When Violence Strikes: The Effects of Mass Shootings on Local Economies and Migration

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Abstract

This paper examines the economic consequences of mass shootings on local communities. Using a stacked difference-in-differences design, we find that mass shootings lead to a deterioration in local economic activity. Affected counties experience declines in entrepreneurship and in the number of local establishments, especially medium- and large-sized establishments. We also find that local bank deposits decline, small-business lending falls, and borrowing costs rise. We identify household out-migration as an important channel. Following a mass shooting, households are more likely to leave affected counties, especially for out-of-state destinations. The migration is stronger when shootings are more severe, receive greater public attention, and occur in Democratic-leaning counties. Overall, the findings suggest that mass shootings impose persistent economic costs by inducing households to move away and weakening the local business and credit environment.

JEL classification: J01, J61

Keywords: Mass shooting, out-migration, local business, entrepreneurship, local credit supply, and small business lending.

I. Introduction

Mass shootings have become an increasingly salient public safety concern in the United States. Beyond the immediate human tragedy, these events often receive extensive media coverage and can substantially alter perceptions of public safety within affected communities. While the direct consequences for victims and their families are immediate and visible, a growing body of research suggests that mass shootings also have broader economic consequences (Cabral, Kim, Rossin-Slater, Schnell and Schwandt, 2026). In this paper, we investigate whether mass shootings affect where households choose to live and whether these migration responses generate broader economic consequences on local economies.

We suggest household migration as a key mechanism through which mass shootings generate persistent local economic decline. When residents leave affected communities, local customer and deposit bases shrink, and incentives for entrepreneurship and business investment weaken. Using a sample of 69 U.S. mass shooting incidents and a stacked difference-in-differences design, we show that mass shootings increase household out-migration, particularly interstate migration. Additional evidence indicates that this increase in out-migration is unlikely to be driven by job displacement, as we find little evidence of persistent increases in layoffs or unemployment following a mass shooting. Population loss is accompanied by declines in entrepreneurship, reductions in medium- and large-sized establishments, lower local bank deposits, fewer small business loans, and higher borrowing costs. These findings suggest that violent public tragedies can affect the long-run economy of communities through household out-migration.

Previous studies document a wide range of economic consequences of mass shootings. Gill and John (2025) show that mass shootings weaken local housing markets, reducing buyer interest, increasing time on market, and lowering listing prices. Chordia, Jeung and Pati (2025) find that municipal bond yield spreads increase and market liquidity deteriorates following mass shootings. Similarly, García and Li (2023) document declines in credit demand, higher interest rates, and lower repayment rates in FinTech lending market.

While this literature documents various economic consequences, the mechanisms underlying these effects remain less well understood. We examine household out-migration as one such mechanism, which may account for part of the economic response documented in prior work. A mass shooting may reduce the attractiveness of an affected community by increasing concerns about public safety and quality of life (Soni and Tekin, 2025; Chiong, Kim and Kim, 2025). As residents leave affected communities, local demand for housing, goods, and services declines, reducing incentives for business investment and entrepreneurship. Population losses may also weaken local deposit bases, reduce expected economic activity, and increase the risk faced by lenders, which contribute to tighter credit conditions and higher borrowing costs. In this sense, household migration provides an important mechanism that might help explain a broad set of economic outcomes documented in the literature. More generally, our results suggest that the costs of mass shootings extend beyond their immediate human toll by changing local population migration and influencing the long-run economic trajectory of affected communities.

To examine this mechanism and the economic consequences of mass shooting, we use county-level mass shooting data from 2003 to 2022 and a stacked difference-in-differences framework to compare counties that experience a mass shooting with nearby control counties within 100 miles and located within the same state that do not experience mass shooting incidents during the sample period.

Our paper has three main findings. First, mass shootings lead to a deterioration in local economic activity. We find that employment declines following a mass shooting and that average wages also decrease in affected counties. We further document significant changes in the composition of local business activity. The number of establishments with fewer than 20 employees experience a temporary decline in the first year after mass shootings. However, the number of medium-sized and large establishments persistently declines for three years following a shooting. These findings suggest that mass shootings weaken local business conditions and disproportionately affect firms with larger economic footprints. Moreover, en-

trepreneurial activity also falls substantially. Using Census county-level business formation data, we find that business formation declines by approximately 4% following a mass shooting. Dynamic difference-in-differences analyses indicate that these effects persist for at least three years after the incident, suggesting that the consequences are not merely temporary disruptions.

Second, mass shootings reduce local capital supply and increase financing frictions. We find that local bank deposits decline by approximately 4 to 5% during the years immediately following a shooting. Given that local deposits constitute an important source of funding for local lending activity (Lin, 2020; Gilje, 2019), we next examine small-business credit markets and find evidence that the number of SBA-backed small-business loans declines following a mass shooting. Meanwhile, SBA loan spreads increase by approximately 19 basis points, indicating a deterioration in local borrowing conditions. Taken together, these findings suggest that mass shootings reduce the availability of local capital while simultaneously increasing financing costs for entrepreneurs and businesses.

Third, and most importantly, we find that following a mass shooting, affected counties experience significantly higher net out-migration rates. The increase in net migration is driven primarily by higher household out-migration rather than lower in-migration. It suggests that existing residents decide to leave affected communities. Moreover, the migration response is concentrated in interstate migration rather than intrastate migration. This pattern is notable given the strong home state bias in county-to-county mobility documented in Wilson (2026). In the aftermath of mass shooting, households are not simply relocating within the same state but are leaving for out-of-state destinations. Most importantly, the out-migration effects are not temporary. Our dynamic specification estimate reveals that migration responses persist for at least three years following the event. This sustained households migration offers a plausible explanation for the deterioration in local business activity documented above.

Additional findings further support the migration mechanism. We find that migration

responses are significantly stronger when shootings are more severe, as measured by the number of fatalities. Likewise, we document larger out-migration after shootings that receive greater public attention, measured using Google Search Intensity. We further find stronger migration effects in Democratic-leaning counties, particularly those located within Republican states. This heterogeneity suggests that responses to public safety shocks depend not only on the severity of the event itself but also on how communities perceive and politicize gun violence.

To further examine the migration mechanism, we exploit more granular county-to-state migration flows, which allow us to characterize not only whether households leave but where they go. Consistent with our county-level results, mass shootings increase outflows from affected counties, driven by higher out-migration rather than reduced inflows.

This paper contributes to three strands of literature. First, we contribute to the growing literature on the economic consequences of mass shootings and violent public tragedies. Recent studies show that mass shootings affect human capital, worker productivity, economic activity, housing markets, and financial markets (Brodeur and Yousaf, 2025; Gill and John, 2025; Chordia et al., 2025; Shaik, Costello, Palazzolo, Pattabhiramaiah and Sridhar, 2025). While these studies document important economic consequences, less is known about the mechanisms through which these effects arise. We suggest that household migration is an important channel through which mass shootings affect local economic outcomes. Consistent with a broader literature showing that households respond to changes in local amenities and public safety through migration (Cullen and Levitt, 1999; Chen and Rosenthal, 2008), we find that mass shootings significantly increase household out-migration, particularly interstate migration. Moreover, we show that mass shootings are associated with weaker entrepreneurship, reduced business activity, and tighter local credit conditions. Overall, our findings suggest that household mobility might be an important mechanism through which violent shocks generate persistent economic consequences.

Deb and Gangaram (2021) examine the effects of mass shootings on exposed students'

health, well-being, educational attainment, and labor market outcomes, and find little evidence that exposure affects these students' migration decisions in adulthood. Rather than investigating the long-run mobility of exposed individuals, our paper examines contemporaneous household migration out of affected counties. We document significant out-migration in the years following a shooting and show how this response shapes local economic activity.

Second, we contribute to the literature on local economic adjustment and capital formation. Prior research suggests that local financial development affects entrepreneurship, business formation, and economic growth (Guiso, Sapienza and Zingales, 2004). We show that violent public tragedies such as mass shootings reduce local bank deposits, decrease small-business lending, and increase borrowing costs. Our findings indicate that household migration affects local economies not only through demand-side channels but also through the local credit supply. Our paper provides novel evidence on how public safety shocks generate persistent economic consequences through household out-migration and local supply of capital.

Third, our paper contributes to the growing literature on household migration and location choice. Existing studies largely focus on economic factors of migration decisions, including wage, employment opportunities, housing affordability, and moving costs as drivers of migration decisions (Bartel, 1979; Stark and Bloom, 1985; Borjas, Bronars and Trejo, 1992; Molloy, Smith and Wozniak, 2011; Diamond, 1981; Kennan and Walker, 2011; Wilson, 2021). This literature also documents a decline in U.S. interstate mobility across all demographic and socioeconomic groups (Molloy et al., 2011), with recent work suggesting home state bias and political partisanship as explanations of the falling interstate mobility (Wilson, 2026; Wang, 2025). We contribute by identifying public safety as an important yet understudied determinant of geographic mobility. Mass shootings increase household out-migration from affected communities across state borders, despite the frictions documented in the existing literature. This mechanism helps explain how mass shootings generate broad and persistent local economic consequences.

The remainder of the paper proceeds as follows. Section II describes the data and empirical design. Section III presents the empirical results. Section IV concludes.

II. Data and Methodology

A. Mass Shooting

We compile a dataset of U.S. mass shootings covering the period from 2006 to 2022. The primary source is the USA Today Mass Killings Database, which aggregates information from multiple sources, including media reports, FBI records, arrest reports, medical examiner records, court documents, and correctional records. The database provides detailed incident-level information, including geographic location, numbers of fatalities and injuries, offender and victim characteristics, and weapon-related information.

Because definitions of mass shootings vary across studies, we follow the FBI definition and classify an incident as a mass shooting when four or more victims are killed by firearms, excluding the perpetrator. We further restrict the sample to random mass shooting incidents with no clearly identifiable targeted motive. Specifically, we exclude shootings associated with drug trafficking, gang activity, and family-related incidents in which all victims are members of the perpetrator's family. This restriction focuses on incidents that are largely random in nature. Finally, our sample includes 69 mass shooting incidents in 65 counties.

B. County Economics and Migration Data

County Business Pattern Survey Data To measure local business activity, we obtain county-level establishment data from the County Business Patterns (CBP) program, following prior literature (Forman, Goldfarb and Greenstein, 2012; Deryugina, 2017). The CBP survey is an annual dataset that provides subnational economic data for establishments with paid employees and employment size. This series includes the number of establishments, employment, and payroll information. We use these data to capture changes in local business

activities. We use total employment, average annual wage, and the number of establishments as our primary measures of county business activity following mass shooting incidents. To examine heterogeneity by establishment size, we aggregate CBP's published employment-size categories into small (1–19 employees), medium (20–49 employees), and large (50 or more employees) establishments.

Business Formation Data We obtain county-level business formation data from the U.S. Census Bureau's Business Formation Statistics (BFS). The BFS tracks business application activity and the progression from initial applications to realized business formations. BFS provides a timely measure of entrepreneurial activity and serves as an early indicator of future business creation. We use these data to examine how mass shooting incidents affect new business formation at the local level. We use number of new business formations in a county as our proxy for entrepreneurship.

Local Bank Deposits To proxy for local deposit activity, we utilize detailed bank branch-level data (Summary of Deposits) from The Federal Deposit Insurance Corporation (FDIC). Following Lin (2020) and Gilje (2019), we aggregate deposits of branches by county using the Summary of Deposits data from the FDIC. The SOD provides annual information on deposits held at individual bank branches across the United States. We aggregate branch-level deposits to the county level to capture local household and business deposit balances following mass shooting incidents. We use the natural logarithm of total deposits (in million) at local bank branches in a county to measure local deposit activity.

Small Business Loan Following the literature (Huang, 2025; Hackney, 2023; Yi, 2023), we use data from the SBA 7(a) loan program, the largest federal loan-guarantee program for small businesses. The program provides financing to eligible small businesses for a wide range of purposes, including working capital, equipment purchases, business expansion, and debt refinancing, with a maximum loan amount of $5 million. The program primarily serves credit-constrained small businesses that are unable to obtain financing from conventional lenders on reasonable terms. To be eligible, borrowers must demonstrate a reasonable prospect of

repayment and meet the SBA's size and other program requirements.

We obtain data on local small business loan application from the U.S. small business administration. The dataset provides information on small business loan applications and approvals, allowing us to examine how mass shooting incidents affect access to credit and financing conditions for local businesses. Specifically, we measure small business loan activities using the number of SBA loan and the spread of the SBA loan. We use the difference between the interest rate of the SBA loan and 1-month LIBOR rate as the spread of the SBA loan. The interest rate information of the SBA loan is only available from 2008 onward.

County Migration Data We capture county migration pattern using the migration data from the internal Revenue Service (IRS). The IRS migration data are constructed from year-to-year address changes reported on individual income tax returns and provide information on migration flows between U.S. counties. The data has been widely used in existing migration studies, e.g., Akee and Jones (2026); Howard (2020). We use these data to examine whether mass shooting incidents influence household relocation decisions and migration patterns. We construct three variables to measure the county migration patterns, i.e., net migration, outflow, and inflow. Outflow (inflow) is measured as the number of households moving out of (to) a county scaled by the total number of households of the county. Net migration is measured as the difference of between outflow and inflow.

C. Empirical Strategy

To examine the effects of mass shooting incidents on local economic activity and household migration, we employ a stacked difference-in-differences (DID) research design. We identify 69 mass shooting incidents occurring in 65 U.S. counties between 2006 and 2020. For counties experiencing multiple incidents, we require consecutive events to be separated by at least six years to minimize contamination from overlapping treatment effects. For each treated county-event, we construct a control group consisting of counties located within 100 miles of the treated county that is in the same state and never experience a mass shooting

during the sample period. This procedure leaves us with 1,001 unique control counties.

For each mass shooting event, we construct an event-specific sample consisting of the treated county and its matched control counties. We then stack all event-specific samples and examine a seven-year event window spanning three years before and three years after the incident year. The identifying assumption is that, absent a mass shooting incident, treated counties and nearby control counties would have followed parallel trends in economic and migration outcomes.

$$Y_{i,e,t} = \beta Treated_{i,e} \times Post_{e,t} + \bar{X}_{i,t} + \alpha_{i,e} + \lambda_{e,t} + \epsilon_{i,e,t}, \tag{1}$$

where index i denotes county, and t denotes year, and e represents mass shooting incident. The dependent variable, $Y_{i,t}$, represents county economic outcomes, such as total number of establishments, business formation, number of SBA loan, or county household migration outcomes, such as net migration (i.e., the difference between out-migration and in-migration), outflows, and inflows. $Treated_{i,e}$ is an indicator equal to one for the county that experiences mass shooting event e, and zero for matched control counties. $Post_{e,t}$ is an indicator equal to one for years after the mass shooting incident and zero otherwise. The coefficient of interest, β, captures the average change in outcomes in treated counties relative to nearby control counties following a mass shooting incident. $\bar{X}_{i,t}$ is a vector of time-varying county characteristics, including population, income, and real GDP. $\alpha_{i,t}$ denotes county by event fixed effects, while $\lambda_{e,t}$ represents event by year fixed effects which control for common shocks affecting all counties within a given event stack in a particular year. Standard errors are clustered at the county level to account for serial correlation within counties over time.

D. Summary Statistics

Our sample spans from 2003 to 2022 and included 1043 counties in the U.S. We identify 69 mass shooting incidents, where the average fatality is 7 and median is 5. Table 1 reports the

summary statistics of the sample. Most establishments are small businesses, with an average of 3,120 establishments employing fewer than 20 workers, compared with 326 establishments employing 20–49 workers and 196 establishments employing 50 or more workers.

Counties exhibit considerable variation in entrepreneurial activity and local money markets. The average county has 1,509 new business formations annually, although the median is 309, suggesting that business formation is concentrated in larger counties. Local bank deposits average $2.1 million, with a median of $407,895. Counties receive an average of 34 SBA loans per year, and the average SBA loan spread is 5.62 percentage points.

Migration rates are relatively stable across counties. The average outflow is 73 per 1000 households, while the average inflow is 77 per 1000 households. Interstate migration accounts for a smaller share of population movement, with an average interstate outflow of 23 per 1000 households, compared with 50 for intrastate migration. Net migration (outflows-inflows) is negative on average. The average county has a population of 167,319 residents, a per capita income of $40,159, and real GDP of $9.17 billion. Politically, 23% of counties are Democratic-leaning, while 7% are Democratic-leaning counties located within Republican-leaning states.

III. Results

A. Local Business Activities

A.1. County establishments

We first examine the effects of mass shootings on local business establishments, focusing on employment and average annual wage. We employ the empirical strategy described in Equation 1. The coefficient of interest is the interaction between the treatment indicator and the post-event indicator (Treated×Post). All specifications include county-by-event fixed effects and event-by-year fixed effects, control for county population, per capita income, and GDP growth, and cluster standard errors at the county level.

The results are reported in Table 2. We measure county business activity using total employment and average annual wage, both expressed in natural logarithms. Columns (1) and (2) report the baseline difference-in-differences specification. Average annual wage declines significantly about 1.4% following mass shooting incidents, and the coefficient is statistically significant at a 1% level. The employment effect is negative but not statistically significant.

Columns (3) and (4) report the dynamic specification. Effects emerge starting at $t+1$. Specifically, employment falls by 0.9% following the mass shooting incidents and the coefficient is statistically significant at a 5% level. It corresponds to 508 employment reduction a year in local establishments. The coefficients remain negative through $t+3$, falling by 0.9% each year, though these later coefficients are only marginally significant (t-statistics of -1.52 and -1.45, respectively). Wage declines by 1.1% in the first year following the mass shooting incidents. The magnitudes of declining in $t+2$ and $t+3$ are 1.2% and 1.5% respectively. The coefficients from $t+1$ to $t+3$ are significant at a 5% level. Coefficients on $t-3$ and $t-2$ are small and statistically indifferent from zero for both outcome variables, supporting the parallel trends assumption.

The findings suggest that local establishments experience persistent declines in employment and average annual wage in the aftermath of mass shootings, with effects emerging one year after the incident and continuing through the following two years. We then examine the effects of mass shootings on the number of business establishments in a county. The results are presented in Table 3.

The dependent variables are the total number of establishments and establishments in different employment-size categories. Specifically, we aggregate CBP's published employment-size categories into small (1–19 employees), medium (20–49 employees), and large (50 or more employees) establishments. Since the dependent variables are county variable, we employ Poisson Pseudo Maximum Likelihood (PPML) regressions.

Panel A reports the baseline stacked difference-in-differences estimates. While we find no significant change in the total number of establishments following a mass shooting, im-

portant shifts occur in the composition of local business activity. Specifically, the number of establishments employing 20–49 workers declines by 1.2%, while establishments employing 50 or more workers decline by 0.9%.In contrast, we do not observe a statistically significant average effect on establishments with fewer than 20 employees.

Panel B presents the dynamic difference-in-differences estimates, which provide a more detailed picture of how local business activity evolves following a mass shooting. Although the average treatment effect for small establishments is statistically insignificant in Panel A, the dynamic estimates reveal a temporary decline of approximately 0.4% in the first year after the incident. By contrast, the decline among medium-sized and large establishments emerges gradually and persists over time. Establishments with 20–49 employees decline by approximately 0.7% in the first post-event year and by about 1.4% and 1.5% in both the second and third years. Similarly, establishments with at least 50 employees decline by 0.9% and 0.8% in the first and second years and by 1.6% three years after the event. The coefficients in the years preceding the shooting are generally small and statistically insignificant, providing support for the parallel-trends assumption.

Taken together, the dynamic estimates suggest that mass shootings generate both short-run and long-run disruptions to local business activity. Small establishments appear to experience a temporary contraction immediately following the incident, whereas medium-sized and large establishments face more persistent declines.

A.2. Entrepreneurship

We examine whether mass shootings affect entrepreneurial activity in Table 4. The dependent variable is the number of county-level business formations obtained from the Census Bureau's Business Formation Statistics. We estimate Equation (1) using the same stacked difference-in-differences framework, fixed effects, controls, and county-level clustered standard errors as in the previous analyses.

Column (1) reports the baseline PPML estimates. The coefficient on the interaction

term (Treated × Post) is -0.041, indicating that business formation declines by approximately 4.1% following a mass shooting. Economically, this estimate implies a reduction of about 61 business applications in the average treated county after the event. This magnitude is economically meaningful and suggests that mass shootings discourage entrepreneurial activity in affected communities.

Column (2) presents dynamic estimates. We find no evidence of differential pre-trends, as the coefficients on the pre-event indicators are statistically insignificant. In contrast, entrepreneurship declines immediately in the year of the incident by 2.1%, which corresponds to 32 business applications. The coefficient is statistically significant at a 5% level. Business formation falls by 5.4% (significant at a 1% level) in the first year after the shooting and by 5.5% (significant at a 1% level) and 4.6% (significant at a 5% level) during the subsequent two years, respectively. The magnitudes of business formation reduction correspond to 82, 83, and 69 new business application in the three years.

These results suggest that mass shootings generate persistent and significant reductions in local entrepreneurial activity rather than temporary disruptions.

A.3. Local bank deposits

We document that mass shooting incidents lead to weakened local business activity, decreased employment and annual wage in local establishments. In this section, we further investigate whether mass shootings affect local capital supply by examining county-level bank deposits. The dependent variable is the logarithm of aggregate county-level bank deposits constructed from the FDIC Summary of Deposits database. We estimate Equation 1 with county-by-event and event-by-year fixed effects and cluster standard errors at the county level. The results are reported in Table 5.

The baseline estimate in Column (1) suggests a decline of 3.6% in deposits following a mass shooting, while the t-statistics is -1.54 and the coefficient is not statistically significant at conventional levels. However, the dynamic analysis reveals a clearer pattern. Local

deposits decline sharply in the event year and the first year thereafter, with reductions of 3.5% and 4.4%, respectively. These effects are economically large, corresponding to $75 million and $94 million, respectively. It suggests that households and businesses experience reduced deposits and withdraw financial resources from affected communities after a mass shooting.

Importantly, the dynamic specification in Column (2) shows no evidence of significant pre-treatment trends, strengthening the causal interpretation of the results. The decline in deposits is consistent with a reduction in local capital supply and provides a potential mechanism linking mass shootings to weaker business activity. Given that bank deposits serve as an important funding source for local lending, a contraction in deposits may subsequently reduce credit availability for entrepreneurs and small businesses (Nguyen, 2019; Bonfim, Nogueira and Ongena, 2021).

A.4. Small business loan

In this section, we study a natural follow-up question: whether mass shootings affect access to credit for local businesses. We focus on both the quantity and cost of SBA-backed small-business loans. The dependent variables are the number of SBA-backed loans and the average SBA loan spread in a county. We report the results in Table 6.

The baseline difference-in-differences estimates in Column (1) and (2) indicate no statistically significant change in the overall number of SBA loans or average loan spreads. However, the dynamic analysis reveals significant post-incident effects. The number of SBA loans declines by approximately 5.4% in the year following a mass shooting, suggesting a contraction in local small-business lending activity.

At the same time, borrowing costs increase substantially. SBA loan spreads increase by approximately 19 basis points in the first year after a shooting and persists thereafter. The increase in loan spreads indicates that lenders perceive greater risk and/or face tighter funding conditions in affected counties. Combined with the evidence on declining deposits

in Table 5, these findings suggest that mass shootings reduce the availability of local capital while simultaneously increasing financing frictions for small business. The deterioration in local credit conditions provides a plausible explanation for the decline in entrepreneurship and the contraction of medium-sized and large business establishments documented in earlier tables.

B. County Migration Pattern

The evidence thus far suggests that mass shootings weaken local economic activity along several margins. We document declines in entrepreneurship, contractions among medium-sized and large establishments, reductions in local bank deposits, and tighter credit conditions for small businesses in affected counties. A natural follow-up question is what drives these economic effects. In particular, we investigate household migration as a potentially important mechanism: if mass shootings induce households to leave affected communities, the resulting population decline could reduce local demand and shrink deposit bases, weakening the economic environment facing local businesses and entrepreneurs.

B.1. County migration: baseline results

We first examine whether mass shootings affect household migration decisions. The dependent variables are county-level net migration, out-migration, and in-migration rates constructed from IRS migration data. Net migration is defined as the difference between out-migration and in-migration. We estimate Equation 1 using the same stacked difference-in-differences framework, fixed effects, control variables, and clustered standard errors at the county-level. The results are reported in Table 7.

Panel A reports the baseline estimates. We find that mass shootings lead to a significant increase in net migration. The coefficient on the interaction term in Column (1) indicates that net migration increases by 2.39 households per 1000 households following a mass shooting. The magnitude corresponds to 140 households net migration from a county on average in the

sample. Regarding the underlying components, Column (2) shows that out-migration rises by approximately 1.59 households per 1000 households, corresponding to 93 households on average in the sample. While Column (3) indicates a negative effect on in-migration, although this coefficient is not statistically significant. These findings suggest that the increase in net migration is driven primarily by existing residents leaving affected communities rather than by a decline in arrivals.

Panel B further distinguishes between interstate and intrastate migration. The results indicate that the increase in out-migration is concentrated among households relocating to other states. The coefficient on the interaction term in Column (1) implies that interstate outflows increase by approximately one household per 1000 households following a mass shooting, corresponding to 58.6 households on average in the sample. The coefficient is significant at a 1% level. Whereas migration within the same state is 0.7 households per 1000 households and the coefficient is significant at a 10% level. This pattern suggests that households are not simply relocating within the local area but move across state borders.

Table 8 presents dynamic stacked difference-in-differences estimates. We find little evidence of differential pre-trends, as the coefficients on the pre-event indicators are statistically insignificant. Following a mass shooting, net migration and out-migration increase immediately and persists for at least three years. Consistent with the baseline results in Table 7, the increase in net migration is driven almost entirely by higher outflows rather than lower inflows. Moreover, Panel B shows that the persistent increase in out-migration is driven by interstate moves.

Taken together, these findings provide evidence that mass shootings induce households to move out of the affected communities and that these migration responses are persistent rather than temporary.

B.2. Heterogeneous effects of salience on county migration

The migration response to a mass shooting may depend on the severity and salience of the event. To evaluate this possibility, we examine heterogeneous effects using measures of shooting severity and public attention. Specifically, we interact the treatment effect with the number of fatalities and an indicator for high Google Search Intensity (GSI). We construct GSI index using quarterly keywords search intensity in U.S. Designated Market Areas (DMA) and convert DMA codes to counties. The keywords include mass shooting, active shooter, gun violence, gun control, and shooting. We take average of the keyword search intensity and aggregate quarterly data to annual data. We report the results in Table 9.

Column (1) shows that migration responses are significantly stronger following more severe shootings. The positive coefficient on Treated $\times$ Post $\times$ Fatality indicates that each additional fatality increases net out-migration from the affected county. This result suggests that households respond more strongly when shootings impose greater human costs and receive greater public attention.

Column (2) examines variation based on public salience. We find that shootings associated with high Google search intensity generate substantially larger migration responses. The coefficient on Treated $\times$ Post $\times$ GSI (High) is positive and statistically significant, indicating that highly publicized shootings induce significantly greater household out-migration from affected communities.

Together, these findings suggest that migration responses depend not only on the occurrence of violence itself but also on the severity and visibility of the event.

B.3. County political ideology and migration

We next examine whether migration responses vary across communities with different political orientations. Table 10 reports the results. In Column (1), we interact the treatment effect with an indicator for Democratic-leaning counties. The positive and significant coefficient on Treated $\times$ Post $\times$ Blue indicates that the increase in out-migration following

a mass shooting is larger in Democratic-leaning counties than in other counties.

Prior research suggests that exposure to mass shootings increases support for stricter gun control policies (Yousaf, 2018; Markarian and Newman, 2025). When Democratic-leaning households reside in Republican-leaning states, their preferred policy response may be less likely to materialize. As a result, mass shootings may not only increase concerns about public safety but also intensify dissatisfaction with the local political environment, raising the incentive to relocate. Column (2) further focuses on Democratic-leaning counties located within Republican-leaning states, where we expect a stronger migration response to mass shootings. Consistent with our prediction, the coefficient on Treated × Post × Blue County in Red State is positive and statistically significant, suggesting that households in these communities are particularly likely to leave following a mass shooting. More importantly, the coefficient estimates indeed suggest an even stronger migration response in Democratic-leaning counties located within Republican-leaning states. These findings indicate that responses to public safety shocks vary across communities with different political preferences.

B.4. County-state pair sample

In subsection III.B, we aggregate total out- and in-migration of a county in a year. Table 11 provides additional evidence using a county-state pair sample. This specification allows us to directly examine migration flows between affected counties and destination (origin) states. The results show that mass shootings significantly increase outflows from affected counties, while having no significant effect on inflows. The coefficient on Treated × Post in Column (1) indicates a substantial increase in household departures, whereas the corresponding coefficient in Column (2) is statistically insignificant. These findings reinforce the conclusion that the overall migration response is driven primarily by existing residents leaving affected communities rather than by a reduction in incoming households.

Taken together, the evidence from Table 7 through Table 11 identifies household out-migration as a key mechanism linking mass shootings to local economic outcomes. Mass

shootings induce households to leave affected counties, particularly through interstate migration. The migration response is stronger following more severe and highly salient shootings and is concentrated in communities with specific political characteristics. These departures likely contribute to the declines in local deposits, small-business lending, entrepreneurship, and business activity documented in the preceding sections.

C. Do Layoffs Explain Household Out-Migration?

The above results suggest that affected counties experience household out-migration after mass shootings. One potential alternative explanation for the observed increase in household out-migration is that mass shootings weaken local business activities, and therefore labor demand and force workers to relocate following job losses. To evaluate this possibility, Table 12 examines county-level layoffs, employment rates, and unemployment rates following mass shootings. If labor market displacement were the primary driver of migration, we would expect persistent increases in layoffs and unemployment.

we obtain layoff data from the WARN database. County-level employment and unemployment rates data are from Bureau of Labor Statistics. We find little evidence supporting this hypothesis. The baseline difference-in-differences estimates show no statistically significant changes in layoffs, employment rates, or unemployment rates following mass shootings. Dynamic difference-in-differences estimates reveal no persistent increase in layoffs. Although employment rates decline modestly two years after the event, the overall evidence indicates that mass shootings do not generate significant labor market displacement. Combined with the migration results, these findings suggest that increased household departures are unlikely to be driven primarily by layoffs.

IV. Conclusion

This paper examines the effects of mass shootings on local economic activity and household migration. Using a sample of 69 mass shooting incidents and a stacked difference-in-differences empirical design, we find that mass shootings weaken local economic conditions by reducing entrepreneurship, contracting local credit markets, and decreasing business activity. We identify household migration as an important mechanism. Following a mass shooting, affected counties experience higher net out-migration, driven primarily by increased household outflows. The migration response is stronger for more severe and highly media covered incidents.

Our findings suggest that household out-migration is not merely one consequence of mass shootings but an important mechanism through which violent shocks affect local economies. By increasing household departures from affected communities, mass shootings affect local capital formation, entrepreneurial activity, and economic development. This mechanism may help explain a wide range of economic effects documented in prior studies, including declines in property values, reduced retail spending, weaker business activity, and higher borrowing costs. More broadly, our results highlight how violent shocks can alter the long-run economic trajectory of communities through household interstate mobility.

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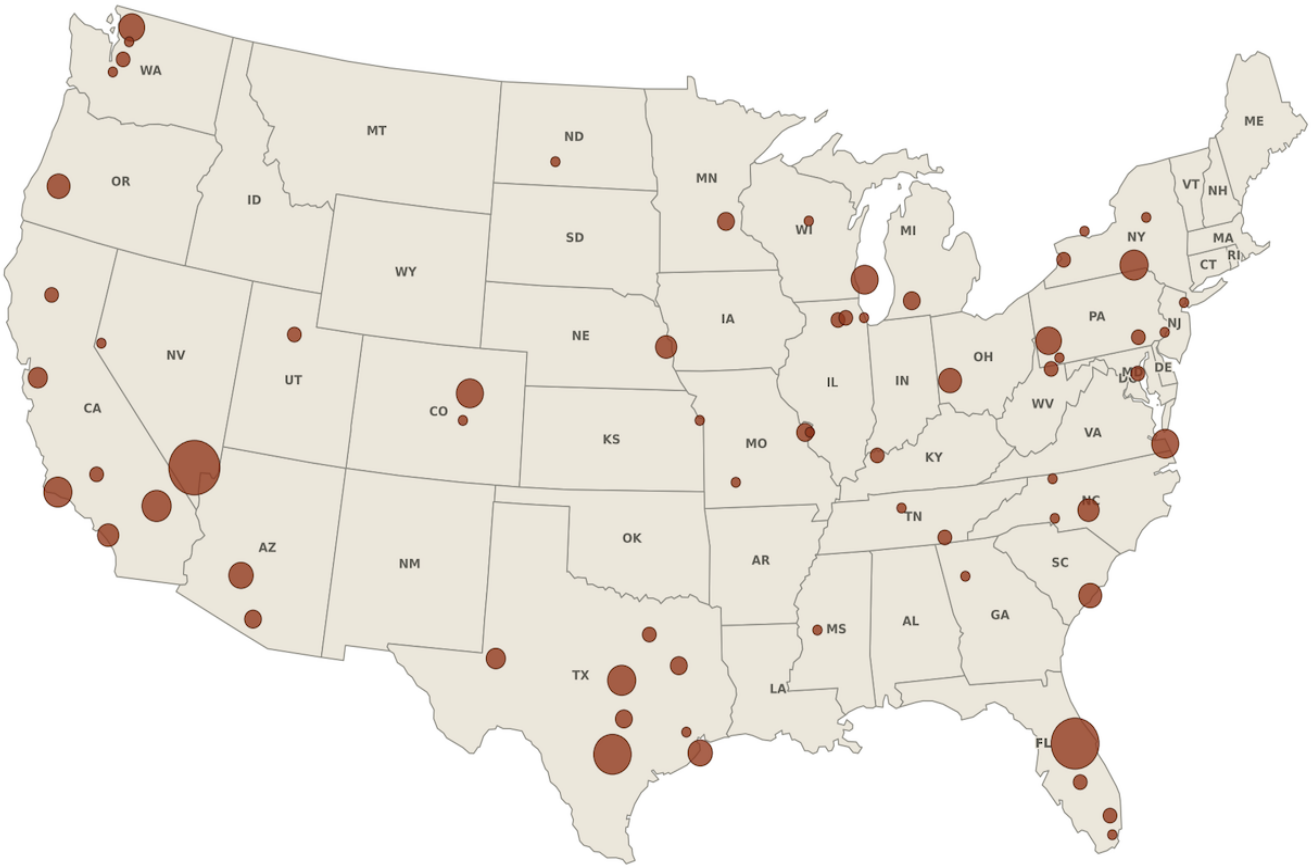
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Figure 1: Counties with mass shooting incidents



Notes: This map displays counties that experienced a mass shooting incident between 2006 and 2020. We restrict the sample to salient incidents with at least four fatalities. Circle area is proportional to the total number of fatalities in each county.

Table 1: Summary Statistics

Variable	Obs.	Mean	STD	P25	Median	P75
Panel A. County-Year Sample						
Employment	9,706	56494.64	117848.30	5514	13846	46240
Wage	9,706	37.11	8.85	30.76	35.57	41.94
Establishments	9,706	3645	6937	491	1081	3139
Establishments (1–19 employees)	9,706	3120	5882	436	970	2696
Establishments (20–49 employees)	9,706	326	641	34	86	288
Establishments ($\geq$50 employees)	9,706	196	417	17	45	160
Entrepreneur	9,489	1509	3608	140	309	1030
Local bank deposits (in million)	9,702	2136	5093	143	408	1406
Number of SBA loans	8,423	34.13	69.77	3.00	9.00	30.00
SBA loan spread	6,995	5.62	0.83	5.13	5.64	6.09
Fatalities	9,706	7.01	6.75	4	5	7
High Google search intensity	9,706	0.49	0.50	0	0	1
Population	9,706	167319	373415	24327	52256	151704
Per capita income	9,706	40160	12287	31851	37685	45232
Real GDP ($1,000)	9,706	9176	25700	810.24	1972	6361
Blue county	9,706	0.23	0.42	0	0	0
Blue county in red state	9,706	0.07	0.25	0	0	0
Per 1000 households						
Net migration (outflow−inflow)	9,699	-3.64	14.08	-9.61	-1	5
Outflow	9,705	73.32	21.70	58.77	69.37	83.47
Inflow	9,699	77.04	27.61	56.78	71.39	92.20
Outflow (different states)	9,611	23.38	12.68	14.58	20.19	28.77
Outflow (same states)	9,705	50.09	18.01	36.90	47.75	61.07
Number of households						
Total households	9,706	58644	131193	7915	18340	52468
Outflow households	9,705	4182	8556	544	1289	3781
Inflow households	9,699	4402	8776	558	1327	4083
Outflow households (different states)	9,611	1713	4224	140	377	1420
Outflow households (same states)	9,705	2486	4827	401	893	2301
Panel B. County-State-Year Sample						
Outflow per 1000 households	528,935	671.60	4340.17	0	0	0
Inflow per 1000 households	528,935	679.08	4339.47	0	0	0

Table 2: The Effects on Local Employment and Wages

This table examines the effects of mass shooting on local establishments' employment and wage using the OLS regressions. The sample period is 2003 to 2022. The variable definition is in the Appendix. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Lnwage is winsorized at the 2nd and 98th percentiles due to the presence of extreme values in the right tail consistent with measurement error. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

VARIABLES	(1) Ln(EMP)	(2) Ln(wage)	(3) Ln(EMP)	(4) Ln(wage)
Treated × Post	-0.005	-0.014***		
	(-1.03)	(-2.62)		
Treated × Event (t-3)			0.000	0.007
			(0.05)	(1.60)
Treated × Event (t-2)			-0.001	0.003
			(-0.17)	(0.83)
Treated × Event (t)			0.007	-0.003
			(0.88)	(-0.95)
Treated × Event (t+1)			-0.009**	-0.011**
			(-2.06)	(-2.49)
Treated × Event (t+2)			-0.009	-0.012**
			(-1.52)	(-1.98)
Treated × Event (t+3)			-0.009	-0.015**
			(-1.45)	(-2.31)
GDP Growth Rate	0.139***	0.060***	0.139***	0.060***
	(7.97)	(3.94)	(7.97)	(3.94)
LnPer cap income	0.137***	0.066**	0.137***	0.066**
	(3.85)	(2.19)	(3.85)	(2.18)
LnPopulation	0.720***	-0.124***	0.721***	-0.123**
	(13.72)	(-2.58)	(13.73)	(-2.58)
Constant	-1.728**	3.400***	-1.729**	3.400***
	(-2.46)	(5.23)	(-2.46)	(5.23)
Observations	9,690	9,690	9,690	9,690
R-squared	0.999	0.974	0.999	0.974
County × Event FE	Yes	Yes	Yes	Yes
Year × Event FE	Yes	Yes	Yes	Yes
Cluster at County	Yes	Yes	Yes	Yes

Table 3: The Effects on Local Business (Number of Establishments)

This table reports the Poisson Pseudo Maximum Likelihood regression results. The sample period is 2003 to 2022. The variable definition is in the Appendix. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

Panel A: Number of establishments – baseline difference-in-differences

	(1)	(2)	(3)	(4)
VARIABLES	N_est	N1_19	N20_49	N50_above
Treated × Post	-0.002	-0.001	-0.012***	-0.009**
	(-1.00)	(-0.53)	(-3.65)	(-2.35)
GDP Growth Rate	0.065***	0.058***	0.094***	0.171***
	(5.62)	(4.74)	(5.22)	(7.70)
LnPer cap income	0.051**	0.041*	0.118***	0.080***
	(2.22)	(1.66)	(4.50)	(2.93)
LnPopulation	0.828***	0.831***	0.767***	0.770***
	(19.03)	(18.18)	(13.78)	(13.81)
Constant	-3.137***	-3.123***	-5.967***	-7.382***
	(-5.61)	(-5.26)	(-8.04)	(-9.73)
Observations	9,690	9,690	9,690	9,663
County × Event FE	Yes	Yes	Yes	Yes
Year × Event FE	Yes	Yes	Yes	Yes
Cluster at County	Yes	Yes	Yes	Yes

Panel B: Number of establishments – dynamic difference-in-differences

VARIABLES	(1) N_est	(2) N1_19	(3) N20_49	(4) N50_above
Treated × Event (t-3)	0.001	-0.000	0.005	-0.001
	(0.29)	(-0.09)	(1.40)	(-0.35)
Treated × Event (t-2)	-0.000	-0.000	0.002	0.002
	(-0.04)	(-0.22)	(0.80)	(0.72)
Treated × Event (t)	-0.002	-0.001	-0.005	-0.004
	(-1.52)	(-1.15)	(-1.56)	(-1.30)
Treated × Event (t+1)	-0.005**	-0.004**	-0.007**	-0.009**
	(-2.44)	(-2.01)	(-1.98)	(-2.11)
Treated × Event (t+2)	-0.002	-0.002	-0.014***	-0.008*
	(-0.98)	(-0.58)	(-3.38)	(-1.78)
Treated × Event (t+3)	0.000	0.002	-0.015***	-0.016***
	(0.06)	(0.44)	(-2.85)	(-3.26)
GDP Growth Rate	0.065***	0.058***	0.093***	0.171***
	(5.64)	(4.76)	(5.25)	(7.70)
LnPer cap income	0.050**	0.041*	0.121***	0.084***
	(2.22)	(1.65)	(4.58)	(3.06)
LnPopulation	0.828***	0.833***	0.761***	0.764***
	(18.97)	(18.09)	(13.61)	(13.68)
Constant	-3.147***	-3.140***	-5.910***	-7.348***
	(-5.61)	(-5.26)	(-7.96)	(-9.66)
Observations	9,690	9,690	9,690	9,663
County × Event FE	Yes	Yes	Yes	Yes
Year × Event FE	Yes	Yes	Yes	Yes
Cluster at County	Yes	Yes	Yes	Yes

Table 4: The Effects on Local Entrepreneurship

This table reports the difference-in-differences Poisson Pseudo Maximum Likelihood regression results of local county entrepreneurship. Since the county business formation data is only available after 2005, the sample period for this analysis is 2005 to 2022. The variable definition is in the Appendix. The dependent variable is the count of business application in a county-year. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

	(1)	(2)
VARIABLES	Business Formation	
Treated × Post	-0.041**	
	(-2.42)	
Treated × Event (t-3)		-0.005
		(-0.48)
Treated × Event (t-2)		-0.005
		(-0.76)
Treated × Event (t)		-0.021**
		(-2.07)
Treated × Event (t+1)		-0.054***
		(-3.03)
Treated × Event (t+2)		-0.055***
		(-3.05)
Treated × Event (t+3)		-0.046**
		(-2.55)
LnReal GDP	0.002	0.004
	(0.04)	(0.06)
LnPer cap income	0.242*	0.252*
	(1.69)	(1.77)
LnPopulation	1.097***	1.080***
	(4.76)	(4.65)
Constant	-8.446***	-8.352***
	(-2.66)	(-2.62)
Observations	9,474	9,474
County × Event FE	Yes	Yes
Year × Event FE	Yes	Yes
Cluster at County	Yes	Yes

Table 5: The Effects on Local Bank Deposits

This table reports the OLS results of local bank deposits. The sample period is 2003 to 2022. The variable definition is in the Appendix. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Lndep is winsorized at the 2nd and 98th percentiles due to the presence of extreme values in the lower tail consistent with measurement error. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

	(1)	(2)
VARIABLES	LnDeposits	
Treated × Post	-0.037	
	(-1.54)	
Treated × Event (t-3)		0.005
		(0.23)
Treated × Event (t-2)		-0.002
		(-0.10)
Treated × Event (t)		-0.036**
		(-2.24)
Treated × Event (t+1)		-0.045**
		(-2.14)
Treated × Event (t+2)		-0.039
		(-1.58)
Treated × Event (t+3)		-0.024
		(-0.60)
LnReal GDP	0.123*	0.123*
	(1.79)	(1.79)
LnPer cap income	0.226*	0.227*
	(1.91)	(1.91)
LnPopulation	1.194***	1.194***
	(5.39)	(5.38)
Constant	-11.237***	-11.240***
	(-4.05)	(-4.05)
Observations	9,686	9,686
R-squared	0.989	0.989
County × Event FE	Yes	Yes
Year × Event FE	Yes	Yes
Cluster at County	Yes	Yes

Table 6: The Effects on Small Business Loan

This table reports the PPML and OLS regression results on SBA loans. The sample period is 2003 to 2022. The variable definition is in the Appendix. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Number of SBA loans	SBA loan spread	Number of SBA loans	SBA loan spread
Treated × Post	-0.010	0.050		
	(-0.58)	(0.87)		
Treated × Event (t-3)			-0.012	0.135
			(-0.44)	(1.52)
Treated × Event (t-2)			-0.007	0.145
			(-0.30)	(1.61)
Treated × Event (t)			-0.037	0.094
			(-1.58)	(1.08)
Treated × Event (t+1)			-0.054**	0.190***
			(-2.28)	(2.59)
Treated × Event (t+2)			0.014	0.119
			(0.50)	(1.37)
Treated × Event (t+3)			0.026	0.145*
			(0.80)	(1.77)
LnReal GDP	-0.256***	0.201	-0.249***	0.198
	(-2.67)	(0.99)	(-2.59)	(0.98)
LnPer cap income	0.145	-0.063	0.122	-0.064
	(0.85)	(-0.15)	(0.71)	(-0.15)
LnPopulation	1.015***	0.720	1.059***	0.727
	(4.39)	(1.25)	(4.60)	(1.26)
Constant	-5.809*	-4.889	-6.270*	-4.922
	(-1.74)	(-0.64)	(-1.86)	(-0.64)
Observations	8,368	6,896	8,368	6,896
R-squared		0.573		0.573
County × Event FE	Yes	Yes	Yes	Yes
Year × Event FE	Yes	Yes	Yes	Yes
Cluster at County	Yes	Yes	Yes	Yes

Table 7: The Effects on Household Migration

This table reports the baseline OLS regression results on county migration. The sample period is 2003 to 2022. The variable definition is in the Appendix. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

Panel A: Baseline difference-in-differences

	(1)	(2)	(3)
	Net migration		
VARIABLES	(Outflow-inflow)	Outflow	Inflow
Treated × Post	2.390***	1.588***	-0.848
	(2.83)	(3.08)	(-1.13)
LnReal GDP	-0.378	0.564	0.404
	(-0.20)	(0.41)	(0.23)
LnPer cap income	4.518	5.383	1.840
	(1.05)	(1.52)	(0.48)
LnPopulation	78.626***	12.329**	-54.152***
	(6.66)	(2.50)	(-4.64)
Constant	-914.157***	-127.830*	649.882***
	(-6.44)	(-1.92)	(4.71)
Observations	9,683	9,689	9,683
R-squared	0.783	0.960	0.959
County × Event FE	Yes	Yes	Yes
Year × Event FE	Yes	Yes	Yes
Cluster at County	Yes	Yes	Yes

Panel B: Outflows to same and different states

	(1)	(2)
VARIABLES	Different state	Same state
Treated × Post	0.932***	0.711*
	(2.64)	(1.90)
LnReal GDP	0.224	0.721
	(0.32)	(0.72)
LnPer cap income	2.345	0.712
	(1.46)	(0.31)
LnPopulation	11.020***	3.561
	(4.18)	(1.00)
Constant	-126.594***	-7.332
	(-3.58)	(-0.15)
Observations	9,594	9,689
R-squared	0.968	0.967
County × Event FE	Yes	Yes
Year × Event FE	Yes	Yes
Cluster at County	Yes	Yes

Table 8: The Dynamic Effects on Household Migration

This table reports the dynamic OLS regression results on county migration. The sample period is 2003 to 2022. The variable definition is in the Appendix. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

Panel A: Dynamic difference-in-differences

	(1)	(2)	(3)
	Net migration		
VARIABLES	(Outflow-inflow)	Outflow	Inflow
Treated × Event (t-3)	-0.724	0.046	0.131
	(-0.71)	(0.06)	(0.16)
Treated × Event (t-2)	-0.903	-0.051	0.390
	(-0.82)	(-0.07)	(0.54)
Treated × Event (t)	1.903**	1.428***	-0.786
	(2.00)	(2.63)	(-1.09)
Treated × Event (t+1)	1.926*	2.109**	-0.286
	(1.75)	(2.52)	(-0.31)
Treated × Event (t+2)	1.565	1.269*	-0.827
	(1.32)	(1.74)	(-0.82)
Treated × Event (t+3)	2.008*	1.536*	-0.809
	(1.74)	(1.79)	(-0.80)
LnReal GDP	-0.368	0.568	0.403
	(-0.19)	(0.41)	(0.23)
LnPer cap income	4.506	5.358	1.831
	(1.04)	(1.51)	(0.48)
LnPopulation	78.606***	12.324**	-54.148***
	(6.66)	(2.50)	(-4.64)
Constant	-913.920***	-127.563*	649.951***
	(-6.43)	(-1.91)	(4.71)
Observations	9,683	9,689	9,683
R-squared	0.783	0.960	0.959
County × Event FE	Yes	Yes	Yes
Year × Event FE	Yes	Yes	Yes
Cluster at County	Yes	Yes	Yes

Panel B: Outflows to different and same states

VARIABLES	(1) Different state	(2) Same state
Treated × Event (t-3)	0.297	-0.219
	(0.77)	(-0.43)
Treated × Event (t-2)	0.057	-0.154
	(0.13)	(-0.27)
Treated × Event (t)	0.882**	0.531
	(2.33)	(1.24)
Treated × Event (t+1)	1.227**	0.910
	(2.30)	(1.60)
Treated × Event (t+2)	0.907*	0.469
	(1.81)	(0.91)
Treated × Event (t+3)	1.196**	0.428
	(2.16)	(0.69)
LnReal GDP	0.224	0.725
	(0.32)	(0.73)
LnPer cap income	2.340	0.696
	(1.46)	(0.30)
LnPopulation	11.019***	3.556
	(4.18)	(1.00)
Constant	-126.527***	-7.159
	(-3.58)	(-0.15)
Observations	9,594	9,689
R-squared	0.968	0.967
County × Event FE	Yes	Yes
Year × Event FE	Yes	Yes
Cluster at County	Yes	Yes

Table 9: The Heterogeneous Effects on Household Migration

This table reports the difference-in-differences OLS regression results on county migration. The sample period is 2003 to 2022. The variable definition is in the Appendix. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

	(1)	(2)
VARIABLES	(Outflow-inflow)	
Treated × Post × Fatality	0.246*	
	(1.93)	
Treated × Post × Google Search Intensity (high)		4.514***
		(2.86)
Treated × Post	0.695	0.076
	(0.55)	(0.06)
LnReal GDP	-0.375	-0.382
	(-0.20)	(-0.20)
LnPer cap income	4.505	4.497
	(1.04)	(1.05)
LnPopulation	78.308***	78.439***
	(6.63)	(6.64)
Constant	-910.540***	-911.795***
	(-6.41)	(-6.42)
Observations	9,683	9,683
R-squared	0.784	0.784
County × Event FE	Yes	Yes
Year × Event FE	Yes	Yes
Cluster at County	Yes	Yes

Table 10: The Heterogeneous Effects of Event County Ideology on Household Migration

This table examines the effect of political ideology of a county on the outflows after the salient mass shooting tragedies. The dependent variable is the number of outflow households over total households in a county. The independent variables of interest are the three way interaction between Treated × Post and a dummy variable for Democratic-leaning counties in column (1) and a dummy variable for Democratic-leaning counties in a Republican-leaning state in column (2). The sample period is 2003 to 2022. The variable definition is in the Appendix. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

	(1)	(2)
VARIABLES	Outflow	
Treated × Post × Blue	2.054**	
	(1.98)	
Treated × Post × Blue		3.524**
county in red state		(2.25)
Blue	-0.462	
	(-0.96)	
Treated × Blue	-2.801*	
	(-1.96)	
Post × Blue	-0.204	
	(-0.54)	
Blue county in red state		1.294
		(1.56)
Treated × Blue county in red state		-3.844**
		(-2.13)
Post × Blue county in red state		-1.516**
		(-1.98)
Treated × Post	0.624	1.112**
	(0.87)	(2.12)
LnReal GDP	0.555	0.447
	(0.40)	(0.32)
LnPer cap income	5.087	5.521
	(1.44)	(1.56)
LnPopulation	12.548**	12.079**
	(2.53)	(2.45)
Constant	-126.785*	-124.789*
	(-1.89)	(-1.87)
Observations	9,689	9,689
R-squared	0.960	0.960
County × Event FE	Yes	Yes
Year × Event FE	Yes	Yes
Cluster at County	Yes	Yes

Table 11: Evidence from County-state Pair Sample

This table reports the baseline difference-in-differences OLS regression results on county migration using county-state pair sample. The sample period is 2003 to 2022. The variable definition is in the Appendix. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

VARIABLES	(1) Outflow	(2) Inflow
Treated × Post	15.213***	4.970
	(3.27)	(0.91)
LnReal GDP	0.085	0.073
	(0.59)	(0.40)
LnPer cap income	15.338	27.909
	(0.53)	(0.76)
LnPopulation	145.141***	-159.477***
	(4.57)	(-2.95)
Constant	-1,096.971**	2,150.508***
	(-2.41)	(3.03)
Observations	528,605	528,605
R-squared	0.993	0.990
County × Event FE	Yes	Yes
Year × Event FE	Yes	Yes
County-State Pair FE	Yes	Yes
Cluster at County-State pair	Yes	Yes

Table 12: The Effects on Local Employment and Wages

This table examines the effects of mass shooting on layoff and unemployment in affected counties using the difference-in-differences regressions. Layoff data is obtained from WARN database. Employment and unemployment rates are from BLS. The sample period is 2003 to 2022. The variable definition is in the Appendix. The fixed effects of the regressions are reported at the bottom of the table. T-statistics are in parentheses. Standard errors are clustered at the county level. Continuous variables are winsorized at the 1% and 99% level. Coefficients statistically significant at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.

Panel A: Layoff baseline results

VARIABLES	(1) LnLayoff	(2) Employed_rate	(3) Unemployed_rate
Treated × Post	-0.123	-0.080	0.080
	(-0.76)	(-0.99)	(1.00)
LnReal GDP	0.770**	-0.091	0.090
	(2.31)	(-0.48)	(0.48)
LnPer cap income	0.250	0.175	-0.168
	(0.32)	(0.51)	(-0.49)
LnPopulation	0.812	-1.306**	1.312**
	(0.70)	(-2.37)	(2.38)
Constant	-21.240	107.652***	-7.757
	(-1.44)	(15.40)	(-1.11)
Observations	7,303	9,690	9,690
R-squared	0.694	0.964	0.964
County × Event FE	Yes	Yes	Yes
Year × Event FE	Yes	Yes	Yes
Cluster at County	Yes	Yes	Yes

Panel B: Dynamic difference-in-differences

VARIABLES	(1) LnLayoff	(2) Employed_rate	(3) Unemployed_rate
Treated × Event (t-3)	0.035	-0.104	0.104
	(0.12)	(-1.22)	(1.22)
Treated × Event (t-2)	0.254	-0.007	0.007
	(0.92)	(-0.13)	(0.13)
Treated × Event (t)	0.258	-0.078	0.079
	(0.93)	(-1.16)	(1.18)
Treated × Event (t+1)	-0.024	-0.132	0.134
	(-0.08)	(-1.40)	(1.40)
Treated × Event (t+2)	-0.345	-0.147*	0.149*
	(-1.14)	(-1.65)	(1.68)
Treated × Event (t+3)	0.008	-0.107	0.106
	(0.02)	(-1.20)	(1.19)
LnReal GDP	0.773**	-0.091	0.089
	(2.32)	(-0.48)	(0.47)
LnPer cap income	0.255	0.177	-0.170
	(0.33)	(0.52)	(-0.50)
LnPopulation	0.819	-1.307**	1.312**
	(0.71)	(-2.38)	(2.38)
Constant	-21.420	107.634***	-7.738
	(-1.45)	(15.40)	(-1.11)
Observations	7,303	9,690	9,690
R-squared	0.694	0.964	0.964
County × Event FE	Yes	Yes	Yes
Year × Event FE	Yes	Yes	Yes
Cluster at County	Yes	Yes	Yes

Appendix A.

Table A1: Mass Shooting Incidents

Year	State	County	Fatality
2006	Arizona	Maricopa	4
2018	Arizona	Maricopa	6
2011	Arizona	Pima	6
2012	California	Alameda	7
2018	California	Kern	5
2011	California	Orange	8
2015	California	San Bernardino	14
2014	California	Santa Barbara	6
2006	California	Santa Barbara	7
2017	California	Tehama	5
2012	Colorado	Arapahoe	12
2007	Colorado	El Paso	4
2017	Florida	Broward	5
2019	Florida	Highlands	5
2010	Florida	Miami-Dade	4
2016	Florida	Orange	49
2010	Georgia	Cobb	4
2020	Illinois	Cook	4
2008	Illinois	De Kalb	5
2019	Illinois	Kane	5
2019	Kansas	Wyandotte	4
2008	Kentucky	Henderson	5
2018	Maryland	Anne Arundel	5
2016	Michigan	Kalamazoo	6
2012	Minnesota	Hennepin	6
2017	Mississippi	Yazoo	4
2020	Missouri	Greene	4
2008	Missouri	St Louis	6
2006	Missouri	St Louis City	4
2007	Nebraska	Douglas	8
2017	Nevada	Clark	60
2011	Nevada	Carson City	4
2019	New Jersey	Hudson	4

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Year	State	County	Fatality
2009	New York	Broome	13
2010	New York	Erie	5
2013	New York	Herkimer	4
2009	New York	Monroe	4
2020	North Carolina	Mecklenburg	4
2009	North Carolina	Moore	8
2009	North Carolina	Surry	4
2019	North Dakota	Morton	4
2019	Ohio	Montgomery	9
2015	Oregon	Douglas	9
2018	Pennsylvania	Allegheny	11
2018	Pennsylvania	Fayette	4
2006	Pennsylvania	Lancaster	5
2007	Pennsylvania	Philadelphia	4
2015	South Carolina	Charleston	9
2018	Tennessee	Davidson	4
2015	Tennessee	Hamilton	5
2015	Texas	Anderson	6
2009	Texas	Coryell	13
2016	Texas	Dallas	5
2019	Texas	Ector	7
2018	Texas	Galveston	10
2016	Texas	Harris	4
2007	Texas	Travis	6
2017	Texas	Wilson	25
2007	Utah	Salt Lake	5
2019	Virginia	Virginia Beach City	12
2012	Washington	King	5
2009	Washington	Pierce	4
2008	Washington	Skagit	6
2016	Washington	Skagit	5
2014	Washington	Snohomish	4
2011	West Virginia	Monongalia	5
2017	Wisconsin	Marathon	4
2020	Wisconsin	Milwaukee	5
2012	Wisconsin	Milwaukee	7

Appendix B. Variable Definitions

Variables	Definitions	Sources
Treated	A dummy variable that equal one if a county experiences mass shooting incidents in a year; zero, otherwise.	USA Today
Post	A dummy variable that equals one in the year of mass shooting and three years after; zero in the preceding three years.	As above
Employment	Total employment in the establishments in a county.	County Business Pattern Survey
Wage	Average annual wage (in thousands) of the employees in the establishments in a county.	As above
Establishments	Total number of establishments in a county.	As above
Establishments (1–19 employees)	The number of establishments with 1–19 employees in a county.	As above
Establishments (20–49 employees)	The number of establishments with 20–49 employees in a county.	As above
Establishments ($\geq$50 employees)	The number of establishments with more than 50 employees in a county.	As above
Entrepreneurs	The number of new business applications in a county.	Census Business Formation Statistics
Local bank deposits (in million)	Total deposits in the bank branches in a county.	FDIC Summary of Deposits
LnDeposits	The natural logarithm of one plus local bank deposits.	As above
Number of SBA loans	The number of small business loan approved in a county.	Small Business Administration
SBA loan spread	The average of the difference between SBA loan interest rates and 1-month LIBOR rate in a county.	As above
Fatalities	Number of victims killed in mass shooting incidents in a county.	USA Today
High Google search intensity	A dummy variable that equals one if a county's Google search intensity is above sample median and zero, otherwise.	Google Search Volume
Population	The population of a county in a year.	BEA
Per capita income	The per capita income of a county in a year.	As above

Real GDP ($1,000)	The real GDP of a county in a year.	As above
Blue county	A dummy variable that equals one if the winning candidate is from Democratic party in a county in the last presidential election and zero, otherwise.	BallotPedia
Blue county in red state	A dummy variable that equals one if the winning candidate is from Democratic party in a county while the state is Republican -leaning in the last presidential election and zero, otherwise.	As above
Net migration (outflow−inflow)	The difference between out-migration and in-migration households over total households in a county.	IRS SOI tax stats Migration data
Outflow	The ratio of out-migration households over total households in a county.	As above
Inflow	The ratio of in-migration households over total households in a county.	As above
Outflow (different state)	The ratio of out-migration to different states households over total households in a county.	As above
Outflow (same state)	The ratio of out-migration to the same states households over total households in a county.	As above
County-State-Year Sample		
Outflow/Total households×1000	The ratio of out-migration households per 1000 households in a county.	As above
Inflow/Total households×1000	The ratio of in-migration households per 1000 households in a county.	As above