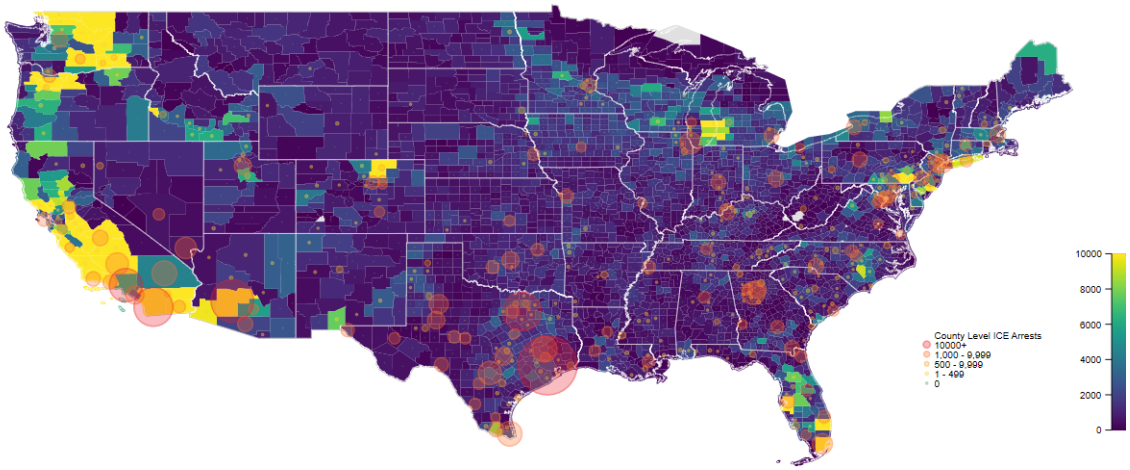
Table (6) Falsification Tests

	Labor Force Participation			Hours Worked: $\sinh^{-1} x$		
	Pooled	Men	Women	Pooled	Men	Women
	(1)	(2)	(3)	(4)	(5)	(6)
Shock	0.007	0.009	0.006	0.009	0.028	-0.065
	(0.005)	(0.006)	(0.011)	(0.056)	(0.077)	(0.142)
Observations	8,491	6,604	1,883	8,491	6,604	1,883
Adjusted R^2				0.100	0.110	0.074

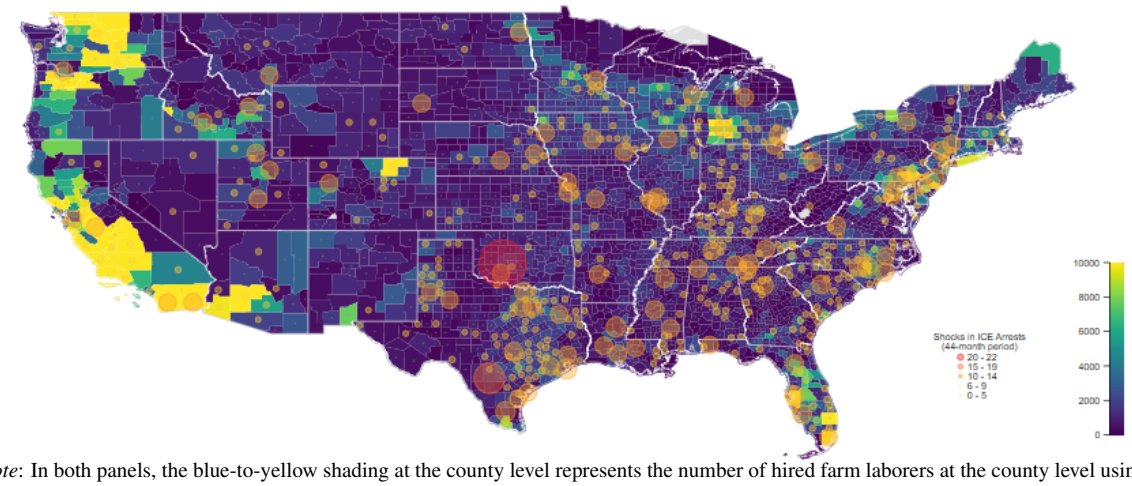
Note: This table presents the results of a falsification test, which evaluates the impact of immigration enforcement shocks on labor supply among US citizens and authorized immigrant farmworkers. Columns 1 through 3 contain the results from the analysis of labor force participation estimated using a linear probability model. Columns 4 through 6 contain the results from the analysis on the hours worked ($sinh^{-1}(\Delta y_i)$) model estimated using OLS. The sample was restricted to those who resided in the contiguous US and had no more than a high school education at the time of the survey. Additionally, the sample was restricted to agricultural workers who were employed, on layoff, unemployed but had worked in the past, or not in the labor force but had worked in the past year. The baseline regressions account for the respondent's age, age squared, gender, race, education level, birthplace, and the contemporaneous level of arrests in the respondent's resident state. Additionally, the models account for state-year (θ_{tl}), month$\times$year (θ_t), year (θ_y), and month (θ_m) fixed-effects. The results in columns 2, 3, 5, and 6 were estimated using a gender-specific sample restriction. The results were estimated using the CPS sample weights. Standard errors are clustered at the state level and are shown in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Figure (1) Workers in the Ag. Sector & Immigration Enforcement

(a) ICE Arrests



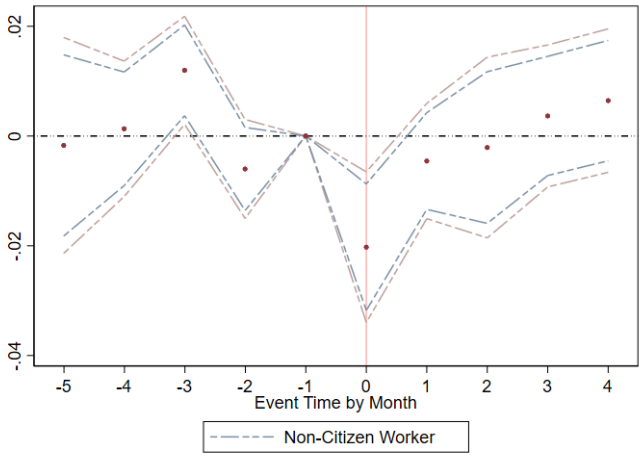
(b) Shocks in ICE Arrests



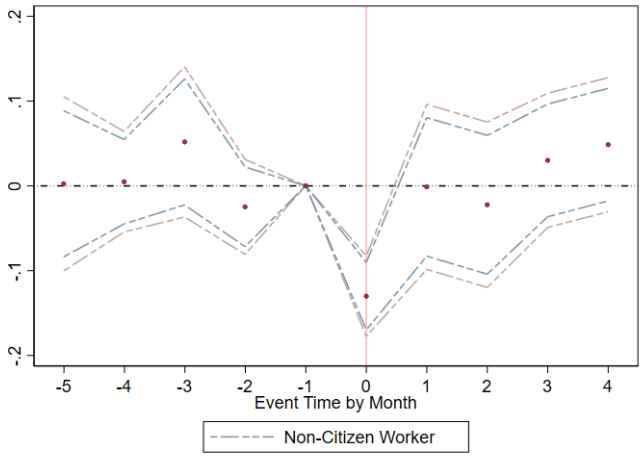
Note: In both panels, the blue-to-yellow shading at the county level represents the number of hired farm laborers at the county level using National Agricultural Statistics Service (NASS) data in 2017. Panel A shows that counties with the most arrests often coincide with heavily populated areas. Panel B illustrates that enforcement shocks frequently occur in counties with large agricultural workforces. The overlay of farm labor data highlights the potential impact of enforcement actions on agricultural communities. This comparison suggests that the shock variable captures enforcement variations that may be less apparent when examining arrest levels alone, particularly regarding agricultural labor concentrations

Figure (2) Simple event analysis

(a) Labor Force Participation



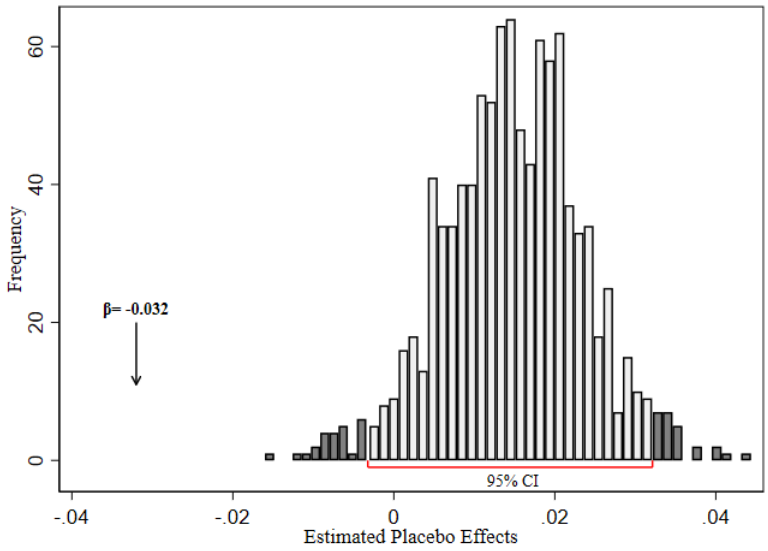
(b) Hours Worked: $\sinh^{-1} x$



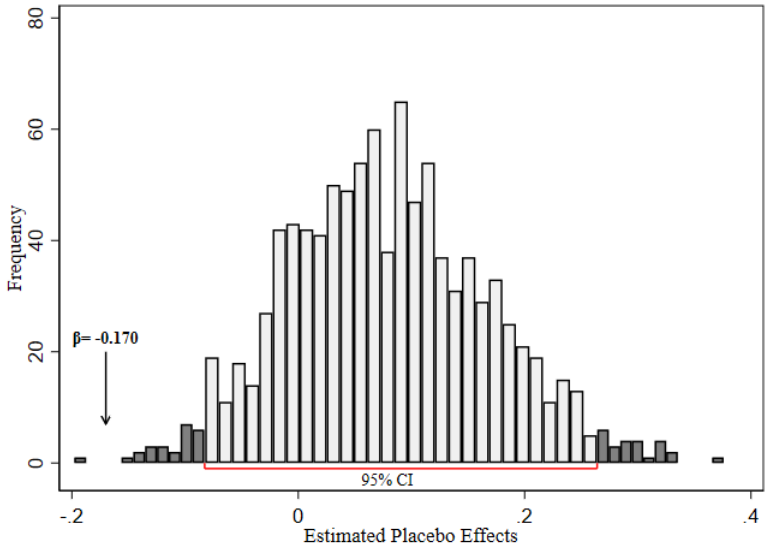
Note: This figure plots the estimates from an event-study regression of labor supply before and after shock to immigration enforcement . Panel A examines labor force participation and Panel B examines hours worked as transformed using the inverse hyperbolic sine function.

Figure (3) ICE arrest placebo

(a) Labor Force Participation



(b) Hours Worked: $\sinh^{-1} x$



Note: This figure presents the distribution of placebo estimates for labor force participation (Panel a) and hours worked (Panel b), generated from 1,000 iterations of randomly assigned immigration enforcement shocks across states and month-by-year periods.