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States Taking the Reins? Employment Verification Requirements and Local Labor Market Outcomes

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ABSTRACT

We estimate the impact of state-level "E-Verify" legislation that mandates employment eligibility verification for private-sector workers. We document declines in formal sector employment and employment turnover after mandate passage, with effects concentrated among those likeliest to be work-ineligible. Using newly available data, we show that larger firms are far more likely to comply with mandates. Heterogeneity in adherence leads to substantial within-state employment spillovers from larger to smaller firms, as well as a reduction in the number of large firms. We find no evidence that work-ineligible populations relocate or that native-born workers' labor market outcomes improve in response to mandates.

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1 Introduction

As global migration flows rose over recent decades, United States federal immigration policy focused resources on strengthening border security and raising the costs of entering into the U.S. illegally. U.S. Border Patrol spending correspondingly rose almost ten-fold over the past two decades, to $4.3 billion in Fiscal Year 2017. In spite of this unidimensional focus of federal immigration policy, states have selectively adopted policies designed to make undocumented immigration less attractive to potential migrants by reducing access to public benefits, by increasing cooperation between local/state law enforcement and federal immigration authorities, and by strengthening employment eligibility verification systems. The adoption of employment eligibility verification systems, in particular, has the potential to dramatically reshape the immigration landscape by eliminating undocumented immigrants' access to formal sector labor markets and the associated earnings gains that have motivated past waves of migration to the U.S. At the same time, the welfare implications of these state-level policies are ambiguous. The substitutability of natives and work-eligible immigrants for undocumented workers will determine whether these subgroups benefit from falling undocumented labor supply in formal sector markets, while constraints placed on the hiring of undocumented workers will raise the costs that firms face.

The primary system used to verify immigrants' work eligibility is E-Verify, a largely voluntary electronic verification system developed by the U.S. Immigration and Naturalization Service (INS) in 1997.[1] Partial or comprehensive mandates have been adopted by twenty-two states that require the E-Verify system be used to verify employment eligibility of new hires. In this paper we study how the passage and enforcement of state-level E-Verify mandates have affected local labor market outcomes for subpopulations with

[1] The INS was abolished in 2003 and replaced by the U.S. Citizenship and Immigration Services (USCIS), Immigration and Customs Enforcement (ICE), and Customs and Border Patrol (CBP) offices in the Department of Homeland Security.

varying rates of predicted employment ineligibility and for native-born workers, the intended beneficiaries of these policies.

Understanding the complex impacts of expanded E-Verify usage is particularly relevant at present. Recent comprehensive immigration reform proposals, such as legislation passed by the U.S. Senate in 2013, and the White House's FY 2019 Budget Message (OMB, 2018) have called for a federal private-sector E-Verify mandate. More broadly, this work contributes to a greater understanding of the role of state and local policies, including cooperation agreements with federal authorities, in influencing labor market outcomes and immigrants' location choice.[2] Finally, immigration policy is currently among the most hotly debated political issues. A vast academic literature has sought to understand how immigration, both legal and undocumented, impacts American firms and the economic fortunes of the native-born.[3] While evaluating the efficacy of E-Verify is important for understanding the limits of policy, an improved understanding of the impact of E-Verify helps deepen our understanding of the ultimate gains or losses from immigration.[4]

Our investigation begins with a new analysis of administrative data from the Department of Homeland Security on usage of the E-Verify system. We use this data to estimate the effect of E-Verify mandates on usage and document a high degree of non-compliance. Specifically, we show that E-Verify usage is quite low among firms with fewer than 20 employees and their usage is largely unaffected by passage of a mandate. The high degree of non-compliance that we document suggests that the mandates may impose substantial costs on firms.

[2] For example, other recent work studies the impacts of the Secure Communities Act (East et al., 2019; East and Velasquez, 2019) and the 287(g) program (Bohn and Santillano, 2017).

[3] This literature is recently reviewed and discussed in Lewis and Peri (2015) and Dustmann et al. (2016a). Other recent examples are Chassamboulli and Peri (2015), Dustmann and Glitz (2015), Dustmann et al. (2016b), and Clemens et al. (2018).

[4] Our work also contributes to understanding of the role of legal status in immigrant outcomes because the increased use of E-Verify may have the effect of creating much sharper distinctions in the labor market outcomes of immigrants with different legal statuses. See, for instance, Borjas and Cassidy (2019).

We use three data sources to identify labor market impacts: the Quarterly Workforce Indicators (QWI), American Community Survey (ACS), and County Business Patterns (CBP). Our benchmark county-level approach identifies significant declines in Hispanic worker employment in response to both passage and enforcement of E-Verify mandates. We provide evidence that employment declines are driven by those subpopulations most likely to be classified as work-ineligible. We identify employment declines among Hispanic and likely work-ineligible subpopulations that are notably larger than those found in prior work (Orrenius and Zavodny, 2015, 2016; Orrenius et al., 2018; Amuedo-Dorantes and Bansak, 2014). These divergent findings are explained by differences in the benchmark specifications employed. Specifically, we test for parallel pre-trends with respect to key outcomes and, in contrast to past work, focus on specifications without linear time trends when the data provide support for doing so. Given treatment effects that grow over time, the inclusion of time trends will tend to attenuate estimates. We also build on past work by showing that usage of the E-Verify system and the associated labor market effects are apparent when mandates are passed, prior to enforcement. Treatment effects associated with the date of enforcement, which have been the focus of much prior research, may therefore fail to accurately capture the overall effect of the mandates.

Consistent with the prior evidence, we document declines in Hispanic worker turnover (hires and separations) that parallel employment losses. This type of "job lock" is driven by the fact that E-Verify mandates apply only to newly-hired workers and represents a notable labor market distortion induced by E-Verify mandates. We use ACS data to demonstrate that Hispanic employment declines in response to E-Verify mandate passage are driven by probabilistically undocumented workers, the intended targets of the policy. Our work finds no evidence that native-born workers benefit from E-Verify mandates and some evidence they are harmed by them. In particular, we identify small but statistically significant declines in employment among non-Hispanics using the QWI. ACS data

provide no evidence of corresponding employment gains among U.S. citizens. We estimate employment declines among native-born workers who are the most substitutable for undocumented immigrants, such as young, male workers without college degrees. These employment declines are mirrored by declines in labor market earnings and family income.

We next identify substantial heterogeneity in employment effects by firm size. Larger firms are more likely to comply with E-Verify mandates and we correspondingly demonstrate that virtually all of the decline in Hispanic employment is driven by workers in larger firms. The number of large firms also declines significantly in response to the passage of E-Verify mandates, suggesting that aggregate employment effects result from a combination of extensive and intensive margin changes. The disproportionate decline in large firm employment represents an unintended consequence of E-Verify mandates and suggests that the costs imposed on firms that do comply with these mandates may be substantial.

The heterogeneous employment impacts between large and small firms motivate our analysis of within-state and within-county spillovers. Since some E-Verify mandates exclude smaller firms, and even when covered smaller firms have a lower compliance rate with mandates, counties that have a larger share of employment in small firms will be impacted less by statewide mandates. We use this variation to estimate models that compare counties in the same state that vary in their effective E-Verify coverage. These estimates indicate that there are important spillover effects that reflect the movement of workers from jobs in high-compliance to low-compliance counties and from jobs in larger to smaller firms. These models are also important because they rely on a distinct source of variation in E-Verify coverage than the traditional variation across states and time exploited in our and others' earlier analyses.

Finally, we use ACS data to show that the size of the potentially undocumented population does not change in response to passage of E-Verify mandates. The divergence

between this finding and the evidence from past work that E-Verify mandates lead to undocumented population declines (see, for instance, Orrenius and Zavodny, 2016) appears to be explained by our focus on the timing of mandate passage rather than enforcement. We provide suggestive evidence that increases in supplementary family income sources may explain the lack of any significant estimated impact on the mobility of the work-ineligible subpopulation.

2 E-Verify Background, Mandates, and Usage

The 1952 Immigration and Nationality Act officially made employers responsible for ensuring that their employees are legally eligible to work in the United States, but enforcement of this requirement remained limited over subsequent decades. Beginning in 1986 the eligibility verification process was streamlined and strengthened through a requirement that all newly hired employees fill out Employment Eligibility Verification Form I-9. This form requires new employees to submit documentation of their identify and their authorization to work in the United States, for example through a combination of a passport, Permanent Resident Card, or other approved documents. Federal law requires that employers maintain I-9 forms, but does not mandate that the employer verify the authenticity of the information or documents provided. Concerns arose in subsequent years regarding the accuracy and timeliness of verification of employee eligibility based on I-9 Form submissions (Orrenius and Zavodny, 2015, Meissner and Rosenblum, 2009).

In 1997 an electronic verification system was developed by the U.S. Immigration and Nationalization Service (INS) to improve the efficiency of the employee verification process. The E-Verify program provides employers with access to an electronic database that allows for rapid verification of work eligibility. There is no federal mandate to use the E-Verify system to verify the accuracy of information on the I-9 form. Rather, federal

legislation requires only that E-Verify be used for all employees in a given firm or else not be used at all by the firm.[5] While there are no monetary costs to firms to use the E-Verify system, the are non-trivial set-up, training, and compliance costs to using the system. These costs are particularly cumbersome for small firms, which a 2011 analysis suggested would spend $2.6 billion on compliance-related costs if forced to utilize E-Verify (Arvelo, 2011). Firms that use E-Verify turn over employment data to the Department of Homeland Security for statistical analysis, which employers may worry could trigger audits or immigration enforcement raids.[6]

In 2006, Colorado, Georgia, and North Carolina became the first states to enact mandates that require E-Verify usage for particular types of new hires.[7] Currently 22 states have enacted some type of E-Verify mandate. E-Verify requirements vary significantly across states, ranging from requirements imposed in nine states that E-Verify be used by all or nearly all employers, to less comprehensive E-Verify requirements covering only state agencies and state contractors/subcontractors. Table 1 lists all state-level E-Verify laws. Note that many mandates were phased-in over several years, with larger firms covered initially and smaller firms covered in later years.[8] In our benchmark analyses, we exclude those states that passed E-Verify mandates covering state agencies and/or state contractors/subcontractors but not covering other private sector firms since the effective coverage in these states is low and since our data do not allow us to identify firms' state contractor/subcontractor status. In the Appendix, we show the robustness of findings to the inclusion of data from these states. Penalties for non-compliance vary across states

[5] Beginning in 2009, the Federal Acquisitions Regulation requires federal contractors, with some exceptions, to use E-Verify for all new employees.

[6] For example, see https://www.shrm.org/resourcesandtools/hr-topics/talent-acquisition/pages/pros-and-cons-registering-for-everify.aspx.

[7] Data on state E-Verify laws comes from the National Conference of State Legislatures (2015) and individual state statutes.

[8] Several counties in California enacted E-Verify mandates. These were overturned by subsequent state law that prohibited lower levels of government from enacting such mandates. Illinois also prohibits lower levels of governments from enacting E-Verify mandates. We are not aware of any other sub-state E-Verify mandates.

from modest fines to suspension of a business license.

A unique contribution of our work is in providing the first assessment of the effect of state E-Verify mandates on usage of the system. We obtained administrative records from the USCIS via a Freedom of Information Act request that include counts of enrollment by firms in the E-Verify system, counts of total E-Verify queries, and counts of queries deemed work ineligible, separately by county, detailed industry, firm size, and year-quarter from 2004 to 2016. These data are an important part of our research design because they allow us to assess how common E-Verify usage was prior to a mandate's passage and to evaluate the change in usage associated with mandate passage as well as enforcement. In addition, these data are used to evaluate heterogeneity in adherence to state-level mandates as a function of firm size.

New hires (the population subject to E-Verify mandates) are measured in the Quarterly Workforce Indicators (QWI) data. The QWI contain aggregate data on employment, hires, separations, and other labor market measures by geographic area, industry, firm size, and a limited number of worker demographic characteristics from 2004 through the second quarter of 2015. The QWI is created by the United States Census Bureau from matched employer-employee data that is itself created from state and federal administrative records and surveys. Much of the information on employment and hires comes from state Unemployment Insurance (UI) records, which cover 96 percent of civilian wage and salary jobs.[9] The measure of hires that we use includes all people who had earnings from an employer in a particular quarter but did not have earnings from that employer in the previous quarter.

Figure 1 shows the ratio of E-Verify queries to new hires from 2004 to 2015. E-Verify usage was quite low prior to 2006 and began to rise after the relaunch of the web interface with enhanced features (including photo matching for individuals who have a Permanent

[9] Detailed information about the QWI data is available at https://lehd.ces.census.gov/data.

Resident Card or Employment Authorization Document), and public outreach in 2007.[10] In 2006, three percent of hires were queried. The ratio rose to 20 percent in 2010 and 31 percent in 2015.[11] 2008 was the first year that any private sector hires were subject to an E-Verify mandate. Figure 1 also shows the fraction of private-sector hires that were subject to an E-Verify mandate. We estimated this coverage rate by applying applicable state laws based on firm size.[12] The coverage rate rises from zero in 2007 to 12.3 percent in 2015.

Figure 2 shows the ratio of E-Verify queries to hires separately by firm size. E-Verify usage is quite uncommon among firms with fewer than 20 employees, where under ten percent of hires were queried in 2015. By contrast, over 40 percent of hires in firms with 20 or more employees were queried in 2015. This disparity is not because of state mandates that exclude small firms since most states with private sector mandates eventually covered all firms (the exceptions are Tennessee, Georgia, and Utah, which exclude firms with fewer than six, fewer than 11, and fewer than 15 employees, respectively). Rather, the disparity is likely caused, in part, by the fact that some portion of the set-up and compliance costs are fixed and therefore higher on a per-hire basis for small firms. Some of the disparity is also likely due to larger firms being more likely to be federal or state contractors and therefore subject to a mandate. In Section 4, we demonstrate that mandate passage sharply increases E-Verify usage by larger firms while smaller firms experience a more marginal increase in usage.

A small existing literature has directly investigated labor market impacts of E-Verify

[10] A summary of the history of the E-Verify program is given at https://www.uscis.gov/e-verify/about-program/history-and-milestones.

[11] The E-Verify queries data in Figure 1 includes queries by both public and private-sector entities, while our extract of the QWI data covers only the private sector. Thus the ratio of queries to hires overstates the fraction of private sector hires that are queried.

[12] The data on hires in the QWI is grouped into firm size bins that do not always coincide with the E-Verify mandate thresholds, which induces some measurement error in our coverage rate. Our measure of coverage does not take into account any others exclusions to a law.

mandates.[13] This past work has consistently identified state-level employment declines among likely work-ineligible subpopulations in response to E-Verify enforcement but is otherwise inconclusive regarding the net labor market impacts of (and costs associated with) E-Verify mandates. The best-known, state-level E-Verify case studies examine the migration and labor market impacts of Arizona's 2007 Legal Arizona Workers Act (LAWA), which mandated statewide E-Verify usage. These studies identify a significant decline in the state population characterized as non-citizen Hispanic in response to LAWA's passage, but find no evidence of improvement in employment outcomes for non-Hispanic low-skilled workers (Bohn et al., 2014, 2015). Moreover, LAWA was passed during a period in which Arizona enacted multiple laws which were widely perceived as "anti-immigrant" (Newman, 2017), suggesting that the undocumented population might have been particularly responsive to the passage of LAWA given the overall state climate. The most comprehensive empirical research on the aggregate labor market impacts of the scale-up of E-Verify usage includes Amuedo-Dorantes and Bansak (2014), Orrenius and Zavodny (2015), and Orrenius et al. (2018). These studies examine the employment and wage effects of E-Verify mandates passed in multiple states and find mixed evidence of whether any benefits accrue to likely work-eligible sub-populations, likely due to differences in the data sources used, among other factors. Orrenius and Zavodny (2016) employs a similar approach to examine changes in state-level likely undocumented populations and finds evidence that E-Verify mandates lead to reductions in this population, driven by declines in the number of recent migrants living in a given state.[14]

[13] Other recent work has turned to investigating downstream outcomes, including foreign direct investment responses, educational enrollment, and health insurance (Amuedo-Dorantes et al., 2015; Gunadi, 2018; Churchill, 2019).

[14] Although we replicate this finding when examining undocumented population responses to E-Verify mandate enforcement, we find no such impact in benchmark specifications that study responses to mandate passage. These divergent results are explained by an increase in the undocumented population immediately after passage, which leads to an inflated estimate of the decline in population following mandate enforcement. See Figure A6.

3 Data sources

We use three complementary data sources on labor market outcomes. Our benchmark specifications employ outcomes constructed using QWI data from 2004 to 2015, which we described in Section 2. These data give accurate measures of aggregate employment, hires, and separations by quarter, county, firm size, industry, and Hispanic ethnicity.[15] These data cover formal sector, wage and salary workers. The data do not cover self-employed workers, independent contractors, or those who work in informal or uncovered jobs. QWI data does not include any information about a worker's eligibility to work in the United States. We analyze these data for Hispanics and non-Hispanics separately. While the population of Hispanic workers includes both natives and immigrants, and the subpopulation of Hispanic immigrants includes both work-eligible and work-ineligible immigrants, we anticipate that changes in employment patterns driven by E-Verify legislation will be most likely to manifest themselves as changes in Hispanic employment patterns given that the share of Hispanic workers who are undocumented is substantially higher than the share of non-Hispanic workers without work eligibility, a fact we document below.

We also analyze data from the ACS from 2005 to 2015 that allows us to focus more directly on workers most likely to be undocumented and ineligible to work in the United States, and workers who are potentially affected by changes in labor market outcomes among undocumented workers. ACS data have a number of advantages. First, they contain variables that allow us to study geographic movement, household-level earnings, self-reported employment status (which may include informal employment), and self-employment, which are not available in the QWI. Rich demographic data allow us to focus on treatment effects among more narrow classifications of individuals, including native-born Hispanics and low-skilled, native-born individuals. However, the ACS does

[15] QWI data is available for both public and private sector employment. We only analyze data on private sector employment.

not contain information on the legal status of foreign-born persons and so we follow an existing literature and define a respondent as probabilistically undocumented if that person is a foreign-born, non-veteran with no post-secondary education.[16] Averaged over our sample period, 47.1 percent of Hispanics are foreign-born and 55.4 percent of these are probabilistically undocumented. More generally, 26.9 percent of the foreign-born are probabilistically undocumented.

Two important drawbacks of the ACS are, first, that it is a sample and thus provides a noisier measure of employment; second, geographic coverage is more limited than in the QWI. Individuals in the ACS are classified by their Public Use Microdata Area (PUMA), which are areas created by the Census Bureau that contain at least 100,000 people. We thus employ a cross-walk that maps PUMAs into each of the 3,142 counties (or county-equivalents). Finally, ACS data is annual, rather than quarterly.

We also study changes in the number of establishments in operation using County Business Patterns (CBP) data, which are derived from the Business Register data collected by the U.S. Census Bureau. These data provide the number of establishments in operation at the county-by-firm size bin-by year level and represent the most comprehensive existing data source for establishment-level records (United States Census Bureau, 2019). Data are available for the first quarter of each year between 2004 and 2015.

4 Research Design and Empirical Findings

We now describe our empirical framework to identify changes in E-Verify usage in response to the enactment of legislation mandating its use and to examine resultant changes in labor market outcomes for exposed workers as a function of their likely employment eligibility. The ideal experiment to identify E-Verify program impacts would require the

[16] This definition is adopted in Feigenberg (2019) and a closely-related definition is employed in Orrenius and Zavodny (2016).

random assignment of E-Verify legislation passage and enforcement across place and time. Absent random variation in the passage and enforcement of E-Verify legislation, a key identification challenge is that, even in the absence of an E-Verify mandate, counties in states that pass and enforce E-Verify legislation may have subsequently experienced changes in labor market and immigration outcomes that differed from those in counties in states that did not pass such legislation. To identify the causal impacts of E-Verify legislation in the presence of potentially endogenous passage, we begin with event-study models that document that there are no pre-trends in E-Verify usage or in QWI-based Hispanic labor market outcomes prior to passage of E-Verify legislation. (A comprehensive set of event studies for all examined outcomes is included in the Appendix.) We then employ two complementary identification strategies to measure the effect of legislation on outcomes following passage and enforcement of employment verification mandates: The first approach uses variation across states and time in E-Verify mandates to identify the causal effect of mandates on average labor market outcomes. The second approach uses data disaggregated to the firm size level to exploit within-state variation in the predicted coverage of and adherence to E-Verify mandates and to investigate within-state spillovers.

4.1 Event study models

We begin by presenting event study graphs that characterize differences in E-Verify query rates and in QWI-based employment outcomes among Hispanics in the years before and after passage of any private sector E-Verify legislation in a given state. Our primary goal here is to assess whether there are differential trends in outcomes prior to passage of an E-Verify mandate. To do this, we estimate regression models with the following form:

$$Y_{cst} = \alpha + \sum_{y=-4}^{4} \beta_y Everify_{csty} + \gamma_t + \lambda_c + \epsilon_{cst} \quad (1)$$

where Y_{cst} is the outcome of interest for county c in state s in year-quarter t.[17] γ_t and λ_c represent year-quarter and county fixed effects. Finally, $Everify_{csty}$ is defined as an indicator variable that identifies whether E-Verify legislation covering any private sector workers (regardless of firm size) was passed in county c in state s in y years after year-quarter t (or y years before for negative-valued y). We focus here on the effects of passage, rather than of enforcement, of any private sector E-Verify mandate since passage and enforcement of legislation mandating coverage for smaller firms is typically preceded by legislation mandating coverage of larger firms. As a result, even if the conditional exogeneity assumption is satisfied with regards to the passage of E-Verify legislation, labor market responses to initial passage have the potential to bias estimates derived from models that focus on dates of enforcement or on the dates on which mandates covering all private sector workers were passed. As noted, this emphasis on the timing of legislative passage of any private sector mandate also distinguishes our research design from the prior literature and is supported by the finding (presented below) that E-Verify system usage increases in response to initial mandate passage.

Figure 3 demonstrates that E-Verify mandate passage sharply increases E-Verify usage by firms. Panel A shows the ratio of E-Verify queries to hires in states that passed any private sector mandate, by year relative to the date a mandate was passed. This ratio increases by 22 percentage points from four years prior to the mandate to four years after it, with an 15 percentage point jump during the first full year after the law was passed. Panels B through C show the ratio of queries to hires separately by firm size. The ratio of queries to hires in firms with fewer than 20 employees rises by 10 percentage points, with a three percentage point increase in the first full year after the law was passed. We

[17] We use the inverse hyperbolic sine (asinh) transformation of all dependent variables, unless otherwise noted, because some cells have zero values for employment, hires, or separations. Our results are similar when we use the natural log of labor market outcomes (dropping zero) or using ratios of outcomes to population. The asinh function closely parallels the natural logarithm function, but is well defined at zero (Card and Dellavigna, 2019).

find a similarly small responsiveness to mandates that explicitly cover all private sector firms. By contrast, larger firms are far more likely to use E-Verify and their usage pattern shows a noticeable increase after E-Verify mandates are passed. Firms with 20 or more employees have a 23 percentage point increase in the first full year after the law was passed.

Figure 4 presents estimates from Equation 1 for outcomes characterizing Hispanic employment, separations, and hires. We find no evidence of statistically significant pre-trends in any of the outcomes. All three labor market outcomes decline in the year after E-Verify passage and the effect sizes tend to grow over the subsequent years. Importantly, these figures provide support for the identifying assumption that the declines in Hispanic employment, hires and separations after E-Verify passage that we will document cannot be attributed to differential pre-trends that would have predicted diverging outcomes even in the absence of E-Verify legislation.

In Appendix Figures A1-A10, we present estimates from parallel event study models for all of the dependent variables that we consider below, in the QWI, ACS, and CBP samples. In most specifications, we find no evidence of pre-trends in outcomes. Below we note a few limited exceptions in which we assess the sensitivity of estimates to the inclusion of county-specific linear time trends.

4.2 Employment outcomes in the QWI

We next estimate changes in E-Verify query rates and labor market outcomes associated with the passage and implementation of E-Verify legislation. An initial goal of our analysis is to assess whether effects of E-Verify mandates emerge after passage of legislation, before it goes into effect. The event studies presented in Figure 4 preview the finding that mandate passage impacts local labor market outcomes even prior to enforcement. Since E-Verify mandates apply only to newly-hired workers, we expect that there could be "job

lock" based on immigration status among those who would be forced to verify employment eligibility if they switch employers. If true, this would lead to a decline in job separations among work-ineligible individuals after E-verify mandates are passed, even before they are enforced. A reduction in separations could contribute to a concurrent reduction in hires among work-ineligible individuals. By contrast, whether we observe an immediate decline in employment is theoretically uncertain; to the extent that work-ineligible workers forgo job transitions and/or job search, we may see limited aggregate changes in employment even in the presence of significant declines in hires and separations.

We begin our analysis with labor market effects on Hispanic individuals measured in the QWI files. Our first research design builds on the existing literature and exploits state by year-quarter variation in E-Verify passage and enforcement in a multi-state difference-in-differences estimation framework. We estimate models at the county level, rather than state level, that more flexibly account for within-state differences across local labor markets and consequently generate more precise treatment effect estimates. The estimated specifications are of the following form:

$$Y_{cst} = \alpha + \beta_1 Everify_{cst,p} + \beta_2 Everify_{cst,e} + \gamma_t + \lambda_c + \epsilon_{cst} \tag{2}$$

The included regressors are as defined in Equation 1, with the exception of $Everify_{cst,p}$, an indicator variable equal to one if E-Verify legislation that covers **any** private sector workers has been passed in county c state s by year-quarter t, and $Everify_{cst,e}$, which characterizes whether a private sector mandate covering all workers is being enforced in county c state s by year-quarter t. For comparison, we also present estimates that omit the $Everify_{cst,e}$ indicator in order to parallel the specifications used to generate event study plots in Figures 3 and 4. Here, we estimate Equation 2 using inverse hyperbolic sine transformations of the dependent variables because a number of our outcomes have

a subset of zero-valued cells. Standard errors are clustered at the state level.[18]

Before examining labor market outcomes, we estimate the effect of E-Verify legislation on the fraction of new hires that are queried though the E-Verify system. Results are presented in the first two columns of Table 2. Column 1 indicates that passage of any private-sector E-Verify mandate is associated with a 16.4 percentage point increase in the fraction of hires queried in the system. In the second column we separately control for both passage of a mandate and enforcement of a mandate. Over half of the effect loads onto passage of an E-Verify mandate, further supporting our hypothesis that legislative passage (rather than subsequent enforcement) is the relevant determinant of the initial onset of local labor market responses.

The remaining columns of Table 2 present estimates of the impact of E-Verify mandates on labor market outcomes among Hispanics. Odd-numbered columns estimate treatment effects associated with E-Verify passage on employment, separations, and hires among Hispanic workers, while even-numbered columns include both the passage and enforcement regressors as indicated in Equation 2. In columns three, five, and seven we find a statistically significant 8.7 percent decline in Hispanic employment, a 13.3 percent decline in separations, and a 13.9 percent decline in hires. In columns four, six, and eight, in which we include separate indicators for both the passage and the enforcement of mandates, the coefficient associated with passage is larger than the coefficient associated with

[18] In Appendix Tables A5 to A15, we present corresponding regression estimates that include linear time trends; these represent our preferred specifications in the subset of cases for which event studies provide evidence of divergent pre-trends. In Appendix Tables A5 to A15, we also verify that our estimates are not sensitive to the inclusion of state-level covariates characterizing lagged labor market performance and the set of additional immigration enforcement measures already in place in county c in state s in year-quarter t. Specifically, following Orrenius and Zavodny (2015, 2016), we include the lagged unemployment rate, lagged log state GDP per capita, lagged log housing starts, and lagged log state government expenditures. We also include indicators for whether a state has any legislation in place to facilitate information-sharing with federal law enforcement, to restrict public benefits access for undocumented immigrants, or to strengthen protections for undocumented immigrants. Finally, we verify in Appendix Tables A5 to A15 that estimates are robust to including all states in the sample (states that passed E-Verify mandates covering state agencies and/or state contractors/subcontractors but not covering other private sector firms are excluded in our benchmark specifications).

the date of enforcement in the employment model, while the opposite is true for separations and hires. In any case, passage and enforcement coefficients are not statistically distinguishable within each of these models.

As noted previously, the employment and turnover declines we estimate among Hispanic workers are notably larger than those found in prior work (Orrenius et al., 2018). Though our focus on date of mandate passage rather than enforcement could be expected to contribute to these divergent findings, in practice this is not the case. Effect sizes that grow over time mean that average post-event outcome values are higher in passage-based than enforcement-based models, while declining outcome values between passage and enforcement imply that pre-event outcomes are also higher in passage-based than in enforcement-based models. These pre- versus post-event differences across models appear similar in magnitude and so effectively cancel out. In contrast, the exclusion of linear time trends from our benchmark models appears to explain most of the difference; in the presence of effects sizes that grow over time and in the absence of differential pre-trends, the inclusion of these linear time trends will tend to attenuate estimated treatment effects.

In Table 3, we present estimates analogous to those in Table 2 but for non-Hispanic workers. Non-Hispanic workers could be affected in a number of ways. We estimate that 1.2 percent of Non-Hispanics are probabilistically undocumented and so their labor market outcomes could be negatively affected by the enactment of E-Verify mandates. The employment available to work-eligible individuals could increase or decrease, depending on whether they are substitutes or complements to individuals who are not eligible to work in the United States. Furthermore, if work-ineligible individuals experience "job lock", mobility for those who are work-eligible may also be depressed as a result, leading to declines in separations and hires above and beyond any measured employment effects. On net, the estimates in Table 3 indicate negative effects on labor market outcomes, though smaller than the effects on Hispanics. For example, passage of an E-Verify man-

date is associated with declines of 2.9, 8.3, and 7.3 percent in employment, separations, and hires. While these negative impacts may appear to be large, we note that labor market outcomes among non-Hispanics display a slight downward trend prior to passage of E-Verify legislation, which, if not controlled, would bias our post-period estimates downwards (see Appendix Figure A1). When we control for a county-specific linear time trend, the pre-period trend goes away and our post-period effects are small in magnitude and generally not statistically significant at conventional levels.[19] Importantly, given the low share of non-Hispanics likely to be work-ineligible, we can rule out employment gains greater than two percent among work-eligible, non-Hispanics in response to the passage of E-Verify mandates.

We next turn to our analysis of labor market effects measured in the ACS, which allows us to identify average treatment effects for individuals who are likely to be undocumented based on additional observable characteristics, as well as effects on subgroups of native-born individuals. We estimate models similar to Equation 2, though the ACS data are annual and the only policy variable that we include is a dichotomous treatment variable indicating whether any private-sector E-Verify mandate has been passed by the end of a given year. Table 4 first presents employment effects of E-Verify mandates by Hispanic ethnicity and undocumented status. Here employment excludes self-employment since self-employed individuals are not subject to E-Verify mandates. We examine changes in self-employment patterns separately in the subsequent analysis. Columns 1 and 2 show mandates are associated with a large 16.5 percent decline in employment among Hispanics and no effect among non-Hispanics, which mirror our results from the QWI. Columns three through five show that the policy impacts are largest for those we impute to be probabilistically undocumented. In particular, E-Verify mandates reduce employment by 17.5 percent among likely undocumented Hispanics, by 13.2 percent among likely docu-

[19] We find declines of 1.0, 1.8, and 0.6 percent in employment, separations, and hires in these models, presented in Appendix Table A6.

mented Hispanics, and by 19.0 percent among all likely undocumented workers (regardless of ethnicity). Roughly one-quarter of Hispanic workers in the ACS sample are classified as probabilistically undocumented while only about one percent of non-Hispanic workers are classified accordingly, which buttresses our interpretation of the estimates from the QWI that larger (negative) labor market impacts for Hispanic workers are driven by the relatively higher share of work-ineligible individuals within this subpopulation.

A purported motivation for restricting employment opportunities among undocumented immigrants is to improve outcomes among the native-born. However, outcomes among the native-born could be helped or harmed, depending on whether they are substitutes or complements with undocumented migrant labor. Our estimates in the remaining columns of Table 4 indicate that E-Verify mandates, in fact, reduce employment among some lower-skilled groups of native-born workers. The estimate in column six shows a fairly precisely estimated zero effect among the native-born population as a whole. However, the passage of any E-Verify mandate reduces employment among natives with a high school degree or less education by 2.7 percent. The last two columns indicate that this effect is entirely driven by reduced employment among low-skilled natives who are 16 to 40 years old, while there is no effect among older workers.

4.3 Firms and heterogeneity in E-Verify coverage and adherence

In this section we extend our analysis to better understand the role of firms. To do so, we employ an alternative identification strategy that organizes the data by county, firm size, and year-quarter. We first examine heterogeneity in labor market impacts as a function of firm size. We leverage findings from these initial analyses to construct a county-level measure of predicted E-Verify exposure. Using this measure, we can control for unrestricted state-year-quarter fixed effects in our models to assuage any remaining concerns regarding internal validity and to assess the extent of within-state employment

spillovers across areas with differing levels of predicted E-Verify coverage. To conduct the initial firm size-level analysis, we estimate models of the form

$$Y_{fcst} = \alpha + \beta Everify_{fcst} + \gamma_t + \gamma_{fc} + \epsilon_{fcst} \tag{3}$$

Here, Y_{fcst} reflects the outcome of interest for firm size bin f in county c in state s in year-quarter t and $Everify_{fcst}$ is a measure of whether E-Verify legislation that covers *any* firms in firm size bin f has been passed by the end of year-quarter t. γ_t is a year-quarter fixed effect and γ_{fc} is a firm-size bin-by-county fixed effect. Although the raw QWI includes five firm size bins, data is frequently censored or missing for three intermediate bins, corresponding to firms with 20-499 employees. Consequently, we divide the sample into two bins: workers in firms with fewer than 20 employees and workers in firms with 20+ employees. Since data is least likely to be missing for the smallest (0-19 employee) bin, this approach allows us to maximize sample coverage by calculating employment in the 20+ employee bin as the difference between total employment and small firm employment. To maximize coverage, we impute missing employment levels within county-by-firm size bin cells, though we verify in the Appendix that results are not sensitive to this approach.

The estimates corresponding to Equation 3 are presented in the odd-numbered columns of Table 5 and characterize average treatment effects for the Hispanic subpopulation. In the even-numbered columns, we present split-sample equivalent estimates (including year-quarter-by-firm size bin fixed effects) to produce treatment effects separately by firm size bin. Column 2 indicates that aggregate employment declines are driven almost entirely by job losses in larger firms. Interestingly, declines in hires and separations are similar in smaller and larger firms, suggesting that even workers in low-adherence small firms may experience "job lock" after the passage of E-Verify mandates, perhaps due to concerns regarding the likelihood that they will find alternative employment within the set of firms that exhibit similarly low adherence to existing E-Verify mandates. In Appendix Table

A1, we present corresponding results for the non-Hispanic population. We do not find the same evidence of heterogeneous employment responses in smaller versus larger firms. Since the vast majority of non-Hispanic workers are work-eligible, this lack of heterogeneity is consistent with the hypothesis that differences in adherence across smaller versus larger firms explain the heterogeneous Hispanic employment responses that we identify.[20]

We have documented stark differences in compliance with E-Verify mandates and in Hispanic employment effects across firms of varying sizes. We next examine the extent to which measured employment changes result from changes in the number of establishments in operation as compared to within-firm intensive margin changes in the number of employees. Increases in the cost of labor or in hiring costs could lead firms to close or relocate to other areas, or may deter firms from entering the market. We explore these effects using County Business Patterns (CBP) data. Table 6 first presents coefficients from specifications that parallel those presented in Table 5.[21] In columns one and two, the dependent variable is the total number of establishments in the given firm size bin. While the column 1 estimate indicates that E-Verify enforcement is associated with a (insignificant) 1.6 percent decline in the number of establishments, column 2 identifies a larger (and precisely-estimated) decline in the number of establishments with 20+ employees. These contrasting results are explained by the finding from Table 5 that employment declines are concentrated in larger firms. In column 3, we aggregate the data to the county-year-quarter level and identify a small and statistically insignificant 0.4 percent decline in the total number of establishments. This small aggregate effect is explained by the fact that most establishments have fewer than 20 employees and so changes in the number of larger establishments do not lead to significant changes in the total number of establishments.

[20] Interestingly, we also find no evidence of heterogeneity in employment effects across industries as a function of likely undocumented employment shares.

[21] CBP data are available for the first quarter of each year from 2004 to 2015 and so we estimate specifications at the annual level and employ an E-Verify passage measure that is an indicator for whether a mandate has been passed by the end of the first quarter in a given year.

However, in columns four through six, we replace the dependent variable with a measure of the number of employment-weighted establishments.[22] This specification is designed to better capture the share of jobs lost due to the reduction in the number of establishments in operation. We find a larger (and statistically significant) 2.4 percent decline in the county-year-quarter specification. Though this estimate should be interpreted cautiously given the actual underlying distribution of establishment sizes within each bin is not available in the CBP, the point estimate would imply that roughly 60 percent of total job losses are due to the reduced number of establishments in operation.[23]

4.4 E-Verify mandates and employment spillovers

In this subsection we assess the extent to which E-Verify mandates lead to shifts in employment from covered or compliant firms to others. In particular, some E-Verify mandates explicitly exclude small firms. Others phase-in coverage for small firms over time. We have also shown that usage of E-Verify at small firms is low and largely unresponsive to mandates. Much of the employment effect of E-Verify mandates is concentrated in large firms. To what extent, therefore, does a state mandate shift employment from larger to smaller firms? This is important because spillovers arguably represent a clear welfare loss and do not advance any of the purported goals of E-Verify proponents.

We begin this analysis in Table 7, in which we leverage within-state variation in effective E-Verify coverage. Our prior analyses focused on changes in outcomes associated with passage of an E-Verify mandate. We now compare these to models that condition on a state by year-quarter fixed effect, which removes the common effect of passage of the

[22] As an example, a county with two firms with 1-19 employees in a given year would have a weighted establishment value of 20 (two times the midpoint of the 1-19 employee bin). In contrast, a county with one firm with 1-19 employees and one firm with 20-49 employees would have a weighted establishment value of 44.5 (the sum of midpoint of the 1-19 employee bin and the midpoint of the 20-49 employee bin).

[23] This estimate is based on the finding that passage of E-Verify legislation leads to a 3.8 percent reduction in total employment (combining the Hispanic and non-Hispanic samples) and a corresponding 2.4 percent decline in the number of employment-weighted establishments.

mandate. The only remaining variation in E-Verify coverage in these models will be due to differences in the firm size distribution across counties. To the extent E-Verify coverage induces shifts in employment from high coverage to lower coverage areas, estimates in these models will be larger in magnitude than those in corresponding specifications that do not include state by year-quarter fixed effects.

To conduct this analysis, we exploit cross-county variation in the baseline share of employment in large firms in combination with variation in the timing of the passage of mandates covering each firm size bin and in adherence to these mandates. Specifically, we use data from 2004 to 2006 (before the passage of the first relevant E-Verify mandate) to construct county-specific measures of the share of employment in firms with 20+ employees. We then construct a time-varying county-level coverage measure that captures the share of private sector jobs that would be expected to adhere to E-Verify mandates in each year-quarter based on this baseline firm size distribution. Effective coverage is zero if a given firm size bin is not yet covered by an E-Verify mandate. To measure effective coverage conditional on the passage of a mandate, we exploit variation in adherence, as measured using DHS E-Verify query data. Based on estimates from a specification that parallels those included in Table 5 but replaces the dependent variable with the firm size-specific E-Verify query rate, we thus scale the effective coverage of small firms by a factor of 0.23 to account for the relatively smaller "first stage" magnitude (characterizing the relationship between mandate passage and E-Verify query rate) in small firms as compared to large firms. As an example, a county with 50 percent of employment in small firms at baseline has an effective coverage rate of 50 percent in each quarter in which only large firm mandates have been passed and has an effective coverage rate of 61.5 percent (50 percent+50 percent*0.23) in each quarter in which a mandate covers all firm sizes.[24]

[24] To confirm robustness, in Appendix Table A2 we present results based on a coverage measure that uses only variation across firm sizes in the timing of mandate enforcement and ignores variation in adherence. Across specifications, estimated patterns of labor market effects appear qualitatively similar.

Odd-numbered columns of Table 7 present estimates that correspond to Equation 2, but replace the prior E-Verify passage and enforcement measures with this measure of predicted county-level coverage. Variation in coverage in these models is driven by passage of E-Verify mandates and the results closely mirror those presented in Table 2. In the even-numbered columns of Table 7, we add state-by-year-quarter fixed effects to the specifications from the corresponding odd-numbered columns. These fixed effects control for the state-wide mandate in place and so variation in coverage is driven by differences in the baseline firm size distribution. Column 2 validates this alternative approach by demonstrating that higher predicted coverage significantly increases E-Verify usage.

Turning to labor market outcomes, in column 4 we find a 38.2 percent decline in Hispanic employment in response to a 100 percentage point increase in predicted coverage. This point estimate is significantly larger than the benchmark employment decline estimated in column 3. Without state-by-year-quarter fixed effects, the estimate in column 3 captures both spillovers and the average pre-post difference in employment that results from the E-Verify mandate. In contrast, column 4 exploits only variation that is conditional on the set of mandates in place, and so the notably larger estimated treatment effect in this specification is consistent with sizable employment spillovers from local labor markets with higher to lower levels of predicted coverage. This large estimated employment decline also suggests that unobservable, time-varying state-level factors correlated with E-Verify mandate passage cannot explain the measured Hispanic employment declines presented previously. Turning to job turnover measures, the specifications in columns 6 and 8 provide little evidence of spillovers on the separations or hires margins, consistent with the finding that declines in separations and hires appear fairly uniform across the firm size distribution. For completeness, Appendix Table A3 presents parallel results for the non-Hispanic population; here, we find little evidence of comparable within-state employment spillovers for non-Hispanic workers.

To provide additional evidence on the extent of sub-state employment spillovers, Table 8 estimates employment changes in small firms for Hispanic and non-Hispanic workers as a function of the same county-level predicted coverage measure included in Table 7 specifications. Columns 1 and 4 demonstrate modest employment declines in small firms in response to higher county-level coverage rates (insignificant for Hispanics and significant for non-Hispanics but not statistically distinguishable across the two subpopulations). Columns 2 and 5 restrict the sample to county-year-quarter cells in which small firms are not yet subject to E-Verify mandate enforcement and results appear nearly identical. These findings are consistent with the possibility that E-Verify mandate passage has a modest deterrent effect on employment levels in uncovered small firms, perhaps due to anticipation of future coverage. Columns 3 and 6 add state-by-year-quarter fixed effects and show that higher coverage is associated with a large and precisely-estimated 35.3 percent increase in Hispanic employment in small firms (the corresponding 6.9 percent estimate for non-Hispanics is notably smaller and is only marginally significant). This relative increase in small firm employment in response to higher county-level coverage, in a specification which differences out any common deterrent effect associated with state-level mandate passage, is consistent with the presence of within-county spillovers as employment moves from larger (high-adherence) to smaller (uncovered or low-adherence) firms.

4.5 Understanding the response to E-Verify mandates

In the preceding analyses, we have established that the passage of E-Verify mandates led to reductions in employment among Hispanic workers in general and among undocumented workers in particular. We next explore a range of alternative outcomes to better understand how individuals and labor markets adjusted to changing E-Verify coverage. In particular, we ask whether employment verification requirements lead to declines in the likely work-ineligible population and changes in self-employment (which is not sub-

ject to employment verification). We conclude this analysis by investigating impacts of E-Verify mandates on individual wage and self-employment earnings, and overall changes in household income.

We begin in Table 9 with an assessment of the impact of E-Verify mandates on the probabilistically undocumented population in a county. These are estimated using (person-weighted) population counts in the American Community Survey and a regression model similar to Equation 2, though the only policy variable is an indicator that any private-sector E-Verify mandate has been passed. The estimate in column 1 shows no effect of passage of an E-Verify mandate on the probabilistically undocumented population. Next we assess whether passage of an E-Verify mandate affected the share of undocumented workers who moved to their current state of residence in the past year. Passage of a mandate would reduce this share if it leads to shifts in the undocumented population from states with mandates to those without. In fact, the estimate in column 2 indicates that the in-migration rate among undocumented workers is unaffected by passage of E-Verify legislation.

The remaining two columns of Table 9 present estimates of the impact of E-Verify mandates on self-employment, measured through self-reports in the ACS. Self-employment is an important outcome because a potential effect of E-Verify is for undocumented workers to move from regular, payroll employment (which is captured in the QWI data and may be subject to an E-Verify mandate) to self-employment (which is not measured in the QWI and would not be subject to an E-Verify mandate). In particular, to the extent that firms, in response to E-Verify mandates, are able to reclassify some of their labor force from employees to independent contractors, the QWI data would show declines in employment. Column 3 measures the effect of passage of a mandate on self-employment among all workers and shows a fairly precise null effect. By contrast, the estimate in column 4 shows that passage of a mandate increases self-employment among undocumented workers by

17.0 percent. Though the estimate is sizeable, the baseline self-employment rate is 8.1 percent and so the increase in self-employment is small relative to the overall decline in wage and salary employment. Moreover, this estimate should be interpreted cautiously given evidence that self-employment among undocumented workers is already rising prior to E-Verify mandate passage (see Appendix Figure A6).

To provide a summary impact of passage of E-Verify mandates, we conclude with an analysis in Table 10 of effects on individual and household labor market earnings. Our measures of annual earnings refer to income earned in the calendar year prior to the survey.[25] As above, we estimate the parameters of these models using an inverse hyperbolic sine transformation of the dependent variables. Panel A, which examines changes in wage and salary income, presents estimates that parallel corresponding employment effects: wage declines are significantly larger for Hispanics than non-Hispanics and for the likely work-ineligible populations as compared to natives. In Panel B, however, we examine self-employment income and find that Hispanics and likely work-ineligible individuals experience large (though generally imprecise) estimated increases in self-employment income, while non-Hispanics and natives experience significant declines.[26] Despite the increases in self-employment income, our estimates in Panel C indicate that total personal earnings (the sum of wage and self-employment income measures from the prior two panels) fall in response to passage of E-Verify mandates. Finally, in Panel D we assess effects on total household income from wages and self-employment. Though point estimates suggest that E-Verify mandates lead to declines in household earnings for all groups, estimated effects are smaller than the corresponding effects on individual earnings. This is especially true in column 5, which presents effects for probabilistically undocumented workers, who experi-

[25] In Appendix Table A4, we estimate the relationship between the same annual earnings measures and lagged E-Verify mandate passage to ensure that results are not sensitive to the assumed timing of treatment effects. Estimates in Appendix Table A4 parallel those in Table 10.

[26] As above, self-employment earnings estimates for undocumented workers should be interpreted cautiously given the evidence of pre-trends found in Appendix Figure A8.

ence an estimated 27 percent decline in their own earnings, but only a four percent decline in household earnings (which is not statistically different from zero). This indicates that the household members of respondents with higher rates of work ineligibility seemingly increase their earnings in response to the passage of E-Verify mandates, partly offsetting the direct negative effects estimated for the work-ineligible population and helping to explain the lack of a significant migration response (documented in Table 9).

5 Conclusions

This paper investigates the labor market impacts of employment eligibility authorization (E-Verify) mandates. A key contribution of our work is to document the impact of E-Verify mandates on usage of the system, relying on newly available administrative records from the Department of Homeland Security. Importantly, usage of E-Verify to verify employment eligibility of new hires is quite low in firms that employ fewer than 20 individuals. Mandates have a modest effect on usage, raising the ratio of queries to hires by about ten percentage points in the four years after a mandate is passed (from a baseline level of 4.5 percent). Usage in large firms is considerably higher, but still far from complete. In total, we estimate that four years after a mandate is passed, usage increases by 25 percentage points from a baseline level of 21 percent. Imperfect compliance in the face of a legal mandate is noteworthy because it implies there are important monetary and/or non-monetary barriers to using the system. Enactment of a nationwide mandate would exacerbate these costs.

We use two primary data sources – the Quarterly Workforce Indicators and the American Community Survey – and two complimentary research designs to estimate the labor market impacts of E-Verify mandates. We document that passage of a mandate leads to significant declines in Hispanic employment and in the employment of likely work-

ineligible subpopulations. Our estimates are larger than those found in prior research. We find no evidence that non-Hispanics or natives correspondingly benefit from mandate passage. Rather, we find significant employment declines among young, male, and less-educated native-born workers. Consistent with our findings regarding usage of the E-Verify system, firm size-level analyses reveal that much of the employment decline is concentrated in large firms. Our analysis of data from the County Business Patterns indicates that a substantial fraction of the employment decline is associated with a reduction in the number of large firms that locate in an area following passage of a mandate.

We find clear evidence that E-Verify mandates lead to a number of labor market distortions. First, mandates lead to reductions in both hires and job separations. These effects are largest for Hispanics but are also negative (though in some cases imprecisely-estimated) for non-Hispanic workers, consistent with market-wide declines in employment mobility in response to E-Verify passage. Second, we find evidence of important within-state and within-county spillovers in employment from large to small firms.

In sum, while E-Verify mandates may significantly reduce formal sector employment among work-ineligible individuals, these policies are not effective in deterring undocumented migration. Moreover, the lack of gains experienced by native-born workers, the labor market distortions, and the disproportionate costs imposed on large firms suggest that the net aggregate costs associated with such mandates may be substantial.

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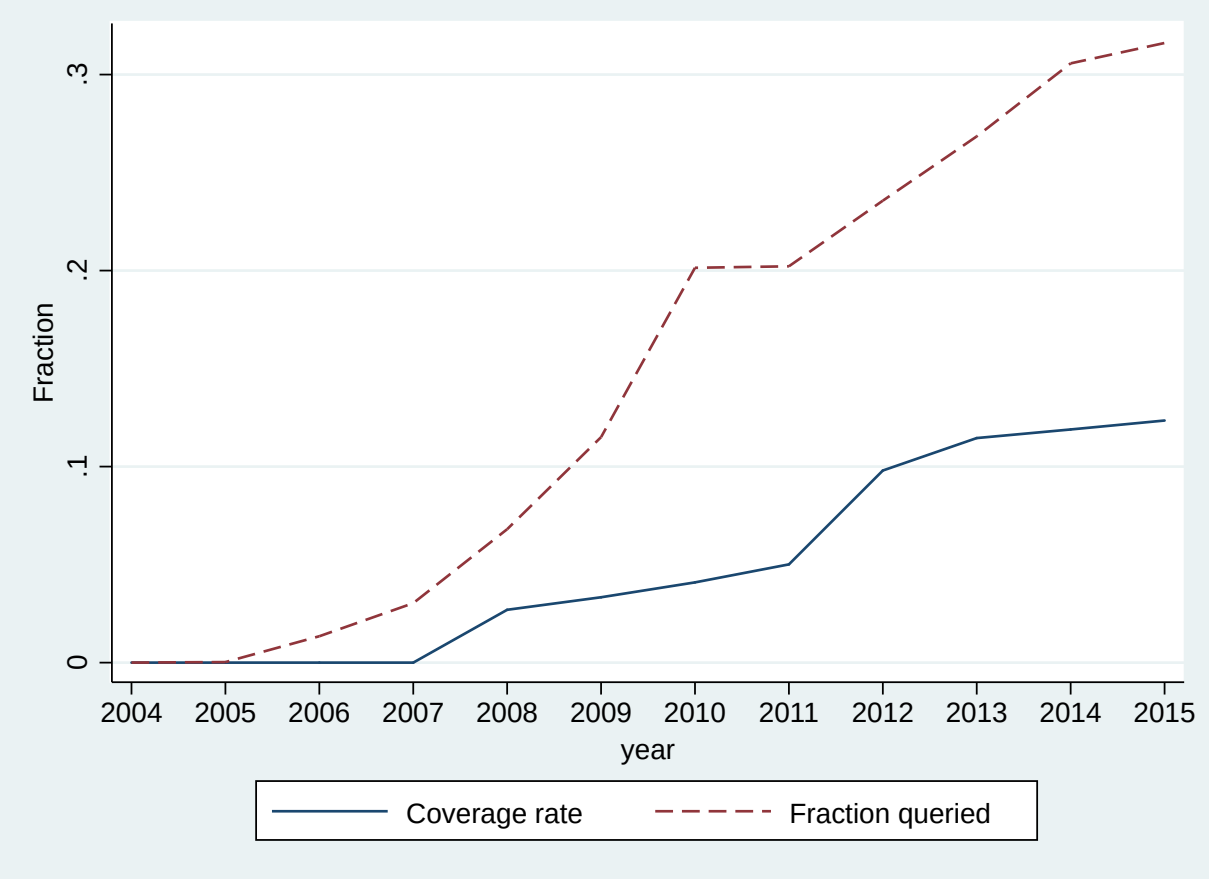
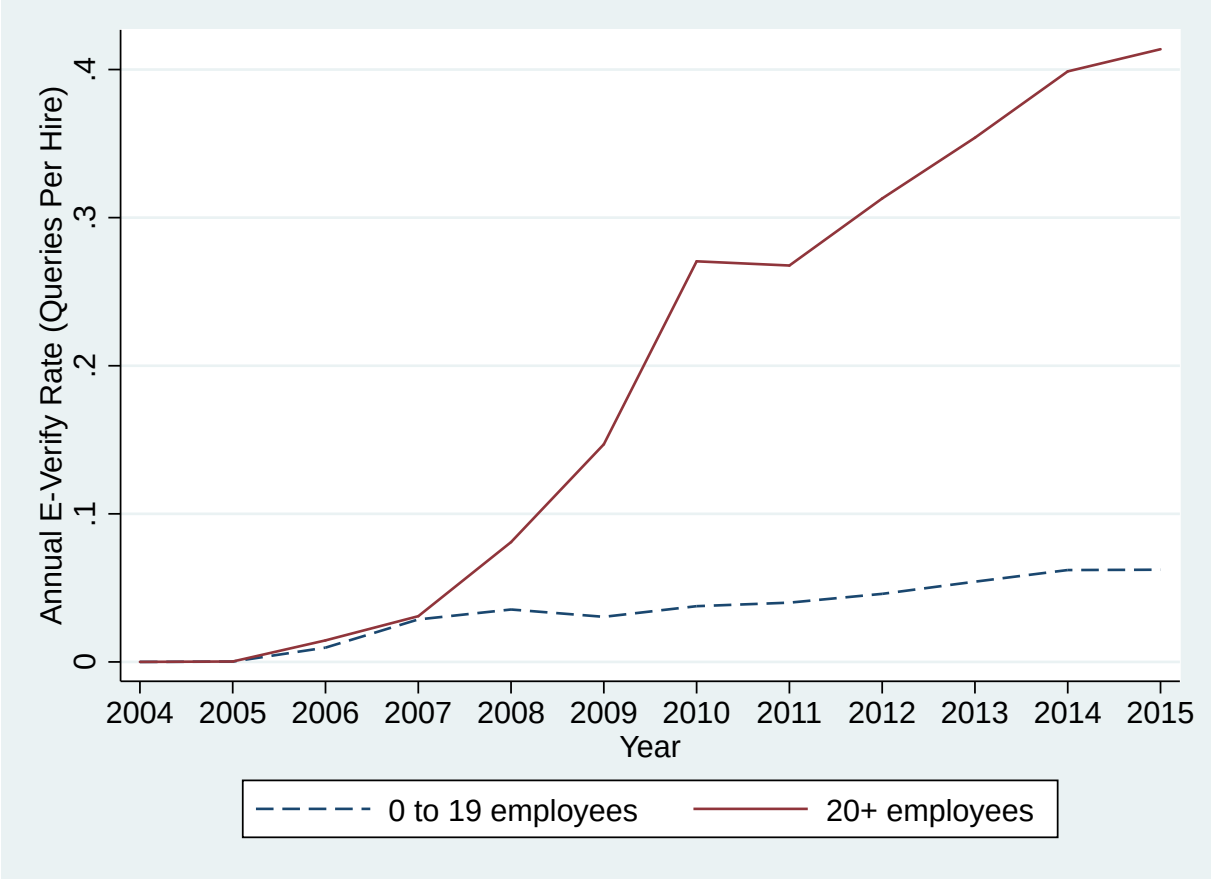
Figure 1: Annual Trends in E-Verify Usage



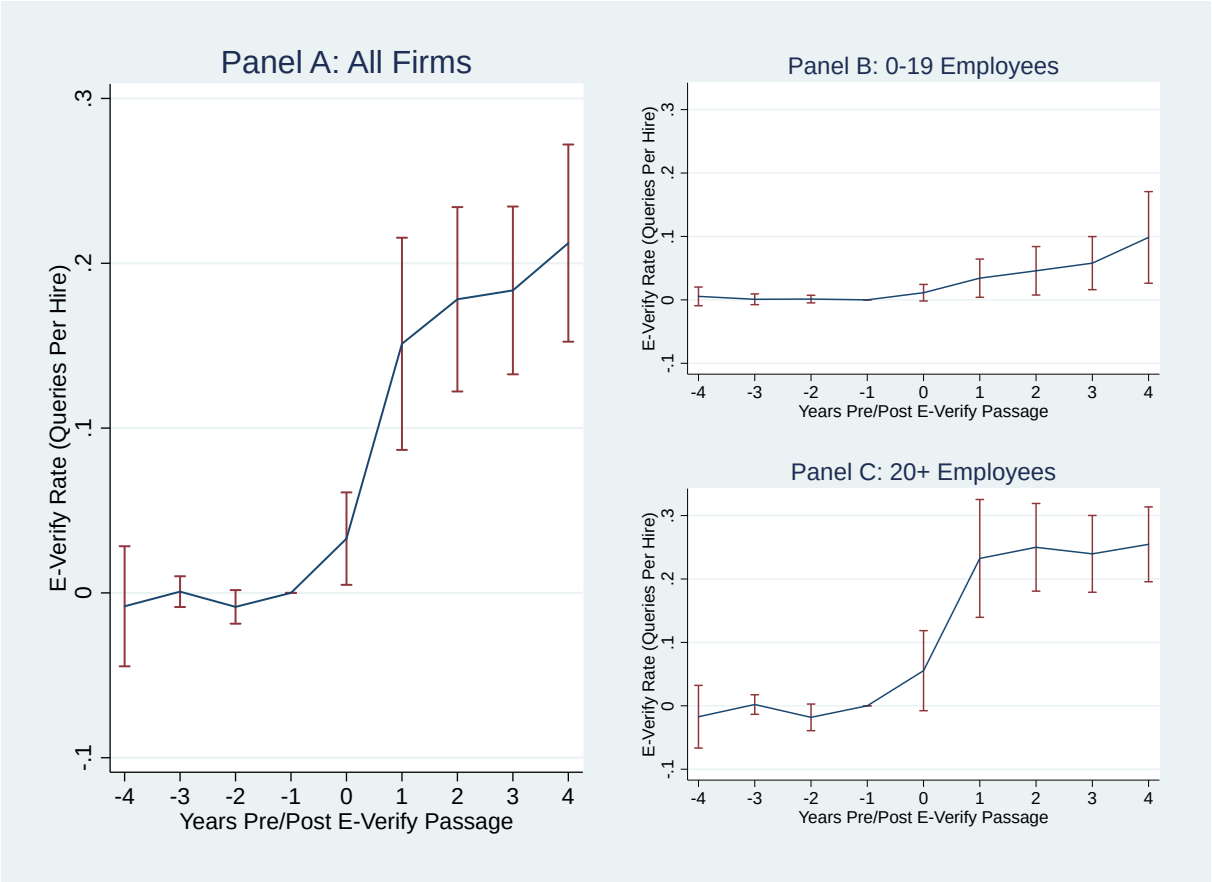
Data source: United States Department of Homeland Security data series.
Notes: This figure plots the annual E-Verify rate, defined as the number of E-Verify queries divided by the total number of new hires, and the annual fraction of all private sector hires subject to E-Verify mandates. New hires are measured using the QWI.

Figure 2: Annual Trends in E-Verify Usage by Firm Size



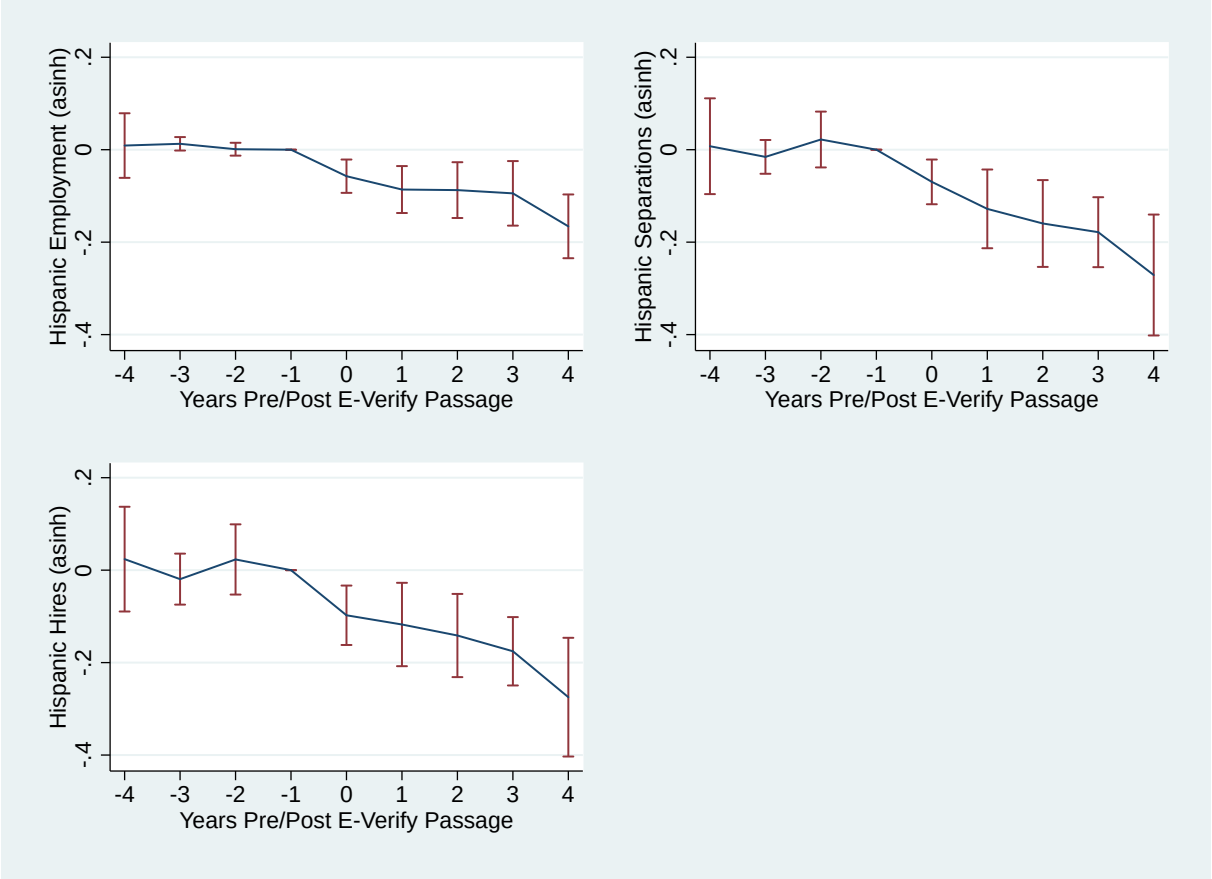
Data source: United States Department of Homeland Security data series.
Notes: This figure plots the annual E-Verify rate, defined as the number of E-Verify queries divided by the total number of new hires, separately by firm size bin. New hires are measured using the QWI.

Figure 3: Event Studies for E-Verify Usage by Firm Size



Notes: Each panel plots coefficients and 95% confidence intervals from a county-level regression of the E-Verify rate, defined as the number of E-Verify queries divided by the total number of new hires in the referenced firm size bin(s), on a set of dummies for years before and after the first private sector E-Verify mandate has been passed in the state in which a given county is located. Specifications include county and year-quarter fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0").

Figure 4: Event Studies for QWI-Based Hispanic Worker Outcomes (County-level)



Notes: Each panel plots coefficients and 95% confidence intervals from a county-level regression of the referenced outcome measure on a set of dummies for years before and after the first private sector E-Verify mandate has been passed in the state in which a given county is located. Specifications include county and year-quarter fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for Hispanic workers.

Table 1: State-level E-Verify Mandates

State	Citation	Year Enacted	Applies to:
Alabama	HB 56 HB 658	2011	All employers (phase in)
Arizona	HB 2779 HB 2745	2007 2008	All employers
Colorado	HB 1343 SB 139 SB 193	2006 2008 2008	State agencies, contractors
Florida	EO 11-02 EO 11-116	2011 2011	State agencies, contractors, subcontractors
Georgia	SB 529 HB 2 SB 447 HB 87 HB 742 HB 1027	2006 2009 2010 2011 2012 2012	Public employers, contractors, subcontractors (phase in) Private employers with 11+ employees (phase in)
Idaho	EO 2009-10	2009	State agencies, contractors
Indiana	SB 590	2011	State/local agencies, contractors
Louisiana	HB 342 HB 646 HB 996	2011 2011 2012	State/local contractors Option for private employers
Michigan	HB 5365	2012	Certain state agencies, contractors and subcontractors
Minnesota	EO 08-01	2008	Certain state contractors
Mississippi	SB 2988	2008	All employers (phase in)
Missouri	HB 1549	2008	Public employers, contractors, subcontractors
Nebraska	LB 403	2009	Public employers, contractors
North Carolina	SB 1523 HB 36 HB 786	2006 2011 2013	State agencies, universities Localities, all employers with 25+ employees (phase in) Excludes employees whose term of employment is less than nine months
Oklahoma	HB 1804	2007	Public employers, contractors, subcontractors
Pennsylvania	SB 637	2012	Public works contractors and subcontractors
South Carolina	HB 4400 SB 20 HB 4813	2008 2011 2012	Public employers, contractors, all private employers (phase in)
Tennessee	HB 1378	2011	Public employers, private employers with 6+ employees required to use E-Verify or retain specified employee documentation (phase in)
Texas	SB 374	2015	State agencies
Utah	SB 81 SB 39 SB 251 HB 116	2008 2009 2010 2011	Public employers, contractors, subcontractors Private employers with 15+ employees
Virginia	HB 737 HB 1859 SB 1049	2010 2011	State agencies Public contractors, subcontractors with 51+ employers
West Virginia	SB 659	2012	Certain public employers, contractors

Table 2: E-Verify Query Rates and QWI-Based Hispanic Worker Outcomes (County Level)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	E-Verify Rate		Employment (asinh)		Separations (asinh)		Hires (asinh)	
Any Private Firm	0.164***	0.136***	-0.087***	-0.076***	-0.133***	-0.090**	-0.139***	-0.097***
(Passage)	(0.022)	(0.023)	(0.028)	(0.025)	(0.040)	(0.038)	(0.040)	(0.035)
All Private Firms		0.106*		-0.040		-0.160***		-0.156***
(Enforcement)		(0.057)		(0.050)		(0.050)		(0.046)
Year-Quarter FE	X	X	X	X	X	X	X	X
County FE	X	X	X	X	X	X	X	X
Observations	92,609	92,609	82,099	82,099	82,099	82,099	82,099	82,099

Notes: The unit of observation is the county by year-quarter. Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year-quarter and All Private Firms (Enforcement) is an indicator for whether a private sector E-Verify mandate covering all firms is being enforced by the end of the given year-quarter. E-Verify rate is defined as the number of E-Verify queries divided by the contemporaneous total number of (Hispanic and non-Hispanic) hires. Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for Hispanic workers.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table 3: QWI-Based Non-Hispanic Worker Outcomes (County Level)

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment (asinh)		Separations (asinh)		Hires (asinh)	
Any Private Firm	-0.029***	-0.029***	-0.083***	-0.061***	-0.073***	-0.050**
(Passage)	(0.010)	(0.009)	(0.022)	(0.020)	(0.024)	(0.021)
All Private Firms		-0.002		-0.085***		-0.086***
(Enforcement)		(0.018)		(0.015)		(0.019)
Year-Quarter FE	X	X	X	X	X	X
County FE	X	X	X	X	X	X
Observations	82,099	82,099	82,099	82,099	82,099	82,099

Notes: The unit of observation is the county by year-quarter. Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year-quarter and All Private Firms (Enforcement) is an indicator for whether a private sector E-Verify mandate covering all firms is being enforced by the end of the given year-quarter. Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for non-Hispanic workers.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table 4: ACS-Based Employment Outcomes (County Level)

	(1) Hispanics	(2) Non-Hispanics	(3) Probabilistically Undocumented Hispanics	(4) Probabilistically Documented Hispanics	(5) Probabilistically Undocumented (All Workers)	(6) All Natives	(7) Low-Skilled Natives	(8) Young, Male Low-Skilled Natives	(9) Old, Male Low-Skilled Natives
Any Private Firm	-0.165***	-0.006	-0.175*	-0.132**	-0.190***	-0.009	-0.027**	-0.068***	-0.007
(Passage)	(0.047)	(0.010)	(0.091)	(0.050)	(0.062)	(0.010)	(0.012)	(0.021)	(0.010)
Year FE	X	X	X	X	X	X	X	X	X
County FE	X	X	X	X	X	X	X	X	X
Observations	23,246	23,246	23,246	23,246	23,246	23,246	23,246	23,246	23,246

Notes: The unit of observation is the county by year. Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year. Each outcome value is the inverse hyperbolic sine transform of the number of employed individuals with the referenced characteristic(s). Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table 5: QWI-Based Hispanic Worker Outcomes (County-by-Firm Size Level)

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment (asinh)		Separations (asinh)		Hires (asinh)	
Covered	-0.058**		-0.133***		-0.140***	
(Passage)	(0.024)		(0.032)		(0.034)	
Covered x Small Firms		-0.019		-0.113***		-0.121***
(Passage)		(0.023)		(0.036)		(0.038)
Covered x Large Firms		-0.092***		-0.158***		-0.165***
(Passage)		(0.030)		(0.036)		(0.038)
County-by-Firm Size Bin FE	X	X	X	X	X	X
Year-Quarter FE	X		X		X	
YearQuarter-by-Firm Size Bin FE		X		X		X
Observations	149,898	149,898	149,898	149,898	149,898	149,898

Notes: The unit of observation is the firm size bin by county by year-quarter. Firm size bins are classified as small (fewer than 20 employees) or large (20 or more employees). Each outcome value is the inverse hyperbolic sine transform of the given measure. Covered is an indicator for whether a given firm size bin-by-county cell is covered by E-Verify legislation that has been passed by the end of the given year-quarter.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table 6: CBP-Based Establishment Outcomes (County and County-by-Firm Size Level)

	(1)	(2)	(3)	(4)	(5)	(6)
	Establishments (asinh)			Establishments, Weighted (asinh)		
Covered	-0.016			-0.034**		
(Passage)	(0.011)			(0.013)		
Covered x Small Firms		-0.008			-0.016	
(Passage)		(0.009)			(0.011)	
Covered x Big Firms		-0.027**			-0.054**	
(Passage)		(0.013)			(0.020)	
Any Private Firm			-0.004			-0.024**
(Passage)			(0.014)			(0.011)
County-by-Firm Size Bin FE	X	X		X	X	
Year FE	X		X	X		X
Year-by-Firm Size Bin FE		X			X	
County FE			X			X
Observations	49,181	49,181	24,809	49,181	49,181	24,809

Notes: The unit of observation is the firm size bin by county by year in Columns (1)-(2) and (4)-(5) and the county by year in Columns (3) and (6). Firm size bins are classified as small (fewer than 20 employees) or large (20 or more employees). Each outcome value is the inverse hyperbolic sine transform of the referenced measure. Covered is an indicator for whether a given firm size bin-by-county cell is covered by E-Verify legislation that has been passed by the end of the first quarter of the given year (establishment count data is available annually for the first quarter). Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the first quarter of the given year. Establishments (Weighted) scales the number of establishments in each of nine available firm size bins by the midpoint of the range of number of employees included in the given bin and then sums these scaled counts across the nine firm size bins.
Standard errors are clustered by state.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table 7: E-Verify Query Rates and QWI-Based Hispanic Worker Outcomes as a Function of Predicted E-Verify Coverage (County Level)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	E-Verify Rate		Employment (asinh)		Separations (asinh)		Hires (asinh)	
Predicted Coverage	0.213***	0.345**	-0.104***	-0.382***	-0.154***	-0.046	-0.159***	-0.023
	(0.026)	(0.133)	(0.033)	(0.107)	(0.046)	(0.130)	(0.046)	(0.165)
County FE	X	X	X	X	X	X	X	X
Year-Quarter FE	X		X		X		X	
YearQuarter-by-State FE		X		X		X		X
Observations	92,289	92,289	75,919	75,919	75,919	75,919	75,919	75,919

Notes: The unit of observation is the county by year-quarter. E-Verify rate is defined as the number of E-Verify queries divided by the contemporaneous total number of (Hispanic and non-Hispanic) hires. Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for Hispanic workers. To construct the Predicted Coverage measure, we first calculate the predicted share of workers covered by E-Verify legislation that has been passed by the end of the given year-quarter, as determined by the baseline (2004-2006) firm size distribution for all workers (in Columns 1-2) and for Hispanic workers (in Columns 3-8). This measure is then scaled by 0.227 for workers in small firms (with fewer than 20 employees) to account for the relative intensity of E-Verify usage across smaller versus larger firms.
Standard errors are clustered by state.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table 8: QWI-Based Spillover Analyses (Small Firm Employment)

	(1)	(2)	(3)	(4)	(5)	(6)
	Hispanic Employment in Small Firms (asinh)			Non-Hispanic Employment in Small Firms (asinh)		
Predicted Coverage	-0.026	-0.027	0.353***	-0.032***	-0.034***	0.069*
	(0.026)	(0.019)	(0.116)	(0.011)	(0.010)	(0.040)
County-by-Firm Size Bin FE	X	X	X	X	X	X
Year-Quarter FE	X	X		X	X	
YearQuarter-by-State FE			X			X
Observations	74,005	67,756	74,005	74,005	67,756	74,005

Notes: The unit of observation is the county by year-quarter. Small firms are those with fewer than 20 employees. Each outcome value is the inverse hyperbolic sine transform of (Hispanic or non-Hispanic) employment in small firms. Columns 2 and 5 restrict the sample to county-year-quarter cells in which small firms are not yet subject to E-Verify mandate enforcement. To construct the Predicted Coverage measure, we first calculate the predicted share of workers covered by E-Verify legislation that has been passed by the end of the given year-quarter, as determined by the baseline (2004-2006) firm size distribution for Hispanic workers (in Columns 1-3) and for non-Hispanic workers (in Columns 4-6). This measure is then scaled by 0.227 for workers in small firms (with fewer than 20 employees) to account for the relative intensity of E-Verify usage across smaller versus larger firms.
Standard errors are clustered by state.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table 9: ACS-Based Migration and Self-Employment Outcomes (County Level)

	(1) Probabilistically Undocumented Population	(2) In-migration Rate (Undocumented)	(3) Self-Employment All Workers	(4) Self-Employment Undocumented Workers
Any Private Firm	-0.002	0.004	-0.014	0.170**
	(0.062)	(0.007)	(0.019)	(0.072)
Year FE	X	X	X	X
County FE	X	X	X	X
Observations	23,246	22,522	23,246	23,246

Notes: The unit of observation is the county by year. In Column (1), the outcome value is the inverse hyperbolic sine transform of the number of probabilistically undocumented residents, defined as foreign-born, non-veterans who have not completed high school. The In-migration Rate measures the share of probabilistically undocumented respondents who moved to their current state of residence within the last year. The outcome measures in Columns (3)-(4) are the inverse hyperbolic sine transforms of the number of self-employed workers in each category. Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year.
Standard errors are clustered by state.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table 10: ACS-Based Per Capita and Household Annual Earnings Measures (County Level)

	(1) Hispanics	(2) Non-Hispanics	(3) Probabilistically Undocumented Hispanics	(4) Probabilistically Documented Hispanics	(5) Probabilistically Undocumented (All Workers)	(6) All Natives	(7) Low-Skilled Natives	(8) Young, Male Low-Skilled Natives	(9) Old, Male Low-Skilled Natives
				Panel A: Per Capita Wage Income					
Any Private Firm	-0.180***	-0.040***	-0.122	-0.147**	-0.263**	-0.036**	-0.045**	-0.077**	-0.024
(Passage)	(0.053)	(0.014)	(0.115)	(0.056)	(0.125)	(0.015)	(0.020)	(0.029)	(0.018)
				Panel B: Per Capita Business (Self-Employment) Income					
Any Private Firm	0.203	-0.117***	0.324*	0.218	0.225	-0.115***	-0.132***	-0.384***	-0.109**
(Passage)	(0.180)	(0.036)	(0.181)	(0.321)	(0.164)	(0.036)	(0.036)	(0.089)	(0.047)
				Panel C: Per Capita Total (Wage and Business) Income					
Any Private Firm	-0.090*	-0.039***	-0.157	-0.104**	-0.269***	-0.036**	-0.043**	-0.079***	-0.029*
(Passage)	(0.050)	(0.013)	(0.105)	(0.049)	(0.082)	(0.013)	(0.018)	(0.029)	(0.016)
				Panel D: Per Capita Total (Wage and Business) Household Income					
Any Private Firm	-0.064	-0.029***	-0.091	-0.083	-0.042	-0.027**	-0.024**	-0.045***	-0.019
(Passage)	(0.047)	(0.010)	(0.106)	(0.056)	(0.073)	(0.011)	(0.010)	(0.011)	(0.012)
Year FE	X	X	X	X	X	X	X	X	X
County FE	X	X	X	X	X	X	X	X	X
Observations	23,196	23,239	19,948	23,182	22,522	23,239	23,239	23,239	23,239

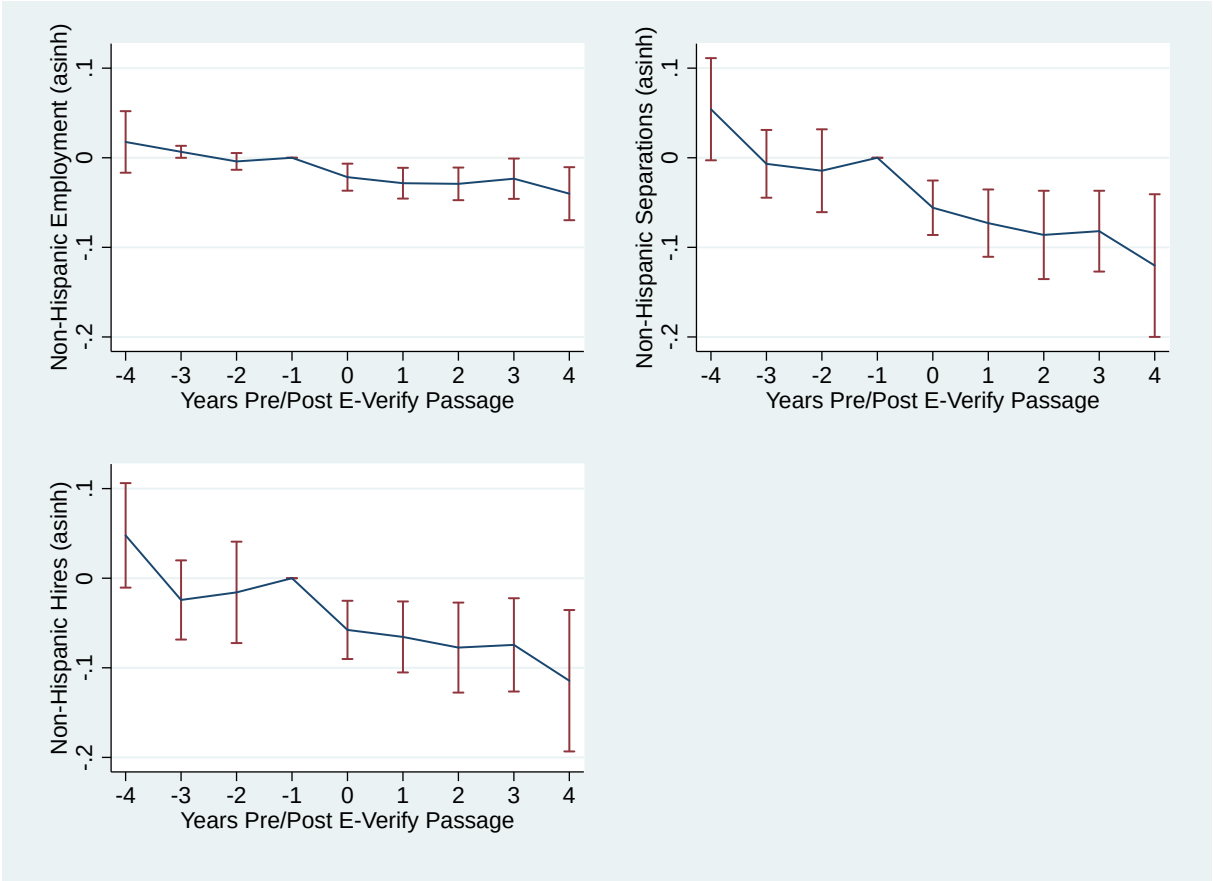
Notes: The unit of observation is the county by year. Each outcome value is the inverse hyperbolic sine transform of mean annual earnings from the specified category for individuals with the referenced characteristic(s). Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year. Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

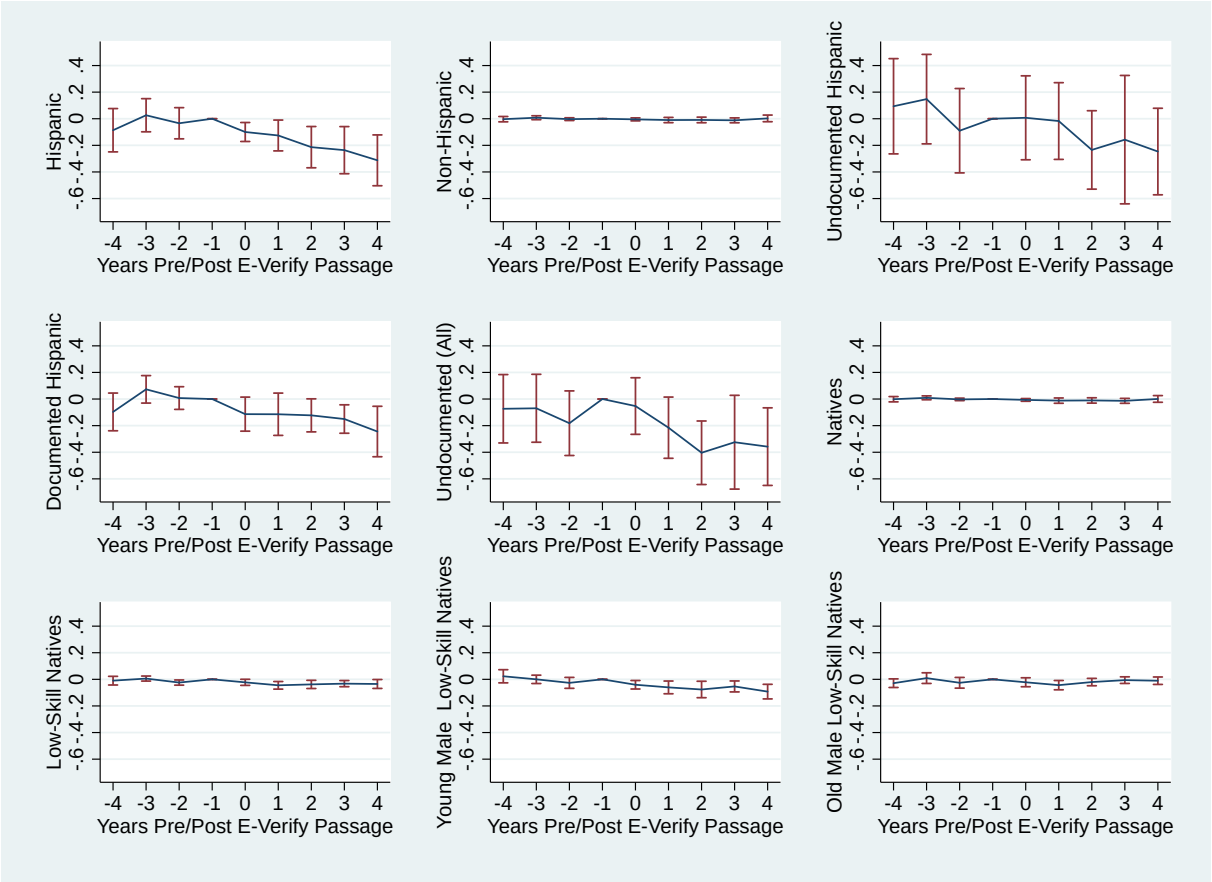
Appendix

Figure A1: Event Studies for QWI-Based Non-Hispanic Worker Outcomes (County-level)



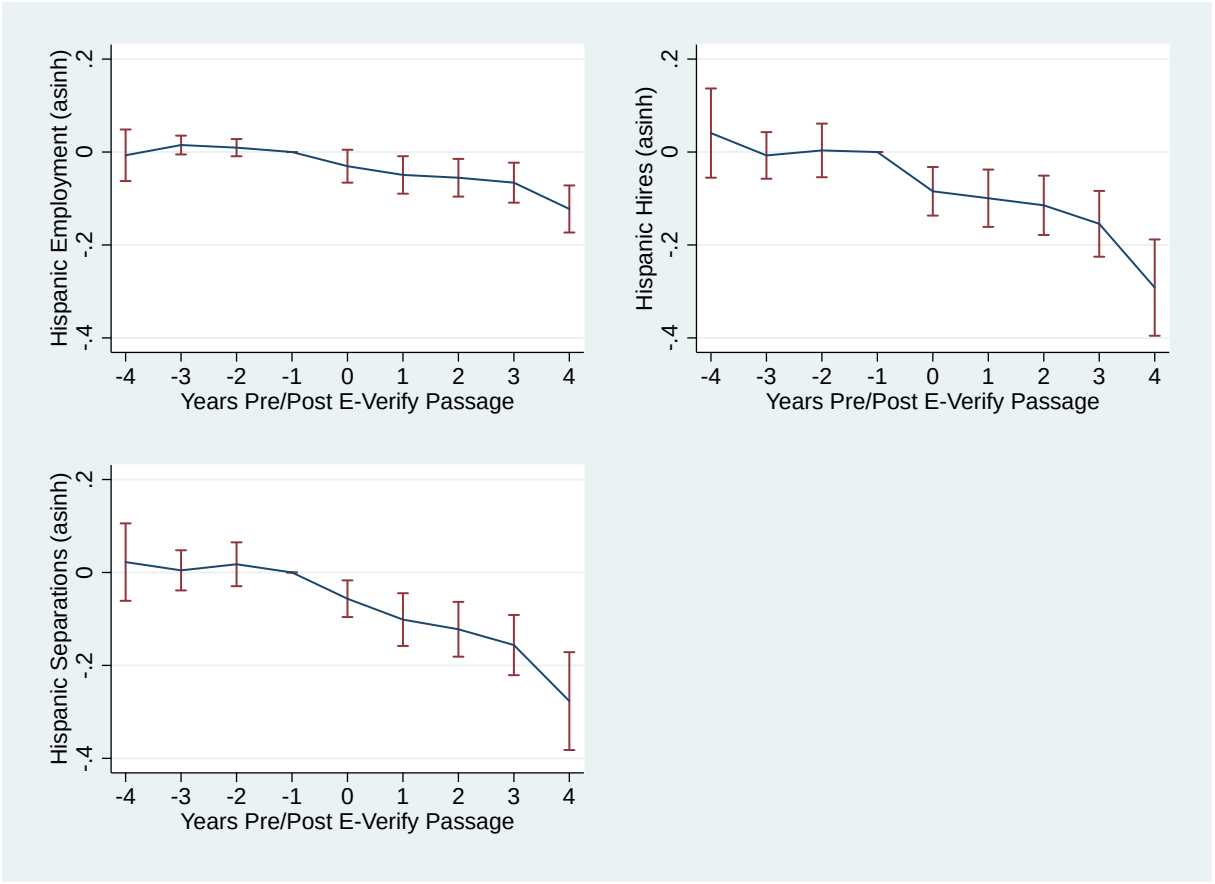
Notes: Each panel plots coefficients and 95% confidence intervals from a county-level regression of the referenced outcome measure on a set of dummies for years before and after the first private sector E-Verify mandate has been passed in the state in which a given county is located. Specifications include county and year-quarter fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for non-Hispanic workers.

Figure A2: Event Studies for ACS-Based Worker Outcomes (County-level)



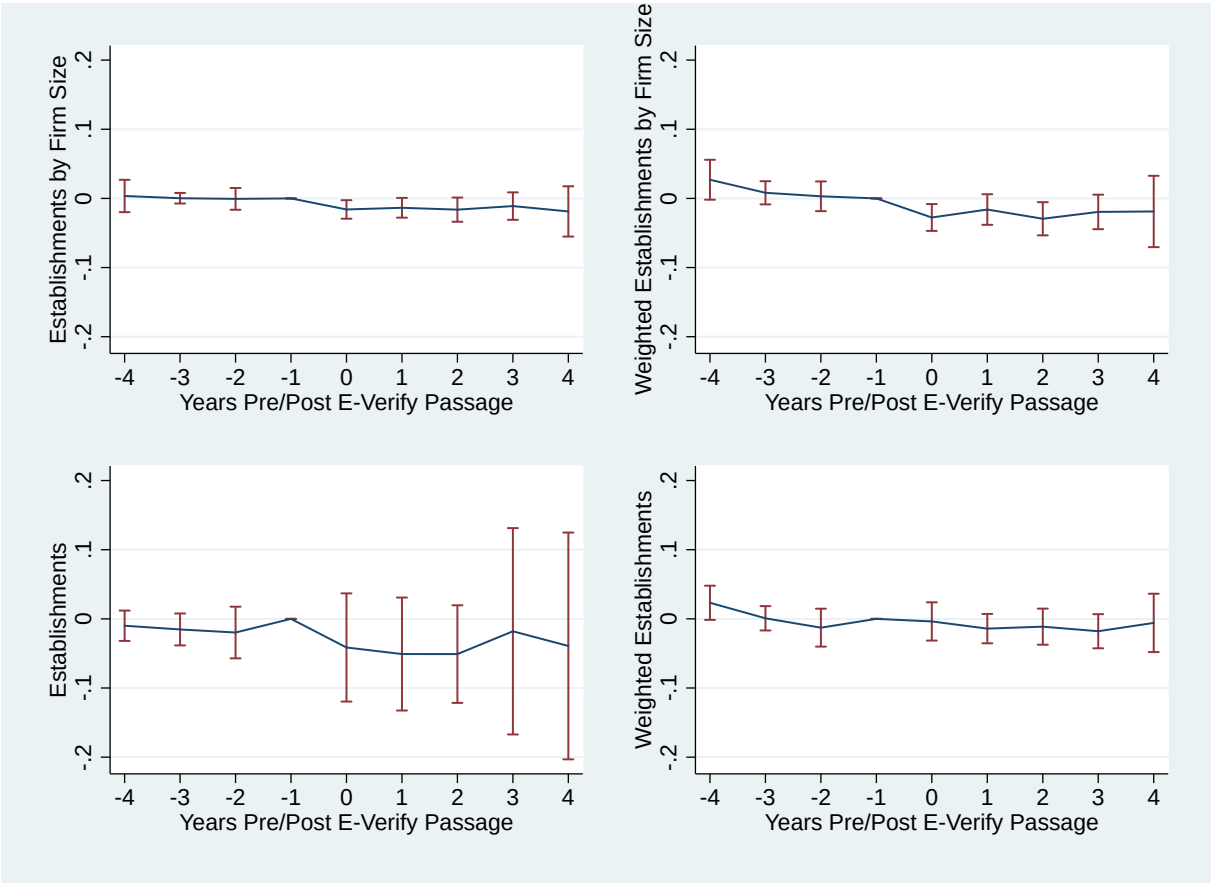
Notes: Each panel plots coefficients and 95% confidence intervals from a county-level regression of the referenced outcome measure on a set of dummies for years before and after the first private sector E-Verify mandate has been passed in the state in which a given county is located. Specifications include county and year fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Each outcome value is the inverse hyperbolic sine transform of the number of employed individuals with the referenced characteristic(s). Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

Figure A3: Event Studies for QWI-Based Hispanic Worker Outcomes (County-by-Firm Size Level)



Notes: Each panel plots coefficients and 95% confidence intervals from a county-by-firm size bin level regression of the referenced outcome measure on a set of dummies for years before and after the first private sector E-Verify mandate that covers the relevant firm size bin has been passed in the state in which a given county is located. Specifications include county-by-firm size bin and year-quarter fixed effects. $y = 0$ represents the year in which the first relevant private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for Hispanic workers in a given firm size bin. Firm size bins are classified as small (fewer than 20 employees) or large (20 or more employees).

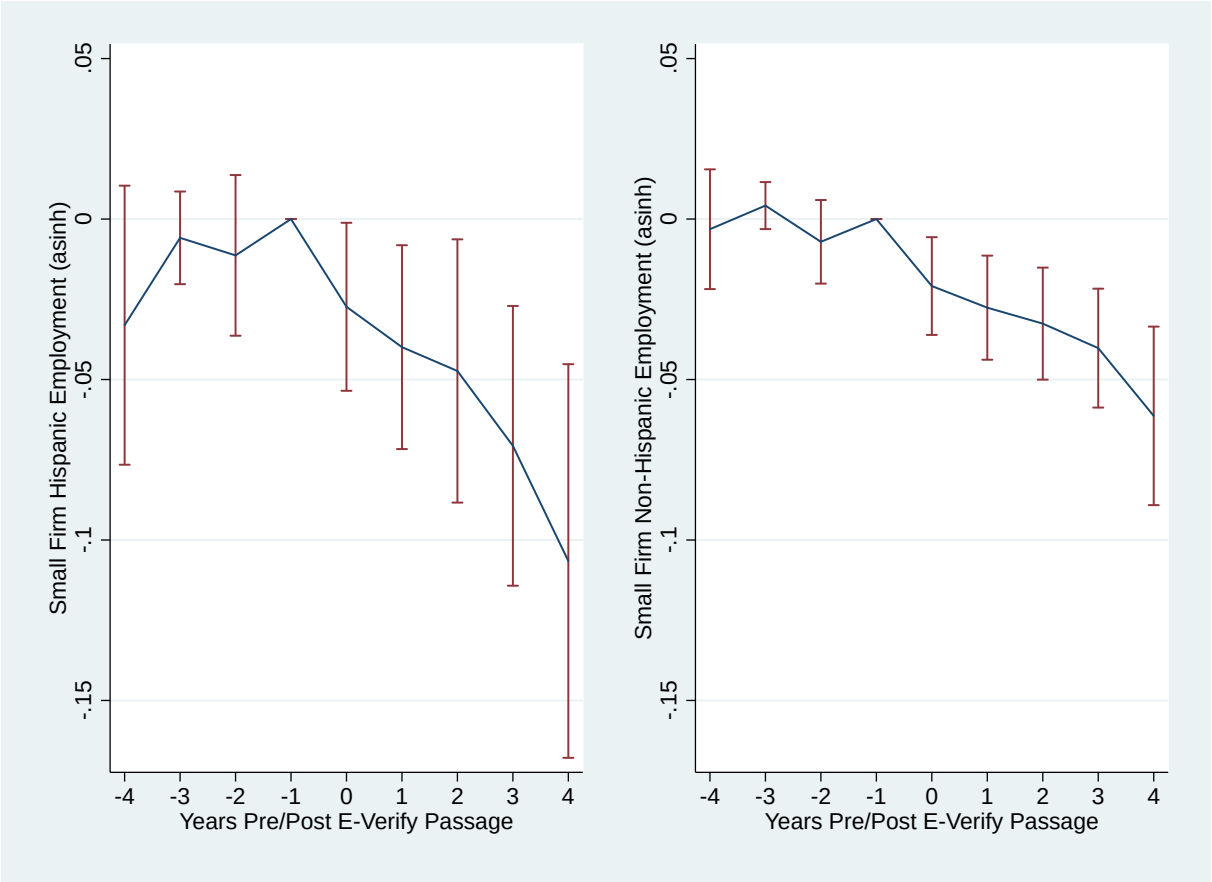
Figure A4: Event Studies for CBP-Based Establishment Outcomes (County and County-by-Firm Size Level)



Notes: The upper two panels plot coefficients and 95% confidence intervals from a county-by-firm size bin level regression of the referenced outcome measure on a set of dummies for years before and after the first year by which a private sector E-Verify mandate that covers the relevant firm size bin has been passed by the end of Q1. Specifications include county-by-firm size bin and year fixed effects. $y = 0$ represents the year in which the first relevant private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Firm size bins are classified as small (fewer than 20 employees) or large (20 or more employees). Establishments (Weighted) scales the number of establishments in each of nine available firm size bins by the midpoint of the range of number of employees included in the given bin and then sums these scaled counts across the nine firm size bins.

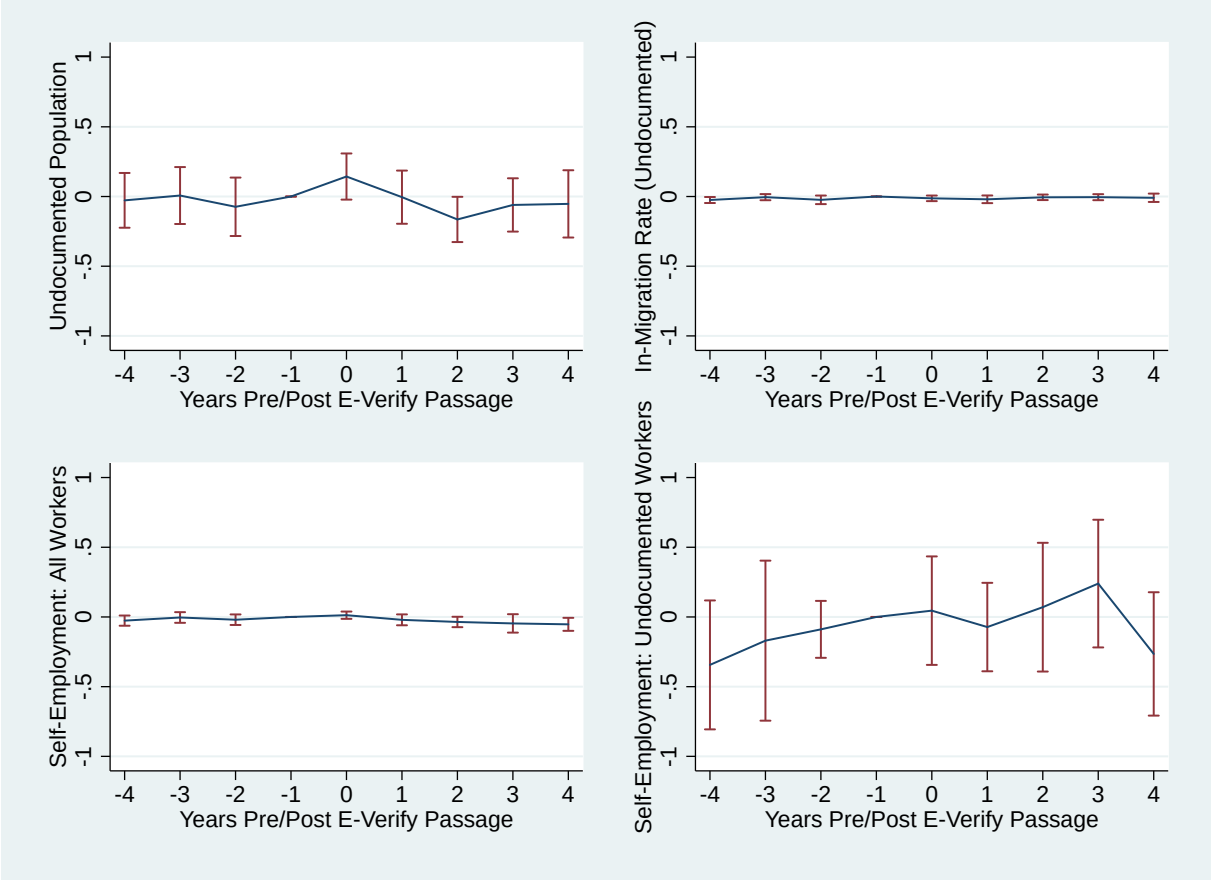
The lower two panels plot coefficients and 95% confidence intervals from a county-level regression of the referenced outcome measure on a set of dummies for years before and after the first year by which a private sector E-Verify mandate has been passed by the end of Q1 in the state in which a given county is located. Specifications include county and year fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed by the end of Q1 and $y = -1$ is the omitted year (with the coefficient set equal to "0").

Figure A5: Event Studies for QWI-Based Spillover Analyses (Small Firm Employment)



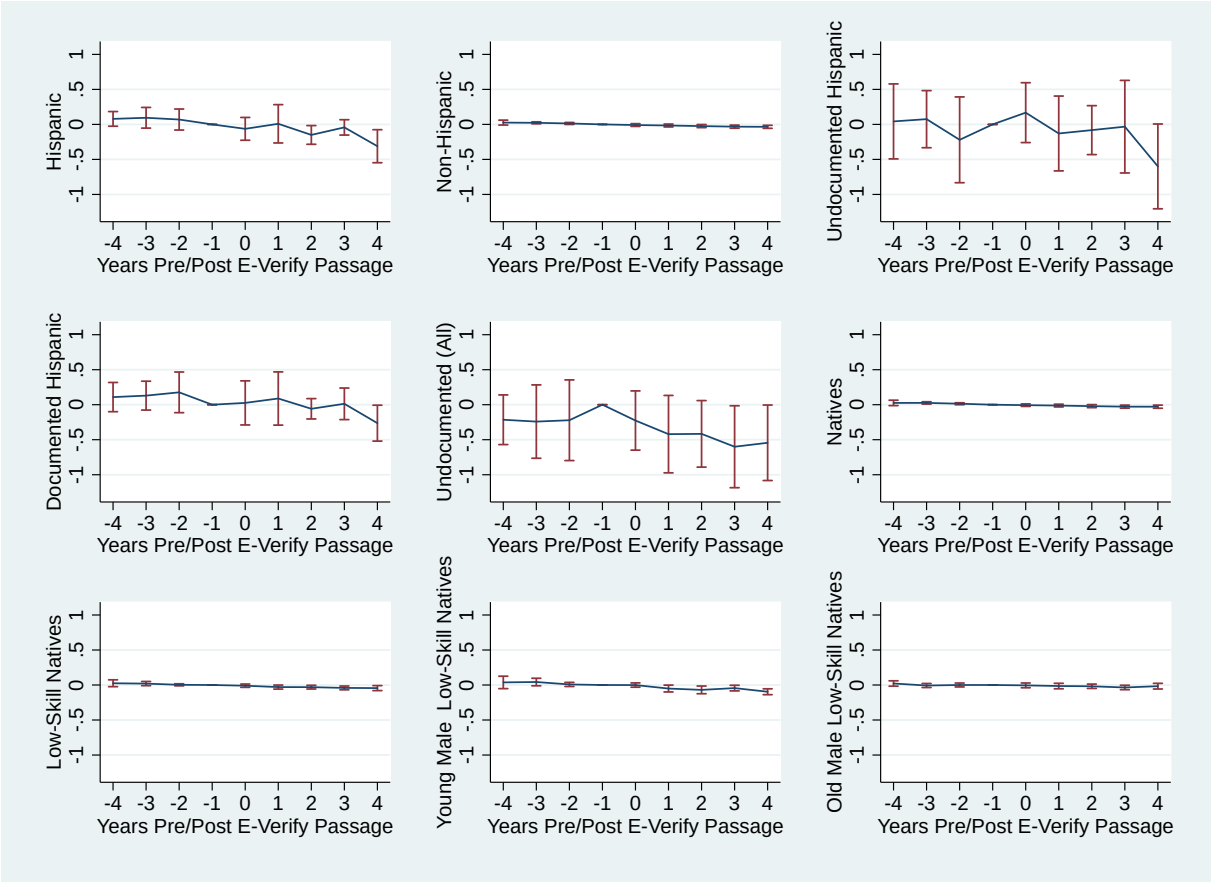
Notes: Each panel plots coefficients and 95% confidence intervals from a county-level regression of the referenced outcome measure on a set of dummies for years before and after the first private sector E-Verify mandate has been passed in the state in which a given county is located. Specifications include county and year-quarter fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Small Firm Employment measures total (Hispanic or non-Hispanic) county-level employment in firms with fewer than 20 employees and the associated outcome measures are inverse hyperbolic sine transformations of these values.

Figure A6: Event Studies for ACS-Based Migration and Self-Employment Outcomes (County Level)



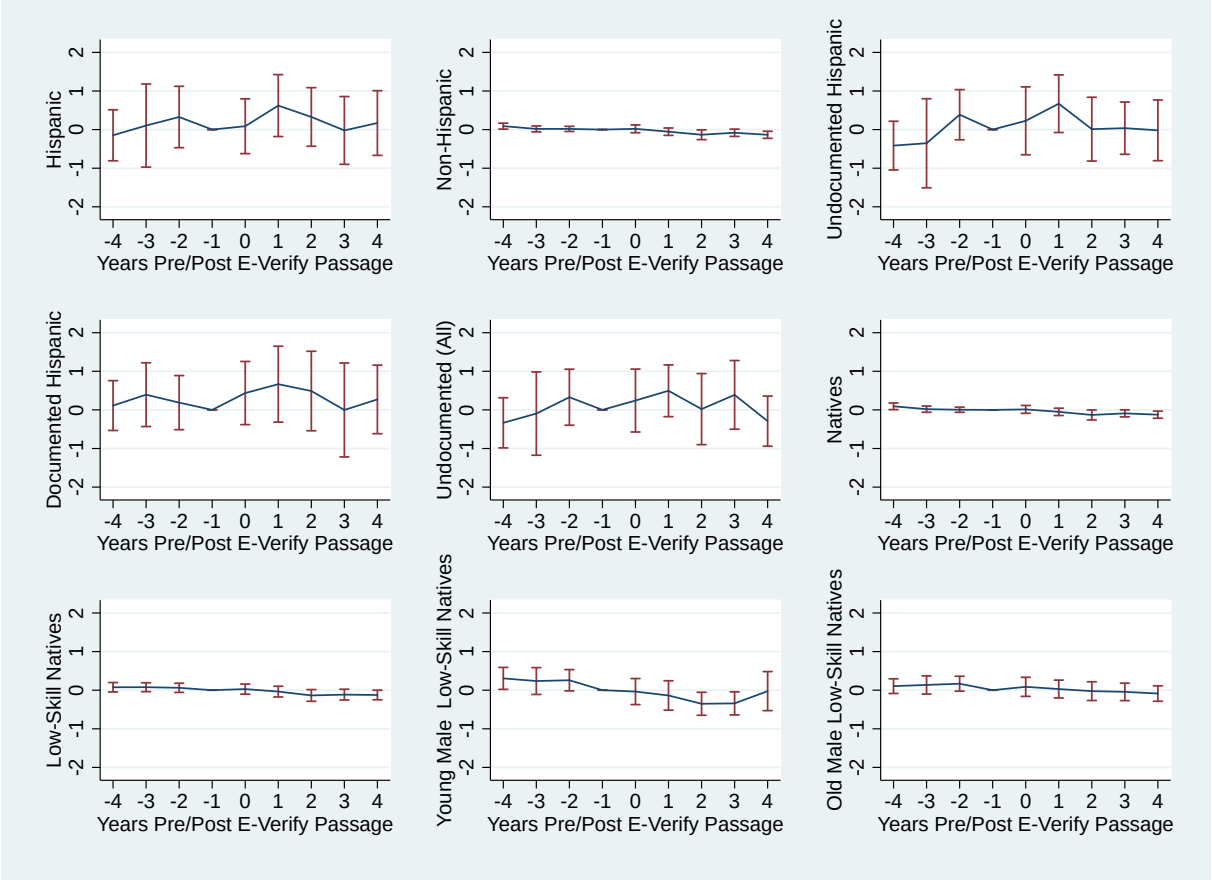
Notes: Each panel plots coefficients and 95% confidence intervals from a county-level regression of the referenced outcome measure on a set of dummies for years before and after the first private sector E-Verify mandate has been passed in the state in which a given county is located. Specifications include county and year fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Undocumented Population is the inverse hyperbolic sine transform of the number of probabilistically undocumented residents, defined as foreign-born, non-veterans who have not completed high school. The In-migration Rate measures the share of probabilistically undocumented respondents who moved to their current state of residence within the last year. The Self-Employment measures are the inverse hyperbolic sine transforms of the number of self-employed workers in each category.

Figure A7: Event Studies for ACS-Based Per Capita Wage Income (County Level)



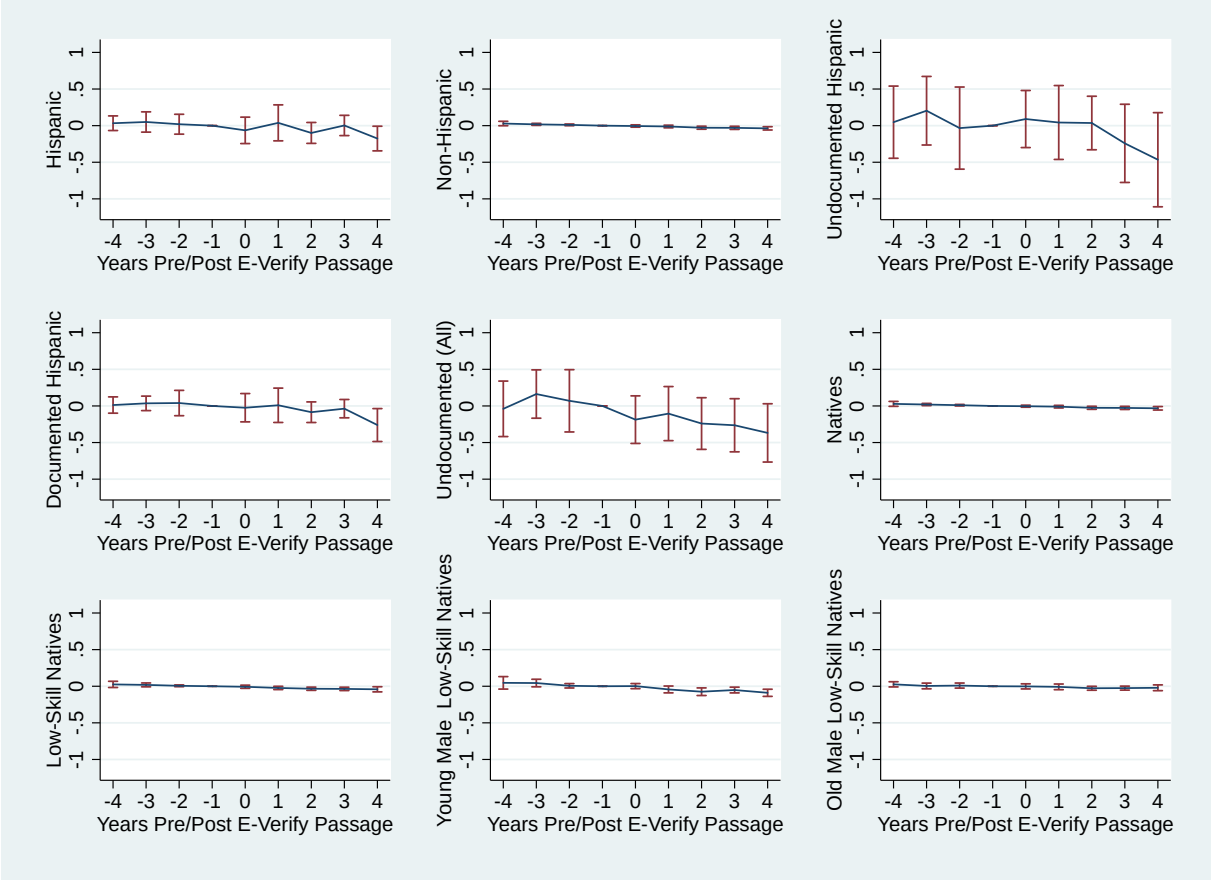
Notes: Each panel plots coefficients and 95% confidence intervals from a county-level regression of the referenced outcome measure on a set of dummies for years before and after the first private sector E-Verify mandate has been passed in the state in which a given county is located. Specifications include county and year fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Each outcome value is the inverse hyperbolic sine transform of mean annual per capita wage income for individuals with the referenced characteristic(s). Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

Figure A8: Event Studies for ACS-Based Per Capita Business Income (County Level)



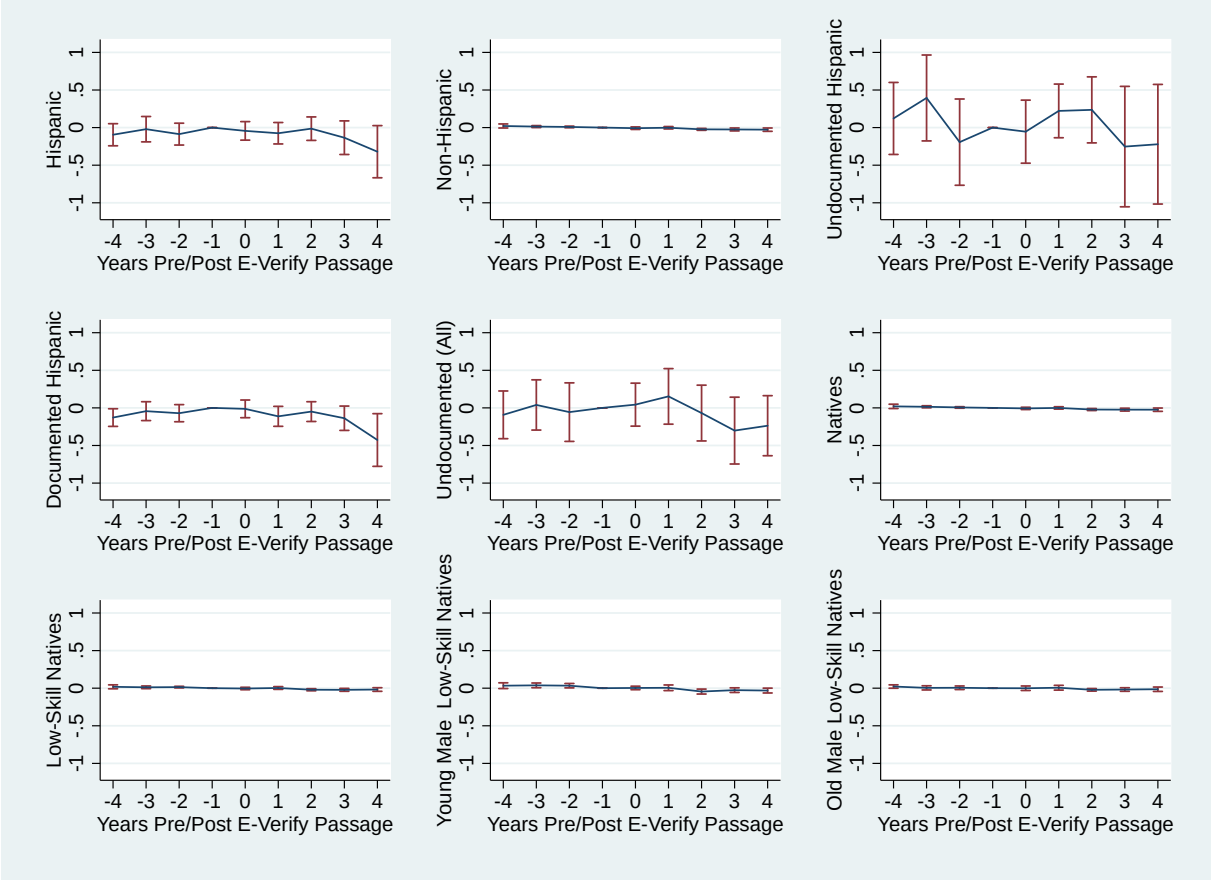
Notes: Each panel plots coefficients and 95% confidence intervals from a county-level regression of the referenced outcome measure on a set of dummies for years before and after the first private sector E-Verify mandate has been passed in the state in which a given county is located. Specifications include county and year fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Each outcome value is the inverse hyperbolic sine transform of mean annual per capita business (self-employment) income for individuals with the referenced characteristic(s). Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

Figure A9: Event Studies for ACS-Based Per Capita Total Income (County Level)



Notes: Each panel plots coefficients and 95% confidence intervals from a county-level regression of the referenced outcome measure on a set of dummies for years before and after the first private sector E-Verify mandate has been passed in the state in which a given county is located. Specifications include county and year fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Each outcome value is the inverse hyperbolic sine transform of mean annual per capita total (wage and business) income for individuals with the referenced characteristic(s). Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

Figure A10: Event Studies for ACS-Based Household Total Income (County Level)



Notes: Each panel plots coefficients and 95% confidence intervals from a county-level regression of the referenced outcome measure on a set of dummies for years before and after the first private sector E-Verify mandate has been passed in the state in which a given county is located. Specifications include county and year fixed effects. $y = 0$ represents the year in which the first private sector E-Verify mandate is passed and $y = -1$ is the omitted year (with the coefficient set equal to "0"). Each outcome value is the inverse hyperbolic sine transform of mean annual household total (wage and business) income for individuals with the referenced characteristic(s). Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

Table A1: QWI-Based Non-Hispanic Worker Outcomes (County-by-Firm Size Level)

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment (asinh)		Separations (asinh)		Hires (asinh)	
Covered	-0.022**		-0.082***		-0.075***	
(Passage)	(0.010)		(0.023)		(0.025)	
Covered x Small Firms		-0.021**		-0.087***		-0.081***
(Passage)		(0.010)		(0.025)		(0.027)
Covered x Large Firms		-0.029**		-0.088***		-0.081***
(Passage)		(0.011)		(0.025)		(0.027)
County-by-Firm Size Bin FE	X	X	X	X	X	X
YearQuarter FE	X		X		X	
YearQuarter-by-Firm Size Bin FE		X		X		X
Observations	149,898	149,898	149,898	149,898	149,898	149,898

Notes: The unit of observation is the firm size bin by county by year-quarter. Firm size bins are classified as small (fewer than 20 employees) or large (20 or more employees). Each outcome value is the inverse hyperbolic sine transform of the given measure. Coverage is an indicator for whether a given firm size bin-by-county cell is covered by E-Verify legislation that has been passed by the end of the given year-quarter.
Standard errors are clustered by state.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A2: E-Verify Query Rates and QWI-Based Hispanic Worker Outcomes as a Function of Predicted E-Verify Coverage (County Level): Alternative Predicted Coverage Definition

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	E-Verify Rate		Employment (asinh)		Separations (asinh)		Hires (asinh)	
Predicted Coverage	0.215***	0.282**	-0.086***	-0.190***	-0.148***	-0.125	-0.147***	-0.208***
	(0.029)	(0.139)	(0.030)	(0.066)	(0.040)	(0.076)	(0.040)	(0.059)
County FE	X	X	X	X	X	X	X	X
Year-Quarter FE	X		X		X		X	
YearQuarter-by-State FE		X		X		X		X
Observations	92,289	92,289	75,919	75,919	75,919	75,919	75,919	75,919

Notes: The unit of observation is the county by year-quarter. Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for Hispanic workers. Predicted Coverage is defined by the share of workers covered by E-Verify legislation that has been enforced by the end of the given year-quarter, as determined by the baseline (2004-2006) firm size distribution for all workers (in Columns 1-2) and for Hispanic workers (in Columns 3-8).

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A3: QWI-Based Non-Hispanic Worker Outcomes as a Function of Predicted E-Verify Coverage (County Level)

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment (asinh)		Separations (asinh)		Hires (asinh)	
Predicted Coverage	-0.035***	-0.078*	-0.100***	-0.032	-0.088***	-0.025
	(0.012)	(0.042)	(0.027)	(0.058)	(0.029)	(0.072)
County FE	X	X	X	X	X	X
Year-Quarter FE	X		X		X	
YearQuarter-by-State FE		X		X		X
Observations	75,919	75,919	75,919	75,919	75,919	75,919

Notes: The unit of observation is the county by year-quarter. Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for non-Hispanic workers. To construct the Predicted Coverage measure, we first calculate the predicted share of non-Hispanic workers covered by E-Verify legislation that has been passed by the end of the given year-quarter, as determined by the baseline (2004-2006) firm size distribution for non-Hispanic workers. This measure is then scaled by 0.227 for workers in small firms (with fewer than 20 employees) to account for the relative intensity of E-Verify usage across smaller versus larger firms.
Standard errors are clustered by state.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A4: ACS-Based Per Capita and Household Annual Earnings Measures (County Level Lagged Specifications)

	(1) Hispanics	(2) Non-Hispanics	(3) Probabilistically Undocumented Hispanics	(4) Probabilistically Documented Hispanics	(5) Probabilistically Undocumented (All Workers)	(6) All Natives	(7) Low-Skilled Natives	(8) Young, Male Low-Skilled Natives	(9) Old, Male Low-Skilled Natives
				Panel A: Per Capita Wage Income					
Any Private Firm	-0.169***	-0.039***	-0.240*	-0.152***	-0.314**	-0.035**	-0.046**	-0.085***	-0.025
(Lagged Passage)	(0.051)	(0.012)	(0.119)	(0.049)	(0.139)	(0.013)	(0.018)	(0.028)	(0.016)
				Panel B: Per Capita Business (Self-Employment) Income					
Any Private Firm	0.222	-0.138***	0.224	0.144	0.136	-0.133***	-0.154***	-0.369***	-0.132**
(Lagged Passage)	(0.211)	(0.033)	(0.239)	(0.318)	(0.198)	(0.033)	(0.035)	(0.109)	(0.049)
				Panel C: Per Capita Total (Wage and Business) Income					
Any Private Firm	-0.072	-0.039***	-0.222*	-0.112**	-0.240**	-0.036***	-0.044***	-0.087***	-0.030**
(Lagged Passage)	(0.052)	(0.011)	(0.121)	(0.053)	(0.090)	(0.012)	(0.015)	(0.028)	(0.013)
				Panel D: Per Capita Total (Wage and Business) Household Income					
Any Private Firm	-0.089	-0.028***	-0.055	-0.134**	-0.095	-0.025**	-0.023**	-0.046***	-0.020*
(Lagged Passage)	(0.056)	(0.009)	(0.118)	(0.064)	(0.076)	(0.010)	(0.009)	(0.011)	(0.010)
Year FE	X	X	X	X	X	X	X	X	X
County FE	X	X	X	X	X	X	X	X	X
Observations	23,196	23,239	19,948	23,182	22,522	23,239	23,239	23,239	23,239

Notes: The unit of observation is the county by year. Each outcome value is the inverse hyperbolic sine transform of mean annual earnings from the specified category for individuals with the referenced characteristic(s). Any Private Firm (Lagged Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the prior year. Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A5: E-Verify Query Rates and QWI-Based Hispanic Worker Outcomes (County Level): Additional Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	E-Verify Rate		Employment (asinh)		Separations (asinh)		Hires (asinh)	
				Panel A: County Linear Time Trends				
Any Private Firm (Passage)	0.069***	0.063***	-0.033	-0.028*	-0.061*	-0.052**	-0.054	-0.047
	(0.019)	(0.021)	(0.024)	(0.016)	(0.035)	(0.022)	(0.040)	(0.030)
Any Private Firm (Enforcement)		0.123*		-0.077***		-0.144***		-0.116**
		(0.061)		(0.017)		(0.027)		(0.044)
Observations	92,609	92,609	82,099	82,099	82,099	82,099	82,099	82,099
				Panel B: County Linear Time Trends + Covariates				
Any Private Firm (Passage)	0.066***	0.061***	-0.029	-0.026*	-0.061**	-0.055***	-0.054	-0.049*
	(0.018)	(0.022)	(0.019)	(0.014)	(0.029)	(0.015)	(0.035)	(0.026)
Any Private Firm (Enforcement)		0.121**		-0.061***		-0.127***		-0.104***
		(0.057)		(0.019)		(0.020)		(0.034)
Observations	92,609	92,609	82,099	82,099	82,099	82,099	82,099	82,099
				Panel C: All States				
Any Private Firm (Passage)	0.174***	0.091***	-0.086***	-0.047*	-0.141***	-0.058	-0.152***	-0.070
	(0.025)	(0.025)	(0.030)	(0.026)	(0.043)	(0.039)	(0.044)	(0.042)
All Private Firms (Enforcement)		0.151**		-0.066		-0.193***		-0.187***
		(0.058)		(0.047)		(0.047)		(0.048)
Observations	138,524	138,524	124,293	124,293	124,293	124,293	124,293	124,293
Year-Quarter FE	X	X	X	X	X	X	X	X
County FE	X	X	X	X	X	X	X	X

Notes: The unit of observation is the county by year-quarter. Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year-quarter and All Private Firms (Enforcement) is an indicator for whether a private sector E-Verify mandate covering all firms is being enforced by the end of the given year-quarter. E-Verify rate is defined as the number of E-Verify queries divided by the contemporaneous total number of (Hispanic and non-Hispanic) hires. Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for Hispanic workers.

Panel A includes county linear time trends. Panel B includes county linear time trends as well as controls for the following covariates: lagged state-level unemployment rate, lagged state-level log GDP per capita, lagged state-level log housing starts, lagged state-level log government expenditures, and indicators for whether a state has any legislation in place to facilitate information-sharing with federal law enforcement, to restrict public benefits access for undocumented immigrants, or to strengthen protections for undocumented immigrants. Panel C presents benchmark specification estimates for all states (including states that have passed E-Verify legislation that covers only public sector workers and/or state contractors/subcontractors). All Panel C specifications include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no private sector mandate has been passed by the end of the given year-quarter. Even-numbered columns in Panel C also include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no comprehensive private sector mandate is being enforced by the end of the given year-quarter.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A6: QWI-Based Non-Hispanic Worker Outcomes (County Level): Additional Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment (asinh)		Separations (asinh)		Hires (asinh)	
			Panel A: County Linear Time Trends			
Any Private Firm (Passage)	-0.010	-0.010	-0.018	-0.014	-0.006	-0.002
	(0.007)	(0.007)	(0.028)	(0.022)	(0.032)	(0.027)
Any Private Firm (Enforcement)		-0.005		-0.061		-0.064
		(0.008)		(0.048)		(0.050)
Observations	82,099	82,099	82,099	82,099	82,099	82,099
			Panel B: County Linear Time Trends + Covariates			
Any Private Firm (Passage)	-0.009**	-0.009**	-0.017	-0.015	-0.005	-0.002
	(0.004)	(0.004)	(0.022)	(0.019)	(0.028)	(0.025)
Any Private Firm (Enforcement)		0.004		-0.039		-0.048
		(0.004)		(0.036)		(0.040)
Observations	82,099	82,099	82,099	82,099	82,099	82,099
			Panel C: All States			
Any Private Firms (Passage)	-0.042**	-0.032**	-0.099***	-0.039	-0.092***	-0.031
	(0.017)	(0.013)	(0.026)	(0.027)	(0.028)	(0.029)
All Private Firms (Enforcement)		-0.014		-0.124***		-0.124***
		(0.019)		(0.025)		(0.027)
Observations	124,293	124,293	124,293	124,293	124,293	124,293
Year-Quarter FE	X	X	X	X	X	X
County FE	X	X	X	X	X	X

Notes: The unit of observation is the county by year-quarter. Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year-quarter and All Private Firms (Enforcement) is an indicator for whether a private sector E-Verify mandate covering all firms is being enforced by the end of the given year-quarter. Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for non-Hispanic workers.

Panel A includes county linear time trends. Panel B includes county linear time trends as well as controls for the following covariates: lagged state-level unemployment rate, lagged state-level log GDP per capita, lagged state-level log housing starts, lagged state-level log government expenditures, and indicators for whether a state has any legislation in place to facilitate information-sharing with federal law enforcement, to restrict public benefits access for undocumented immigrants, or to strengthen protections for undocumented immigrants. Panel C presents benchmark specification estimates for all states (including states that have passed E-Verify legislation that covers only public sector workers and/or state contractors/subcontractors). All Panel C specifications include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no private sector mandate has been passed by the end of the given year-quarter. Even-numbered columns in Panel C also include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no comprehensive private sector mandate is being enforced by the end of the given year-quarter.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A7: ACS-Based Employment Outcomes (County Level): Additional Specifications

	(1) Hispanics	(2) Non-Hispanics	(3) Probabilistically Undocumented Hispanics	(4) Probabilistically Documented Hispanics	(5) Probabilistically Undocumented (All Workers)	(6) All Natives	(7) Low-Skilled Natives	(8) Young, Male Low-Skilled Natives	(9) Old, Male Low-Skilled Natives
				Panel A: County Linear Time Trends					
Any Private Firm	-0.093*	-0.012	-0.016	-0.108*	-0.084	-0.013	-0.027*	-0.029	-0.029**
(Passage)	(0.052)	(0.008)	(0.130)	(0.060)	(0.075)	(0.008)	(0.014)	(0.021)	(0.011)
Observations	23,246	23,246	23,246	23,246	23,246	23,246	23,246	23,246	23,246
				Panel B: County Linear Time Trends + Covariates					
Any Private Firm	-0.085*	-0.013**	-0.010	-0.096*	-0.081	-0.014**	-0.025**	-0.028*	-0.027**
(Passage)	(0.047)	(0.006)	(0.137)	(0.053)	(0.082)	(0.006)	(0.012)	(0.014)	(0.011)
Observations	23,246	23,246	23,246	23,246	23,246	23,246	23,246	23,246	23,246
				Panel C: All States					
Any Private Firm	-0.136***	-0.004	-0.099	-0.119**	-0.126*	-0.009	-0.025**	-0.066***	-0.003
(Passage)	(0.048)	(0.009)	(0.100)	(0.047)	(0.063)	(0.009)	(0.011)	(0.019)	(0.010)
Observations	34,523	34,523	34,523	34,523	34,523	34,523	34,523	34,523	34,523
Year FE	X	X	X	X	X	X	X	X	X
County FE	X	X	X	X	X	X	X	X	X

Notes: The unit of observation is the county by year. Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year. Each outcome value is the inverse hyperbolic sine transform of the number of employed individuals with the referenced characteristic(s). Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

Panel A includes county linear time trends. Panel B includes county linear time trends as well as controls for the following covariates: lagged state-level unemployment rate, lagged state-level log GDP per capita, lagged state-level log housing starts, lagged state-level log government expenditures, and indicators for whether a state has any legislation in place to facilitate information-sharing with federal law enforcement, to restrict public benefits access for undocumented immigrants, or to strengthen protections for undocumented immigrants. Panel C presents benchmark specification estimates for all states (including states that have passed E-Verify legislation that covers only public sector workers and/or state contractors/subcontractors). All Panel C specifications include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no private sector mandate has been passed by the end of the given year.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A8: QWI-Based Hispanic Worker Outcomes (County-by-Firm Size Level): Additional Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment (asinh)		Separations (asinh)		Hires (asinh)	
			Panel A: County Linear Time Trends			
Covered (Passage)	-0.040**		-0.067*		-0.054	
	(0.016)		(0.034)		(0.034)	
Covered x Small Firms (Passage)		-0.007		-0.037		-0.027
		(0.019)		(0.042)		(0.046)
Covered x Large Firms (Passage)		-0.065***		-0.108***		-0.095**
		(0.022)		(0.037)		(0.036)
Observations	149,898	149,898	149,898	149,898	149,898	149,898
			Panel B: No Interpolation Sample			
Covered (Passage)	-0.050**		-0.125***		-0.132***	
	(0.023)		(0.032)		(0.034)	
Covered x Small Firms (Passage)		-0.014		-0.118***		-0.121***
		(0.024)		(0.036)		(0.039)
Covered x Large Firms (Passage)		-0.080***		-0.137***		-0.147***
		(0.027)		(0.033)		(0.035)
Observations	122,833	122,833	122,833	122,833	122,833	122,833
			Panel C: All States			
Covered (Passage)	-0.054**		-0.140***		-0.150***	
	(0.025)		(0.034)		(0.036)	
Covered x Small Firms (Passage)		-0.016		-0.113***		-0.128***
		(0.024)		(0.035)		(0.038)
Covered x Large Firms (Passage)		-0.088***		-0.175***		-0.180***
		(0.030)		(0.039)		(0.039)
Observations	228,190	228,190	228,190	228,190	228,190	228,190
County-by-Firm Size Bin FE	X	X	X	X	X	X
Year-Quarter FE	X		X		X	
YearQuarter-by-Firm Size Bin FE		X		X		X

Notes: The unit of observation is the firm size bin by county by year-quarter. Firm size bins are classified as small (fewer than 20 employees) or large (20 or more employees). Each outcome value is the inverse hyperbolic sine transform of the given measure. Covered is an indicator for whether a given firm size bin-by-county cell is covered by E-Verify legislation that has been passed by the end of the given year-quarter.
Standard errors are clustered by state.
Panel A includes county linear time trends. Panel B presents benchmark specification estimates that drop rather than linearly interpolate missing outcome values. Panel C presents benchmark specification estimates for all states (including states that have passed E-Verify legislation that covers only public sector workers and/or state contractors/subcontractors). All Panel C specifications include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no private sector mandate has been passed by the end of the given year-quarter.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A9: CBP-Based Establishment Outcomes (County and County-by-Firm Size Level): Additional Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
	Establishments (asinh)			Establishments, Weighted (asinh)		
			Panel A: County Linear Time Trends			
Covered	-0.008			-0.007		
(Passage)	(0.007)			(0.011)		
Covered x Small Firms		-0.003			0.008	
(Passage)		(0.007)			(0.015)	
Covered x Big Firms		-0.021***			-0.028*	
(Passage)		(0.007)			(0.015)	
Any Private Firm			-0.015***			-0.006
(Passage)			(0.004)			(0.007)
Observations	49,181	49,181	24,809	49,181	49,181	24,809
			Panel B: County Linear Time Trends + Covariates			
Covered	-0.006			-0.009		
(Passage)	(0.006)			(0.009)		
Covered x Small Firms		-0.001			0.007	
(Passage)		(0.005)			(0.012)	
Covered x Big Firms		-0.020**			-0.030**	
(Passage)		(0.007)			(0.015)	
Any Private Firm			-0.012***			-0.006
(Passage)			(0.004)			(0.005)
Observations	49,181	49,181	24,809	49,181	49,181	24,809
			Panel C: All States			
Covered	-0.024			-0.047**		
(Passage)	(0.015)			(0.019)		
Covered x Small Firms		-0.014			-0.031*	
(Passage)		(0.011)			(0.016)	
Covered x Big Firms		-0.039**			-0.065**	
(Passage)		(0.019)			(0.025)	
Any Private Firm			-0.008			-0.036**
(Passage)			(0.014)			(0.017)
Observations	73,278	73,278	37,021	73,278	73,278	37,021
County-by-Firm Size Bin FE	X	X		X	X	
Year FE	X		X	X		X
Year-by-Firm Size Bin FE		X			X	
County FE			X			X

Notes: The unit of observation is the firm size bin by county by year in Columns (1)-(2) and (4)-(5) and the county by year in Columns (3) and (6). Firm size bins are classified as small (fewer than 20 employees) or large (20 or more employees). Each outcome value is the inverse hyperbolic sine transform of the referenced measure. Covered is an indicator for whether a given firm size bin-by-county cell is covered by E-Verify legislation that has been passed by the end of the first quarter of the given year (establishment count data is available annually for the first quarter). Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the first quarter of the given year. Establishments (Weighted) scales the number of establishments in each of nine available firm size bins by the midpoint of the range of number of employees included in the given bin and sums these scaled counts across the 9 firm size bins.
Panel A includes county linear time trends. Panel B includes county linear time trends as well as controls for the following covariates: lagged state-level unemployment rate, lagged state-level log GDP per capita, lagged state-level log housing starts, lagged state-level log government expenditures, and indicators for whether a state has any legislation in place to facilitate information-sharing with federal law enforcement, to restrict public benefits access for undocumented immigrants, or to strengthen protections for undocumented immigrants. Panel C presents benchmark specification estimates for all states (including states that have passed E-Verify legislation that covers only public sector workers and/or state contractors/subcontractors). All Panel C specifications include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no private sector mandate has been passed by the end of Q1 of the given year.
Standard errors are clustered by state.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A10: E-Verify Query Rates and QWI-Based Hispanic Worker Outcomes as a Function of Predicted E-Verify Coverage (County Level): Additional Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	E-Verify Rate		Employment (asinh)		Separations (asinh)		Hires (asinh)	
				Panel A: County Linear Time Trends				
Predicted Coverage	0.089***	0.006	-0.041	0.014	-0.073*	0.235	-0.057	0.370
	(0.023)	(0.141)	(0.028)	(0.108)	(0.043)	(0.183)	(0.051)	(0.311)
Observations	92,289	92,289	75,919	75,919	75,919	75,919	75,919	75,919
				Panel B: No Interpolation Sample				
Predicted Coverage	0.213***	0.345**	-0.104***	-0.399***	-0.154***	-0.045	-0.159***	-0.014
	(0.026)	(0.133)	(0.033)	(0.120)	(0.046)	(0.142)	(0.046)	(0.163)
Observations	92,289	92,289	75,919	75,919	75,919	75,919	75,919	75,919
				Panel C: All States				
Predicted Coverage	0.223***	0.345**	-0.106***	-0.382***	-0.164***	-0.046	-0.175***	-0.023
	(0.030)	(0.133)	(0.036)	(0.106)	(0.050)	(0.129)	(0.051)	(0.164)
Observations	138,098	138,098	115,730	115,730	115,730	115,730	115,730	115,730
County FE	X	X	X	X	X	X	X	X
Year-Quarter FE	X		X		X		X	
YearQuarter-by-State FE		X		X		X		X

Notes: The unit of observation is the county by year-quarter. E-Verify rate is defined as the number of E-Verify queries divided by the contemporaneous total number of (Hispanic and non-Hispanic) hires. Employment, separations and hires measures reflect inverse hyperbolic sine transformations of the respective measures for Hispanic workers. To construct the Predicted Coverage measure, we first calculate the predicted share of workers covered by E-Verify legislation that has been passed by the end of the given year-quarter, as determined by the baseline (2004-2006) firm size distribution for all workers (in Columns 1-2) and for Hispanic workers (in Columns 3-8). This measure is then scaled by 0.227 for workers in small firms (with fewer than 20 employees) to account for the relative intensity of E-Verify usage across smaller versus larger firms.

Panel A includes county linear time trends. Panel B presents benchmark specification estimates that exclude interpolated firm size bin level employment values in the construction of the Predicted Coverage measure. Panel C presents benchmark specification estimates for all states (including states that have passed E-Verify legislation that covers only public sector workers and/or state contractors/subcontractors). Odd-numbered columns in Panel C include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no private sector mandate has been passed by the end of the given year-quarter.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A11: QWI-Based Spillover Analyses (Small Firm Employment): Additional Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
	Hispanic Employment in Small Firms (asinh)			Non-Hispanic Employment in Small Firms (asinh)		
			Panel A: County Linear Time Trends			
Predicted Coverage	-0.046**	-0.053***	-0.080	-0.022**	-0.024**	0.061
	(0.018)	(0.017)	(0.109)	(0.010)	(0.010)	(0.042)
Observations	74,005	67,756	74,005	74,005	67,756	74,005
			Panel B: No Interpolation Sample			
Predicted Coverage	-0.022	-0.021	0.436***	-0.028**	-0.029***	0.037
	(0.027)	(0.020)	(0.095)	(0.012)	(0.009)	(0.058)
Observations	60,723	55,417	60,723	60,723	55,417	60,723
			Panel C: All States			
Predicted Coverage	-0.016	-0.018	0.353***	-0.043**	-0.041***	0.069*
	(0.027)	(0.019)	(0.116)	(0.017)	(0.014)	(0.040)
Observations	112,972	106,723	112,972	112,972	106,723	112,972
County-by-Firm Size Bin FE	X	X	X	X	X	X
Year-Quarter FE	X	X		X	X	
YearQuarter-by-State FE			X			X

Notes: The unit of observation is the county by year-quarter. Small firms are those with fewer than 20 employees. Each outcome value is the inverse hyperbolic sine transform of (Hispanic or non-Hispanic) employment in small firms. Columns 2 and 5 restrict the sample to county-year-quarter cells in which small firms are not yet subject to E-Verify mandate enforcement. To construct the Predicted Coverage measure, we first calculate the predicted share of workers covered by E-Verify legislation that has been passed by the end of the given year-quarter, as determined by the baseline (2004-2006) firm size distribution for Hispanic workers (in Columns 1-3) and for non-Hispanic workers (in Columns 4-6). This measure is then scaled by 0.227 for workers in small firms (with fewer than 20 employees) to account for the relative intensity of E-Verify usage across smaller versus larger firms.
Standard errors are clustered by state.
Panel A includes county linear time trends. Panel B presents benchmark specification estimates that exclude interpolated firm size bin level employment values. Panel C presents benchmark specification estimates for all states (including states that have passed E-Verify legislation that covers only public sector workers and/or state contractors/subcontractors). All Panel C specifications include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no private sector mandate has been passed by the end of the given year-quarter.
Standard errors are clustered by state.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A12: ACS-Based Migration and Self-Employment Outcomes (County Level): Additional Specifications

	(1) Probabilistically Undocumented Population	(2) In-migration Rate (Undocumented)	(3) Self-Employment All Workers	(4) Self-Employment Undocumented Workers
	Panel A: County Linear Time Trends			
Any Private Firm	0.074	-0.014*	0.001	0.003
(Passage)	(0.062)	(0.007)	(0.013)	(0.169)
Observations	23,246	22,522	23,246	23,246
	Panel B: County Linear Time Trends + Covariates			
Any Private Firm	0.085	-0.013*	-0.001	-0.027
(Passage)	(0.058)	(0.007)	(0.014)	(0.167)
Observations	23,246	22,522	23,246	23,246
	Panel C: All States			
Any Private Firm	0.031	0.003	-0.014	0.165**
(Passage)	(0.061)	(0.006)	(0.018)	(0.072)
Observations	34,523	33,660	34,523	34,523
Year FE	X	X	X	X
County FE	X	X	X	X

Notes: The unit of observation is the county by year. In Column (1), the outcome value is the inverse hyperbolic sine transform of the number of probabilistically undocumented residents, defined as foreign-born, non-veterans who have not completed high school. The In-migration Rate characterizes the share of probabilistically undocumented respondents who moved to their current state of residence within the last year. The outcome measures in Columns (3)-(4) are the inverse hyperbolic sine transforms of the number of self-employed workers in each category.
Panel A includes county linear time trends. Panel B includes county linear time trends as well as controls for the following covariates: lagged state-level unemployment rate, lagged state-level log GDP per capita, lagged state-level log housing starts, lagged state-level log government expenditures, and indicators for whether a state has any legislation in place to facilitate information-sharing with federal law enforcement, to restrict public benefits access for undocumented immigrants, or to strengthen protections for undocumented immigrants. Panel C presents benchmark specification estimates for all states (including states that have passed E-Verify legislation that covers only public sector workers and/or state contractors/subcontractors). All Panel C specifications include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no private sector mandate has been passed by the end of the given year.
Standard errors are clustered by state.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A13: ACS-Based Per Capita and Household Annual Earnings Measures (County Level with County Linear Time Trends)

	(1) Hispanics	(2) Non-Hispanics	(3) Probabilistically Undocumented Hispanics	(4) Probabilistically Documented Hispanics	(5) Probabilistically Undocumented (All Workers)	(6) All Natives	(7) Low-Skilled Natives	(8) Young, Male Low-Skilled Natives	(9) Old, Male Low-Skilled Natives
				Panel A: Per Capita Wage Income					
Any Private Firm	0.000	-0.007	0.169	0.066	-0.182	-0.006	-0.009	-0.009	0.001
(Passage)	(0.126)	(0.010)	(0.134)	(0.164)	(0.188)	(0.010)	(0.010)	(0.013)	(0.013)
				Panel B: Per Capita Business (Self-Employment) Income					
Any Private Firm	0.008	0.010	0.065	0.379	0.031	0.008	-0.031	-0.305*	0.001
(Passage)	(0.360)	(0.050)	(0.347)	(0.482)	(0.308)	(0.057)	(0.064)	(0.162)	(0.094)
				Panel C: Per Capita Total (Wage and Business) Income					
Any Private Firm	-0.004	-0.001	0.084	0.037	-0.205	-0.001	-0.008	-0.007	-0.001
(Passage)	(0.133)	(0.007)	(0.103)	(0.121)	(0.131)	(0.008)	(0.008)	(0.014)	(0.011)
				Panel D: Per Capita Total (Wage and Business) Household Income					
Any Private Firm	0.056	-0.001	-0.004	0.076	0.055	-0.001	-0.005	-0.005	0.003
(Passage)	(0.093)	(0.006)	(0.143)	(0.084)	(0.114)	(0.006)	(0.007)	(0.013)	(0.010)
Year FE	X	X	X	X	X	X	X	X	X
County FE	X	X	X	X	X	X	X	X	X
Observations	23,196	23,239	19,948	23,182	22,522	23,239	23,239	23,239	23,239

Notes: The unit of observation is the county by year. Each outcome value is the inverse hyperbolic sine transform of mean annual earnings from the specified category for individuals with the referenced characteristic(s). Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year. Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.
All specifications include county linear time trends.
Standard errors are clustered by state.
* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A14: ACS-Based Per Capita and Household Annual Earnings Measures (County Level with County Linear Time Trends and Additional Covariates)

	(1) Hispanics	(2) Non-Hispanics	(3) Probabilistically Undocumented Hispanics	(4) Probabilistically Documented Hispanics	(5) Probabilistically Undocumented (All Workers)	(6) All Natives	(7) Low-Skilled Natives	(8) Young, Male Low-Skilled Natives	(9) Old, Male Low-Skilled Natives
				Panel A: Per Capita Wage Income					
Any Private Firm	-0.016	-0.007	0.170	0.047	-0.207	-0.007	-0.007	-0.011	0.005
(Passage)	(0.112)	(0.006)	(0.155)	(0.150)	(0.197)	(0.006)	(0.009)	(0.015)	(0.012)
				Panel B: Per Capita Business (Self-Employment) Income					
Any Private Firm	-0.045	0.010	0.011	0.338	-0.020	0.009	-0.028	-0.315*	0.013
(Passage)	(0.328)	(0.051)	(0.391)	(0.477)	(0.328)	(0.058)	(0.065)	(0.172)	(0.086)
				Panel C: Per Capita Total (Wage and Business) Income					
Any Private Firm	-0.021	-0.001	0.058	0.014	-0.234	-0.001	-0.006	-0.009	0.003
(Passage)	(0.117)	(0.004)	(0.131)	(0.104)	(0.139)	(0.004)	(0.009)	(0.016)	(0.011)
				Panel D: Per Capita Total (Wage and Business) Household Income					
Any Private Firm	0.051	-0.001	0.067	0.067	0.005	-0.000	-0.005	-0.009	0.005
(Passage)	(0.072)	(0.005)	(0.118)	(0.064)	(0.124)	(0.005)	(0.007)	(0.015)	(0.011)
Year FE	X	X	X	X	X	X	X	X	X
County FE	X	X	X	X	X	X	X	X	X
Observations	23,196	23,239	19,948	23,182	22,522	23,239	23,239	23,239	23,239

Notes: The unit of observation is the county by year. Each outcome value is the inverse hyperbolic sine transform of mean annual earnings from the specified category for individuals with the referenced characteristic(s). Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year. Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

All specifications include county linear time trends as well as controls for the following covariates: lagged state-level unemployment rate, lagged state-level log GDP per capita, lagged state-level log housing starts, lagged state-level log government expenditures, and indicators for whether a state has any legislation in place to facilitate information-sharing with federal law enforcement, to restrict public benefits access for undocumented immigrants, or to strengthen protections for undocumented immigrants.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

Table A15: ACS-Based Per Capita and Household Annual Earnings Measures (County Level with All States Included)

	(1) Hispanics	(2) Non-Hispanics	(3) Probabilistically Undocumented Hispanics	(4) Probabilistically Documented Hispanics	(5) Probabilistically Undocumented (All Workers)	(6) All Natives	(7) Low-Skilled Natives	(8) Young, Male Low-Skilled Natives	(9) Old, Male Low-Skilled Natives
				Panel A: Per Capita Wage Income					
Any Private Firm	-0.173***	-0.043***	-0.067	-0.145***	-0.208*	-0.038***	-0.045**	-0.080***	-0.023
(Passage)	(0.045)	(0.014)	(0.114)	(0.050)	(0.110)	(0.014)	(0.019)	(0.029)	(0.016)
				Panel B: Per Capita Business (Self-Employment) Income					
Any Private Firm	0.220	-0.117***	0.310*	0.226	0.246	-0.115***	-0.123***	-0.306***	-0.122***
(Passage)	(0.163)	(0.034)	(0.185)	(0.272)	(0.176)	(0.034)	(0.035)	(0.078)	(0.041)
				Panel C: Per Capita Total (Wage and Business) Income					
Any Private Firm	-0.094**	-0.040***	-0.143	-0.105**	-0.252***	-0.036***	-0.042**	-0.078***	-0.029*
(Passage)	(0.044)	(0.012)	(0.100)	(0.044)	(0.072)	(0.013)	(0.017)	(0.028)	(0.015)
				Panel D: Per Capita Total (Wage and Business) Household Income					
Any Private Firm	-0.069	-0.031***	-0.079	-0.094	-0.048	-0.029***	-0.028**	-0.053***	-0.020*
(Passage)	(0.048)	(0.010)	(0.101)	(0.059)	(0.067)	(0.010)	(0.010)	(0.013)	(0.011)
Year FE	X	X	X	X	X	X	X	X	X
County FE	X	X	X	X	X	X	X	X	X
Observations	34,472	34,516	30,375	34,454	33,660	34,516	34,516	34,516	34,516

Notes: The unit of observation is the county by year. Each outcome value is the inverse hyperbolic sine transform of mean annual earnings from the specified category for individuals with the referenced characteristic(s). Any Private Firm (Passage) is an indicator for whether any private sector E-Verify mandate has been passed by the end of the given year. Undocumented is a probabilistic measure corresponding to foreign-born, non-veteran respondents who have not completed high school. Probabilistically documented workers are those not classified as probabilistically undocumented. Low-Skilled corresponds to respondents who have no post-secondary education. The sample is restricted to respondents aged 16-64. Young corresponds to respondents aged 16-40 and Old corresponds to respondents aged 41-64.

This table presents benchmark specification estimates for all states (including states that have passed E-Verify legislation that covers only public sector workers and/or state contractors/subcontractors). All specifications include an indicator (omitted from the table) that is equal to one if a public sector or contractor/subcontractor E-Verify mandate but no private sector mandate has been passed by the end of the given year.

Standard errors are clustered by state.

* significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.