Government Litigation Risk and the Decline in Low-Income Mortgage Lending*

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We study the effect of Department of Justice lawsuits in the 2010s against large lenders for alleged fraud in the Federal Housing Administration (FHA) mortgage insurance program. The suits led to over $5 billion in settlements and caused targeted banks and their peers to precipitously exit the FHA market. Difference-in-differences and triple differences tests exploiting geographic variation in exposure to exiting banks show a 20% reduction in FHA lending in heavily exposed areas. This reduction was not associated with improved underwriting standards or lower default rates. Large banks' FHA exit has significantly reduced low-income households' overall access to mortgage credit.

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1. Introduction

Homeownership is viewed by many economists and policymakers as an important pathway to wealth accumulation and upward social mobility.[1] The Federal Housing Administration (FHA), which was created by the U.S. Congress in 1934 to stabilize the mortgage market during the Great Depression, plays a key role in providing access to homeownership for households with limited financial means. The FHA offers borrower-paid mortgage insurance that shields lenders from credit losses and facilitates the origination of high loan-to-value (LTV) single-family loans. As a result, the program is an important source of mortgage credit for first-time and lower-income homebuyers (HUD (2023)).

FHA lending was muted during the 2000s housing boom due to restrictive loan size limits and more relaxed underwriting standards for privately securitized subprime mortgages (Frame et al. (2021)). The subsequent housing bust resulted in tighter underwriting for conventional mortgages and an increase in the share of FHA lending.[2] But in the decade following, the FHA share receded.

At the same time, there was a significant decline in overall lending to low-income households, as presented in Figure 1. Panel A shows that the share of all home purchase mortgages going to low-income borrowers decreased from roughly 11% in 2009 to only 6% in 2017, with nearly all of this decrease coming from a contraction in FHA lending.[3] Panel B breaks out the low-income mortgage share by lender type over the same period and shows that the decline was driven by large banks.[4]

[Insert Figure 1 Here]

[1] See for example, Goodman and Mayer (2018) and references therein. For recent causal evidence that homeownership leads to wealth accumulation, improves consumption smoothing, and increases social mobility, see Sodini et al. (2023).

[2] Conventional mortgages refer to all loans that are not insured explicitly by the U.S. government.

[3] The U.S. Department of Housing and Urban Development (HUD) defines low-income borrowers as those with incomes below 50% of the FFIEC median family income in their county (HUD's Public Housing Program). This threshold corresponds to roughly the bottom third of the household income distribution based on Census data.

[4] Large banks are defined throughout as those among the top five percent of FHA home purchase lending volume in 2010.

While the retreat of large banks and the rise of shadow banks in the FHA market has been documented (Bhutta et al. (2017)), the reasons behind the shift have yet to be firmly established, and the broader effects on borrowers are unexplored. In this paper, we show how a wave of litigation brought by the federal government against large FHA lenders starting in 2012 played a significant role in this transition. Specifically, we focus on the role of lawsuits brought by the U.S. Department of Justice (DOJ) under the False Claims Act for alleged fraud in the origination of FHA mortgages. The DOJ contended that fraud resulted in the FHA paying hundreds of millions of dollars in ineligible insurance claims, which contributed to the depletion of its insurance fund.[5] The lawsuits ultimately resulted in 31 lenders paying over $5 billion to the federal government.

We begin by documenting the striking fact that nearly all of the DOJ lawsuits were concentrated among the very largest (top 5%) FHA lenders, most of which were banks.[6] While we cannot directly examine the fraud claims, we do explore whether the targeted institutions were more likely to originate FHA home purchase mortgages that defaulted within 1–3 years of origination. We find no evidence of differences in default rates either unconditionally or in a regression setting with granular controls for borrower and loan characteristics. This casts some doubt on claims of material taxpayer harm from the alleged fraud at targeted lenders, since the basis would be losses suffered by the FHA on defaulted loans.

Next, we examine how the lawsuits affected FHA home purchase lending activity using a difference-in-differences design at the lender-county-year level. We define litigated mortgage lenders and their peers (i.e., those in the top 5% of FHA origination volume in 2010) as treated because of the potential sobering effect of punishment on unpunished peers (D'Acunto et al. (2023)). We then compare the mortgage origination activity of treated FHA lenders to others, before and after the 2012 increase in DOJ litigation. Our empirical speci-

[5] At the end of fiscal year 2012, the FHA's Mutual Mortgage Insurance Fund had net worth of −$13.4 billion for the single-family mortgage insurance program (U.S. Department of Housing and Urban Development Annual Report to Congress Fiscal Year 2012 Financial Status FHA Mutual Mortgage Insurance Fund).

[6] We use the term "banks" throughout as shorthand to capture all depository institutions and any mortgage banking affiliates operating within a bank holding company structure. We use the terms "non-bank" and "shadow bank" interchangeably to refer to non-depository, independent mortgage companies.

fication includes county-year and lender fixed effects to account for changes in demographics and local economic conditions, as well as unobserved lender heterogeneity. The results show that the largest bank lenders, which are diversified institutions with franchise value at risk, reduced their FHA home purchase lending by more than 75%, while the largest shadow banks did not substantially reduce their lending. An additional triple-differences empirical design that accounts for broader trends in the mortgage market using conventional home purchase originations confirms these findings.

Although striking, the net impact of the retreat of the largest FHA bank lenders on consumer access to FHA mortgage credit is unclear. On the one hand, these large banks originated nearly 40 percent of FHA home purchase loans prior to 2012. On the other hand, this market is highly competitive and other originators could fill this gap. To explore this question, we exploit heterogeneity in county exposure to large banks (measured as the 2010 market share of banks in the top 5% of FHA origination volume). We implement difference-in-differences tests at the county-year level to measure changes in aggregate FHA mortgage lending between counties where large banks had high ex ante market shares and counties where these banks had low ex ante market shares.

The key identifying assumption underlying this empirical design is that FHA mortgage lending in counties with high and low exposure to large FHA bank lenders would have trended similarly in the absence of the DOJ's legal actions under the False Claims Act. Some potential violations of the assumption include aggregate trends induced by changes in bank regulation in the post-financial crisis era and the endogeneity of bank branch locations and credit allocation decisions. We present several pieces of evidence supporting the parallel trends assumption. First, we show that the level of FHA home purchase lending in high- and low-exposure counties moved together prior to the legal settlements and only began to diverge in 2012. Second, we estimate a triple-differences model that includes conventional purchase mortgages and show that our findings are not driven by differing trends in the

broader mortgage market. Finally, we show that variation in county level exposure to large banks is uncorrelated with observable, socio-demographic characteristics of counties.

The results from our baseline difference-in-differences specification suggest that moving from a county with no exposure to large banks to one with only large banks would result in a 19.6% reduction in FHA lending in the 2012-2017 period. Results from the triple-differences specification that controls for broader mortgage market trends are quantitatively similar, which gives us confidence that any other shocks occurring around the beginning of the DOJ litigation activity are not driving our results.

While we document a decrease in access to FHA mortgage credit among high-exposure counties, we do not find evidence of a subsequent improvement in the quality of FHA lending from a credit-risk perspective. First, we do not identify any significant changes in average credit scores or debt-to-income ratios for newly-originated FHA home purchase mortgages. Second, despite the DOJ's stated purpose of the litigation activity to stop mortgage fraud and limit credit losses to protect the FHA's insurance fund, we find similar ex-post default rates in high-exposure versus low-exposure counties.

Although credit standards in the FHA program were largely unaffected by the increased litigation risk, it is possible that consumers benefited from an improvement in loan pricing or the average service quality of lenders after the settlements. However, we find that high-exposure counties not only experienced minimal changes in average mortgage rates, but also experienced a relative decrease in the quality of the representative loan officer (as measured by average loan officer misconduct rates). Our results suggest that small shadow banks with a larger share of loan officers with a history of dubious mortgage lending practices partially filled in the gaps left by the exiting large banks.

In a final set of tests, we show that increased litigation risk contributed to the overall decline in mortgage credit to low-income borrowers during the post-financial crisis period documented in Figure 1. We estimate that moving from a county with no exposure to large banks in the period before the DOJ litigation activity to a county with only large

banks originating FHA loans would result in a 1.1 percentage point reduction in the share of purchase mortgages to low-income households over the 2012–2017 period. This is an economically important effect as it constitutes approximately 11% of the unconditional mean of low-income, county level mortgage origination share. We further show that this decline in mortgage lending was most pronounced in rural and underserved communities where there are fewer lenders to fill the void and mortgage credit is relatively scarce. Taken together, these results suggest that the DOJ litigation activity meaningfully reduced access to mortgage credit for low-income homebuyers.

Our paper makes several contributions to the literature. We contribute to the literature exploring the effects of post-financial crisis regulatory changes on the $14 trillion U.S. mortgage market. DeFusco et al. (2020) show that post-crisis constraints on debt-to-income ratios for jumbo mortgages resulted in higher rates and less lending in the jumbo segment of the market. Several studies also document how the share of mortgages originated by shadow banks increased significantly after the financial crisis and attribute that increase to changes in bank regulation and the emergence of fintech lenders.[7] Fuster et al. (2021) find that institutions subject to oversight by the Consumer Financial Protection Bureau (CFPB) exhibit safer lending and fewer foreclosures. D'Acunto and Rossi (2022) show that the overall number of small and medium-sized mortgages has decreased since the crisis, especially among large lenders, but do not discuss events in the FHA market. We add to this literature by documenting that the litigation-induced exit of large banks from the FHA market is a primary driver of the reduction in mortgage credit to low-income households.

Perhaps the most related and complementary paper to ours is Benson et al. (2024). FHA mortgages are virtually all securitized through Ginnie Mae, although originators or secondary market aggregators act as the actual securities issuers. The authors discuss how the exit of two large FHA bank aggregators led smaller originators to shift towards using nonbank

[7]See, for example, Buchak et al. (2018), Gete and Reher (2021), Kim et al. (2022), and Begley and Srinivasan (2022). For more work on the FHA mortgage market, see DeFusco and Mondragon (2020) and Gao et al. (2023).

aggregators. While the exit of these aggregators from the securitization market is not the focus of our study, it may help explain why smaller FHA lenders were unable to completely fill in the void left by large banks exiting the origination market.

We also contribute to the literature on mortgage fraud, which is widely considered to be one of the main causes of the 2008 financial crisis. Studies have documented evidence of fraud related to misrepresentations of borrower income (Jiang et al. (2014); Ambrose et al. (2016); Mian and Sufi (2017)), borrower assets (Garmaise (2015)), home appraisals (Ben-David (2011); Griffin and Maturana (2016)), and second liens and owner-occupancy status (Piskorski et al. (2015); Griffin and Maturana (2016)). See Griffin (2021) for a review. We add to this literature by exploring how the post-crisis government response to fraud reshaped low-income mortgage lending.

Although fines are generally thought to be an efficient form of punishment (Becker (1968)), we document that in this case the penalties and litigation risk were sufficiently large that they drove firms out of the market leading to societal costs in the form of a reduction in the quantity and quality of services available to consumers. Moreover, low-income homebuyers, who disproportionately rely on FHA mortgages, bore a disproportionate share of the cost. This highlights an unintended consequence of the legal settlements.

The remainder of the paper is organized as follows. Section 2 provides background on the FHA mortgage insurance program and the False Claims Act settlements. Section 3 discusses the data. Section 4 examines the effect of the litigation activity on the quantity of FHA lending. Section 5 explores whether the litigation resulted in an improvement in the quality of FHA loans or borrowers' experience. Section 6 studies whether the litigation had implications for overall credit availability to low-income borrowers. Section 7 concludes.

2. The FHA Insurance Program and False Claims Act Litigation

2.1. FHA Mortgage Lending

The Federal Housing Administration, which is part of the U.S. Department of Housing and Urban Development, operates a single-family mortgage insurance program that predominately serves first-time and lower-income homebuyers. The FHA fully guarantees low-downpayment loans (currently 3.5% down) made by participating lenders, in exchange for up-front and ongoing mortgage insurance premiums paid by borrowers. The premium income and insurance expenses are managed within the FHA's Mutual Mortgage Insurance Fund.

The FHA plays a significant role in the U.S. residential mortgage market. Figure 2 Panel A shows the composition of home purchase mortgage originations by loan type (FHA, Conventional, or Other) from 2009 to 2017. During this time, FHA mortgages consistently represented over 20% of the market. Panel B shows the composition by loan type across deciles of borrower income using 2010 originations.[8] For homebuyers with below-median income, FHA loans accounted for over 50% of the market.

[Insert Figure 2 Here]

Given that the FHA serves borrowers with lower income and wealth, it should be no surprise that the loans are riskier. For home purchase mortgages, most borrowers make the minimum downpayment and therefore have a loan-to-value ratio of 96.5%. FHA borrowers typically also have lower credit scores and higher debt-to-income ratios compared to conventional mortgage borrowers. The combination of high leverage and weaker credit profiles translates into higher default rates for FHA mortgages than conventional loans. In fact, elevated default rates for FHA mortgages in the wake of the financial crisis ultimately resulted in the Mutual Mortgage Insurance Fund requiring financial assistance from the U.S. government in 2013.

[8] Income deciles are formed within states based on borrower incomes on originated loans.

Lenders qualified to participate in the FHA's direct endorsement program have the authority to deem mortgages eligible for insurance and close loans without prior FHA approval. These delegated lenders must certify annually and for each loan originated that they comply with all relevant FHA lending guidelines and rules regarding underwriting procedures and quality control plans. Importantly, the Department of Justice asserts that any violation of HUD rules in connection with the submission of a claim for FHA insurance constitutes a false claim, under the False Claims Act of 1863.

2.2. False Claims Act Settlements

The False Claims Act is a federal statute enacted in response to defense contractor fraud during the American Civil War. The law enables the DOJ to pursue a civil penalty of three times the amount of damages plus a fixed penalty of $5,000 to $10,000 per claim against those allegedly defrauding the government.[9] In 2011, the DOJ and HUD filed a lawsuit against Deutsche Bank for False Claims Act violations. In this case, HUD analyzed 21 loans involving FHA claims and found defects, leading to a landmark settlement in 2012 of over $200 million.[10] This marked the beginning of a series of investigations targeting mortgage lenders for allegedly originating loans that were not fully FHA-compliant and submitting them for insurance coverage and guarantees. Internet Appendix Section A.1 presents examples of fraud allegations made by the DOJ.

To identify lenders that were litigated, audited, or investigated by the DOJ for alleged fraudulent activity in the FHA mortgage market between 2006 and 2021, we implement a thorough search across several sources including the DOJ News Archive, Nexis Uni, and Google search. Internet Appendix Section A.2 provides a description of this search process. Table 1 presents a list of lenders that settled with the DOJ/HUD following FHA-related investigations and lawsuits brought under the False Claims Act. Our search identified 31 targeted lenders, with settlements totaling roughly $5 billion.

[9] See 31 U.S. Code § 3729.
[10] See also the Memorandum on Deutsche Bank Settlement.

[Insert Table 1 Here]

Figure 3 displays the number (Panel A) and total dollar amount (Panel B) of False Claims Act settlements for FHA mortgage lenders each year. The figures show that settlements were infrequent and minor before increasing significantly in 2012 and remaining elevated through 2017.

[Insert Figure 3 Here]

We next examine which lenders were targeted and uncover a striking pattern. Figure 4 Panel A sorts lenders into 20 quantile bins based on their FHA lending volume in 2010 and tabulates the number of lenders with DOJ settlements in each bin. We find that nearly all of the settlements were concentrated among the top 5% largest FHA lenders.

Given that the stated goal of the DOJ/HUD for using the False Claims Act was to reduce fraud and costly defaults on FHA loans, we might expect the targeted lenders to have originated particularly poorly performing FHA mortgages in prior years. Figure 4 Panel B plots the average early default rate on FHA loans from 2004-2010 for lenders in each of the 20 size bins.[11] The figure shows that the top 5% largest lenders are not an outlier.

[Insert Figure 4 Here]

We formalize this test in Table 2 by estimating loan level regressions that control for borrower and loan characteristics as well as county and year fixed effects.[12] The results in columns 1–3 show that litigated lenders, the largest (top 5%) lenders, and bank lenders actually had *lower* early default rates on their FHA loans originated from 2004 through 2010

[11] These results are based on administrative data on FHA loans which we discuss in Section 3 below. We define early defaults as loans that become 90 days delinquent within two years of origination. We find similar results using either one-year or three-year windows.

[12] The control variables are narrow bins for FICO scores, DTI ratios, and LTV ratios, the natural logs of income and loan amount, and indicators for first-time homebuyers, female borrowers, and minority borrowers. Appendix Table A.1 provides variable definitions.

as compared to other lenders. Column 4 combines the specifications and finds the strongest evidence for lower default rates at bank lenders.

[Insert Table 2 Here]

Although we document here that litigation activity is uncorrelated with (or negatively correlated with) the frequency with which lenders made "bad loans" in prior years, we note that early defaults are not a direct measure of fraud. The DOJ may also have considered additional factors, such as the fixed costs of investigations relative to the potential settlement amount, when selecting lenders.

2.3. Industry Response to the False Claims Act Litigation

The use of the False Claims Act in the FHA mortgage market has raised concerns about the litigation risk imposed on participating lenders. Concerns appear to stem from (1) the lack of clarity on what constitutes a material error or false claim, and (2) the extrapolation from defect rates in small samples of inspected loans when calculating the lender's total liability. Lenders argue that these factors and the treble damages component of the False Claims Act increase their uncertainty and can make settlements financially devastating. For example, after JPMorgan Chase's $614 million settlement, CEO Jamie Dimon said in a letter to shareholders that the settlement "wiped out a decade of FHA profitability," making such lending "risky and cost prohibitive for many banks."[13]

Some lawmakers also argued that the use of the False Claims Act in these cases is excessive. In a 2017 House Financial Services Committee hearing, Representative Lee Zeldin (NY) noted the "improper use of the False Claims Act to impose outrageous penalties against lenders' immaterial defects" and that "many lenders have left the FHA program, and those that have stayed in the program [became] more costly for the borrowers who can least afford it." In 2019, the DOJ and HUD signed an inter-agency memorandum to clarify that

[13]See JPMorgan Chase & Co. Chairman & CEO Letter to Shareholders (April 4, 2017).

going forward, FHA requirements would be enforced primarily through HUD's administrative proceedings rather than being pursued under the False Claims Act. In the rest of the paper, we study how the wave of litigation activity impacted FHA mortgage lending activity and lending to low-income households more broadly.

3. Data

We use three primary data sources to conduct our empirical analysis. First, we collect data on all types of residential mortgage loans from the public version of the Home Mortgage Disclosure Act (HMDA) database. Second, we use administrative data for the population of FHA-insured mortgages and their performance provided by the U.S. Department of Housing and Urban Development. Third, we construct a national database of mortgage loan officers originating FHA loans using information from the Nationwide Mortgage Licensing System (NMLS).[14] In addition to these sources, we incorporate data on county-year level economic conditions and demographics from the U.S. Census Bureau's American Community Survey, the Federal Housing Finance Agency, and the Bureau of Labor Statistics.

3.1. HMDA Data

The Home Mortgage Disclosure Act requires nearly all mortgage lenders to report comprehensive information on the loan applications they receive, including whether they accept/reject the application and ultimately originate the loan. Only lenders that are very small or operate exclusively in rural areas are exempt from HMDA reporting.[15] Therefore, the HMDA database is a near-comprehensive source of data on mortgage applications and originations in the United States and covers roughly 95% of all loans (Avery et al. (2017)).

[14]For detailed descriptions of these data see Huang et al. (2023a) and Huang et al. (2023b).

[15]As of 2019, any depository institution must report to the HMDA database if it has: (i) at least one branch or office in a metropolitan statistical area (MSA), (ii) at least $46 million in assets, and (iii) originated at least 25 mortgages in each of the previous two years. Non-depository institutions must report data if they have a branch/office in an MSA (or receive at least five applications from MSAs) and originated at least 25 mortgages in each of the previous two years. See A Guide to HMDA Reporting.

The data include borrower income, race, ethnicity, loan size, loan purpose (purchase, refinance, or home improvement), loan type (FHA, conventional, or other government insurance program), and property location. We use data from 2009 to 2017 to study local lending activity in the FHA mortgage market, in the conventional mortgage market (for comparison), and to low-income households across all mortgage types.

3.2. FHA Administrative Data

We use administrative data on the population of FHA-insured single-family mortgage originations from 2004 to 2017. These data were provided to the Federal Reserve Banks of Atlanta and Dallas by HUD. The data are comprehensive and include mortgage loan terms and standard underwriting variables (e.g., credit score, loan-to-value ratio, debt-to-income ratio) that are not available in the public HMDA data. The data also contain information on loan performance through September 2019. We use these administrative data to explore underwriting standards and default risk in the FHA mortgage market.

3.3. NMLS Loan Officer Data

The Secure and Fair Enforcement for Mortgage Licensing Act of 2008 (SAFE Act) requires all residential mortgage loan originators ("loan officers") to be either state-licensed or federally registered and recorded in the Nationwide Mortgage Licensing System.[16] We obtain access to data from NMLS Consumer Access^{SM} through an agreement with the State Regulatory Registry, which is a subsidiary of the Conference of State Bank Supervisors.[17] The dataset contains historical snapshots of loan officer files, including information on licenses, registrations, and other filings as of the end of each calendar year from 2012 to 2017. Importantly, the CFPB's Regulation G requires loan officers to disclose information about disciplinary,

[16]Loan officers working for federally insured depository institutions or their subsidiaries must be federally registered, while loan officers at non-bank mortgage companies must be state licensed.The NMLS was created in 2008 by the Conference of State Bank Supervisors (CSBS) and the American Association of Residential Mortgage Regulators (AARMR), see https://nationwidelicensingsystem.org.

[17]For additional information on NMLS Consumer Access^{SM}, see https://nmlsconsumeraccess.org.

enforcement, and other actions taken against them.[18] We use this loan officer misconduct information to measure FHA lender "service quality."

3.4. Summary Statistics

We conduct our main analysis of FHA lending volumes at the lender-county-year and county-year levels using the HMDA data. We subsequently examine underwriting standards and default risk using the loan level FHA administrative data. For each of our analyses, we restrict the sample to first-lien home purchase mortgages on owner-occupied one-to-four family dwellings originated in the 2009–2017 period. We report summary statistics for the HMDA samples here and statistics for the FHA sample in Section 5 immediately preceding the related analyses.

Table 3 presents various summary statistics for the HMDA data aggregated to the lender-county-year level (Panel A) and the county-year level (Panel B). The HMDA data include mortgages from over 9,000 lenders operating in over 3,000 U.S. counties. We also report statistics for county economic conditions and demographics which serve as control variables in our regression analyses.

[Insert Table 3 Here]

The lender-county-year sample summarized in Panel A requires that the lender-county-year contains at least one mortgage application of any type (our broad definition of where lenders are actively operating).[19] On average, lenders receive 3.6 FHA applications and originate 2.5 FHA mortgages in each county they operate in each year. By contrast, these same lenders originate 4.6 conventional mortgages, on average, in each county they operate in each year.

The county-year level statistics in Panel B show that the average county has approximately 404 FHA mortgage applications and 286 FHA originations per year. This corre-

[18] See the CFPB's Communication on Disciplinary Actions for additional information.

[19] The sample also excludes singletons dropped in our tests due to lender or county-year fixed effects.

sponds to 1.6 new FHA loans each year per 1,000 local residents and an FHA loan volume per capita of $235. By contrast, counties average 573 conventional mortgage originations per year, which corresponds to 3.5 loans per 1,000 residents and a conventional loan volume per capita of $644. The key independent variable in our county-year level analysis is *Exposure to Large Banks*, which is the FHA market share of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county. The statistics show that these large bank lenders had an average FHA market share in 2010 of 39% across counties.

4. Effect of Litigation on FHA Lending Volume

This section examines the effect of the False Claims Act litigation wave on FHA mortgage lending volume. We begin by examining trends in FHA market shares by lender type and document a striking exit by large banks. We then conduct tests at the lender-county-year level to formalize this finding, and to confirm it holds after controlling for broader trends in conventional mortgage lending. Last and most importantly, we test whether the litigation and subsequent exit by large banks had an aggregate effect on FHA mortgage lending in local areas where these banks operated.

4.1. Lender Level Evidence: Large Banks' FHA Exit

We document in Section 2 that the increase in litigation risk fell squarely on the very largest (top 5% in 2010 originations) FHA lenders and that banks paid a large share of the settlement monies. Anecdotal evidence and contemporaneous trade press accounts suggest this may have led large banks to reconsider their participation in the FHA market.

Figure 5 presents trends in FHA market shares. Panel A plots the share of FHA home purchase mortgage originations for three groups of banks: (1) large banks directly targeted in the DOJ litigation, (2) large banks that did not face litigation, and (3) all other banks. The three groups' market shares followed similar trends from 2009 to 2011. Then, large litigated banks significantly reduced their FHA participation in lockstep with the litigation

wave, with their market share dropping from over 30% in 2011 to less than 5% in 2017. Large non-litigated banks also reduced their FHA market share from around 7% in 2011 to around 2% in 2017, consistent with a peer's punishment having a sobering effect (D'Acunto et al. (2023)). Banks not in the top 5% of 2010 FHA volume held steady with market shares around 17% throughout the sample period.

[Insert Figure 5 Here]

Panel B presents a similar FHA market share breakdown for shadow banks. Large litigated shadow banks maintained (or slightly increased) their FHA market share of around 10% over the 2012–2017 period. Large non-litigated shadow banks also maintained their market share of around 16%. Strikingly, smaller shadow banks significantly increased their market share from around 23% in 2011 to just under 50% by 2017. Overall, these patterns represent a significant shift of FHA market share away from large banks toward smaller, monoline shadow banks.

Next, we estimate the effect of the litigation wave on FHA lending by large lenders using a more formal difference-in-differences regression framework. We define treated lenders as those in the top 5% of FHA lending volume (where the settlements were concentrated) based on 2010 originations. We define the post period as 2012 and later, given the first large False Claims Act settlements occurred in 2012.[20] We then estimate the effect on FHA lending using a lender-county-year panel and the following specification:

$$Y_{i,c,t} = \beta \; Top \; 5\% \; Lender_i \times Post_t + \delta_i + \gamma_{c,t} + \varepsilon_{i,c,t}. \tag{1}$$

[20]There were two False Claims Act settlements that occurred before 2012 (see Table 1). Both occurred in 2008 and were relatively small compared to the subsequent wave of settlements. We do not believe that either settlement raised significant concerns among market participants because of the small amounts and the unique nature of the associated DOJ investigations. The National City Mortgage lawsuit was brought over 58 late endorsement loans (loans submitted for insurance coverage more than 60 days from closing) that were more than 30 days past due when they were submitted for FHA insurance coverage. HUD regulations clearly state that late endorsement loans have to be current. The RBC Mortgage Company lawsuit was brought over a mortgage fraud ring that operated in the early-2000s in Rockport and Freeport, IL. The fraud ring included loan officers employed by a subsidiary of RBC (Prism Mortgage) who were convicted on federal charges.

where subscripts i, c, and t represent the lender, county, and year, respectively. The dependent variable, $Y_{i,c,t}$, is the number of FHA home purchase mortgage originations in a given lender-county-year. The key independent variable is the interaction between the indicators *Top 5% Lender* and *Post*. The specification also includes lender and county-year fixed effects denoted by δ_i and $\gamma_{c,t}$, respectively. The inclusion of county-year fixed effects accounts for changes in local economic conditions that may affect loan demand. Standard errors are double-clustered at the lender and county levels.

Table 4 Panel A presents the results. Column 1 shows that during the post period, top 5% lenders' FHA volume declined by an average of 3.55 loans per year in each county where they operated. This effect is economically meaningful, as it corresponds to 46% of the 2010 mean for the top 5% lenders (which is reported at the bottom of Panel A for convenience). In columns 2 and 3, we investigate whether this effect is due to changes in FHA lending among top 5% banks versus top 5% shadow banks. The results confirm the patterns documented in Figure 5: it was large banks that exited the FHA market.

[Insert Table 4 Here]

The county-year fixed effects in these difference-in-differences specifications help mitigate concerns that the results are driven by local demand for FHA loans. Yet, one might still be concerned that the findings represent a broader retreat of large banks from residential mortgage lending, rather than a direct response to litigation risk in the FHA market. To address this concern, we conduct triple differences tests that account for these same lenders' origination activity in the conventional mortgage market.

To conduct the triple differences tests, we construct a lender-county-year-loan type panel that includes two observations for each lender-county-year, one for FHA loan volume and one for conventional loan volume. We then estimate specifications of the form:

$$
\begin{aligned}
Y_{i,c,t,m} = {} & \beta_1 \, Top\ 5\%\ Lender_i \times Post_t \times FHA_m + \beta_2 \, Top\ 5\%\ Lender_i \times Post_t \\
& + \beta_3 \, Top\ 5\%\ Lender_i \times FHA_m + \beta_4 Post_t \times FHA_m + \beta_5 FHA_m \\
& + \delta_i + \gamma_{c,t} + \varepsilon_{i,c,t,m}.
\end{aligned} \tag{2}
$$

where the new subscript m denotes the loan type (FHA versus conventional) and FHA_m is an indicator for the observation corresponding to FHA mortgage lending. $Y_{i,c,t,m}$ is the number of home purchase mortgage originations of the given loan type, and all remaining variables and fixed effects are defined as above. Standard errors are again double-clustered at the lender and county levels.

Table 4 Panel B presents the results. Column 1 shows that FHA lending by the top 5% lenders declined by an average of about 5 loans per year in each county where they operate, relative to their conventional lending. Columns 2 and 3 again provide evidence of a much larger decrease in FHA lending among large banks compared to large shadow banks. Overall, the triple differences results are similar to the difference-in-differences results, providing strong evidence that the exit of large banks is specific to the FHA mortgage market where litigation risk increased sharply.

We conduct four related robustness checks which we report in the Internet Appendix. In Table A.2, we confirm the results are similar if we estimate Poisson regressions to accommodate count-based dependent variables (Cohn et al. (2022)). In Table A.3, we confirm the results are similar if we run the regressions using the natural log of one plus the dollar volume of originations as the outcome variable. In Table A.4, we confirm that the results are similar if we define treated lenders as only those who settled with the DOJ, as opposed to all top 5% lenders (who we contend all faced increased government litigation risk).

Finally, in Section B.1 of the Internet Appendix we estimate a staggered difference-in-differences specification that uses variation in the timing of the False Claims Act settlements across lenders. That is, instead of assuming that the litigation shock occurred in 2012 for all top 5% lenders, we focus on the litigated lenders and assume that the timing of the shock

varies across lenders and corresponds directly to each lender's respective settlement date. An important drawback of this approach is that it assumes the litigation activity only affected those lenders who were explicitly targeted by the DOJ. We believe that the litigation likely had a broader impact on the FHA market, as shown in Figure 5. Nevertheless, Table B.1 shows that the results obtained via a staggered difference-in-differences approach are both qualitatively and quantitatively similar to our baseline results in Table 4.

4.2. County-Year Level Evidence: Aggregate Effects on FHA Lending

Our next set of tests examine the aggregate effect of the DOJ litigation wave on FHA mortgage lending using county-year level data. We exploit the fact that counties exhibit significant variation in their pre-period exposure to the large banks that subsequently exited the FHA market. Our key independent variable, *Exposure*, is the FHA market share of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county. We then test whether counties with greater exposure to the litigation wave (through large banks) experienced a reduction in FHA lending volume. Importantly, these tests estimate the aggregate effects net of any substitution to other (less affected) lenders.

We estimate a difference-in-differences specification of the form:

$$Y_{c,t} = \beta_1 Exposure_c \times Post_t + \beta_2 Controls_{c,t-1} + \delta_c + \gamma_t + \varepsilon_{c,t}. \tag{3}$$

where $Y_{c,t}$ represents various dependent variables we use to measure FHA lending volume at the county-year level. $Controls_{c,t-1}$ represents one period lagged county-year level measures of: county population, median household income, poverty rate, unemployment rate, education levels, minority population share, change in house prices, and average credit scores.[21]

[21] We exclude population from the controls if the outcome variable is a per capita measure. Because the Census Bureau started releasing 5-Year American Community Survey estimates in 2009, we impute the 2008 values using the 2009 values for the Census variables.

δ_c and γ_t are county and year fixed effects, respectively. Standard errors are clustered at the county level.

Table 5 Panel A presents the results using three measures of county-year level FHA home purchase lending: *ln(Volume)* is the natural logarithm of one plus the total dollar volume of FHA originations, *Volume per Capita* is the total dollar volume of FHA originations divided by the population, and *Loans per 1,000* is the total number of FHA originations per 1,000 residents. Column 1 shows that moving from a county with no exposure to large banks to one with only large banks would result in a 19.6% reduction in FHA lending in the post period. Taking into account the variation in the data, this means that a one-standard-deviation increase in *Exposure* leads to a 4% reduction in average aggregate FHA lending volume in a county. Columns 2 and 3 report similar results when we normalize FHA lending in dollar or loan count terms by county population.[22]

[Insert Table 5 Here]

The key identifying assumption in this difference-in-differences approach is that FHA mortgage lending in counties with high versus low *Exposure* would have trended similarly, absent the treatment (i.e., the litigation wave). Although it is not possible to test this assumption directly, we can examine the trends prior to the litigation wave and the dynamics of the effect we document. Therefore, we run a specification similar to Equation (3) above, except we interact the *Exposure* variable with a dummy for each year from 2009 to 2017 (with 2011 as the omitted interaction).

Figure 6 presents the dynamics of the difference-in-differences results. The plots show insignificant point estimates for the interactions between *Exposure* and year dummies during the pre-period, demonstrating that high- and low-*Exposure* counties were trending similarly before the False Claims Act litigation. The interactions then become negative immediately

[22]Our analysis focuses on FHA lending volumes rather than on approval rates for loan applications. This approach is informed by the fact that lenders exiting the FHA market typically did so by no longer taking FHA mortgage applications, rather than by taking and rejecting applications. In fact, Table A.5 shows that *Exposure* had no effect on approval rates in either the FHA or conventional market.

in 2012, coinciding directly with the timing of the first large settlements. The effect of *Exposure* remains persistently negative through 2017, indicating that heavily-affected FHA markets struggled to recover from the exit of the large banks. Overall, the dynamics of the difference-in-differences results are consistent with an effect of the litigation, rather than differing long-term trends in FHA lending across counties.

[Insert Figure 6 Here]

Despite the evidence of parallel trends prior to 2012, one might still be concerned about unobserved local economic trends that could have changed in the post-2012 period in a way that correlates with *Exposure*. We present three pieces of evidence that mitigate such concerns. First, in Figure A.1 in the Internet Appendix, we present a map displaying the variation in *Exposure* across counties. The map shows wide variation throughout the United States rather than clusters of high *Exposure* in certain areas. Second, in Table A.6 we document that *Exposure* is only weakly correlated with county level economic conditions and demographics. This weak correlation is encouraging if we think these county characteristics capture some of the sources of local economic trends. Finally, and most importantly, we conduct triple differences tests that use conventional lending as a counterfactual to address the possibility of a broader retreat of large banks from residential mortgage lending in the aftermath of the financial crisis and to net out any unobserved local trends in mortgage demand.

As a precursor to the triple differences tests, we present the dynamics of difference-in-differences tests similar to those above, except using conventional mortgage lending as the outcome rather than FHA lending. Figure 7 shows that conventional home purchase lending trends were similar in high- and low-*Exposure* counties throughout the sample period. The only exception is a slight upward trend in *Loans per 1,000* in high-*Exposure* counties in the later years of the sample. Of course, to the extent that this reflects increased mortgage demand, it would work against our main difference-in-differences results for FHA lending. Overall, these dynamics are consistent with conventional mortgage lending being relatively

unaffected by the litigation wave (which was specific to FHA loans), and with mortgage demand exhibiting similar trends across high- and low-*Exposure* counties during this period.

[Insert Figure 7 Here]

To conduct our triple differences tests, we construct a county-year-loan type panel. This panel contains two observations for each county-year, one for FHA loan volume and one for conventional loan volume. We then estimate specifications of the form:

$$\begin{aligned} Y_{c,t,m} = {} & \beta_1 Exposure_c \times Post_t \times FHA_m + \beta_2 Exposure_c \times Post_t \\ & + \beta_3 Exposure_c \times FHA_m + \beta_4 Post_t \times FHA_m + \beta_5 FHA_m \\ & + \beta_6 \cdot Controls_{c,t-1} + \delta_c + \gamma_t + \varepsilon_{c,t,m}. \end{aligned} \tag{4}$$

where the subscript m denotes the loan type (FHA versus conventional) and FHA_m is an indicator for the observation corresponding to FHA mortgage lending. $Y_{c,t,m}$ represents the three dependent variables we use to measure lending activity, and all remaining variables and fixed effects are defined as above. Standard errors are again clustered at the county level.

Table 5 Panel B presents the results. Column 1 shows that moving from a county with no exposure to large banks to one with only large banks would result in a 19.4% reduction in FHA lending in the post period, relative to trends in conventional lending. This triple differences estimate is very similar to the difference-in-differences estimate, and it suggests that a one standard deviation increase in *Exposure* reduces FHA lending by over 4% on average. Columns 2 and 3 report similar results when we use *Volume per Capita* and *Loans per 1,000* as dependent variables.

One concern is that conventional mortgage borrowers may differ from FHA mortgage borrowers in ways that generate different trends in demand, potentially influencing the triple differences test. To address this, we conduct an additional robustness test where we restrict conventional mortgages to those taken out by low-income households (those with incomes

below 50% of the FFIEC median family income in their county). The results, reported in Table A.7 of the Internet Appendix, remain similar to those in Table 5 Panel B.

We also estimate a staggered difference-in-differences version of the specifications in equations (3) and (4), and find similar results. Details of the approach are provided in Section B.1 of the Internet Appendix, with the results displayed in Table B.2. Overall, the findings in this section strongly indicate that the False Claims Act litigation prompted large banks to exit the FHA market, leading to an aggregate reduction in FHA mortgage lending.

5. Effect of the DOJ Litigation on FHA Lending Quality

This section examines the effect of the DOJ's False Claims Act litigation activity on FHA mortgage lending quality. We use administrative loan level data from the FHA to assess three aspects of lending quality. First, we explore whether the litigation wave led to changes in FHA lenders' underwriting standards in terms of credit scores and debt-to-income (DTI) ratios. Second, we test whether the litigation activity improved FHA mortgage performance in terms of default rates. Finally, we examine whether borrowers' experience with FHA lending changed in terms of mortgage pricing or exposure to loan officers with records of past misconduct.

5.1. Effect on Underwriting Standards

Table 6 presents summary statistics for FHA mortgages originated from 2009 to 2017 using the loan level administrative data. Like the prior analyses, we restrict the sample to first-lien, home purchase mortgages on owner-occupied, one-to-four family dwellings. Panel A reports statistics for the full sample and Panel B reports statistics for large banks, small banks, and shadow banks separately. The statistics in Panel A show that the average FICO credit score is 690, the average loan-to-value (LTV) ratio is 95.4%, the average DTI ratio is 41%, and that 80% of borrowers are first-time homebuyers. The statistics in Panel B indicate that the three groups of FHA lenders generally serve similar borrowers.

[Insert Table 6 Here]

Our first piece of analysis using these data examines the effect of the litigation wave on FHA underwriting standards. We focus on two key underwriting variables, FICO scores and DTI ratios, which represent dimensions along which lenders could tighten credit standards to reduce the likelihood of borrower defaults and subsequent regulatory scrutiny. We conduct these tests by running difference-in-differences specifications similar to those above, except we use loan level rather than county-year level data.

Table 7 presents the results. In Panel A, the dependent variables are measures of borrower credit scores. Column 1 shows that average borrower FICO scores on FHA mortgages did not change significantly in high- relative to low-*Exposure* counties following the litigation wave. Column 2 reports similar non-results, as there was also no change in the likelihood of FHA loans having borrower FICO scores below 620 in high- versus low-*Exposure* counties.[23]

The tests in Panel B examine whether lenders tightened their underwriting criteria along the dimension of DTI ratios. The results in column 1 show no significant change in the average DTI ratios of FHA borrowers in high- relative to low-*Exposure* counties following the litigation activity. Column 2 presents similar non-results when examining the likelihood of FHA borrowers having particularly high DTI ratios of over 50%. Overall, the evidence in Table 7 suggests that the False Claims Act litigation wave had no discernible effect on FHA lenders' underwriting standards.

[Insert Table 7 Here]

5.2. Effect on Default Risk

The literature has used early defaults as a measure of poor mortgage underwriting practices and an indicator of potential fraud. Our next difference-in-differences tests evaluate whether

[23]The literature has identified a FICO score of 620 as an important threshold below which it is difficult to obtain a conventional loan (Keys et al. (2010) and Bubb and Kaufman (2014)).

the False Claims Act litigation activity led to a reduction in FHA mortgage defaults during the first 1–3 years after loan origination.

Table 8 presents the results. In columns 1 and 2, the dependent variable is an indicator for the loan becoming 90 days or more delinquent within 12 months of origination. Column 1 shows the results when the specification includes county and year fixed effects but no controls for underwriting variables. The coefficient associated with the *Exposure* × *Post* interaction term is statistically insignificant, indicating no effect of the litigation wave on FHA early default risk. Column 2 documents a similar non-result after conditioning on underwriting variables. Columns 3–6 report similar results using 24- or 36-month horizons post-origination to define early defaults. In sum, we find no evidence that the False Claims Act litigation activity resulted in lower FHA default rates.

[Insert Table 8 Here]

5.3. Effect on Loan Pricing and Service Quality

We next explore whether the False Claims Act litigation wave and the ensuing shift in the FHA mortgage market away from large banks toward shadow banks resulted in any change in mortgage pricing or service quality. We again employ a difference-in-differences approach.

Table 9 presents the results. In Panel A, we examine variation in the interest rates on FHA home purchase mortgages, after controlling for underwriting variables as well as county and year fixed effects. The results in column 1 show that for the full loan level sample, we find a statistically insignificant effect of *Exposure* × *Post* on average interest rates. In columns 2 and 3, we split the sample into loans originated in high- versus low-competition counties.[24] We find no statistically significant effect of *Exposure* on FHA loan pricing in high-competition counties in column 2. However, in column 3, we find that *Exposure* leads to a slight increase in interest rates in less competitive lending environments, where moving

[24]We define low-competition counties as those in the bottom tercile in terms of the number of non-treated (i.e., not top five percent) FHA lenders operating in the county in 2010. All other counties are defined as high-competition.

from a county with no exposure to large banks to one with only large banks corresponds to a 6 basis point increase in rates.

[Insert Table 9 Here]

We next test whether the change in the composition of FHA lenders impacted the quality of the representative loan officer serving FHA borrowers. We proxy for the quality of the representative FHA loan officer serving a county by taking the weighted average across lenders, of the fraction of their loan officers with misconduct records, where weights are lenders' FHA market share in the county-year. Loan officer misconduct rates are based on NMLS data, which starts in 2012. Therefore, we construct two measures of the representative loan officer's quality. *Misconduct Rate 2012-2017, (%)* takes into account misconduct records appearing in NMLS any time between 2012 and 2017. *Misconduct Rate 2012, (%)* takes into account only misconduct records that were already in the NMLS in 2012. Given the backward-looking nature of misconduct reporting, this measure likely proxies for misconduct rates during the pre-litigation period.

Table 9 Panel B reports these county-year level tests. The results in column 1 show that the quality of the representative loan officer serving FHA borrowers decreased (misconduct rates increased) in counties with high *Exposure* to large banks' exit. Taking into account the variation in the data, the point estimate implies that a one-standard-deviation increase in *Exposure* corresponds to a 2.5 basis point increase in misconduct rates in the post period (roughly 10% of the unconditional mean).[25] The test in column 2 shows that this result holds if we fix misconduct rates as of 2012 or earlier. In other words, in the local markets most affected by the increase in litigation activity, local FHA borrowers now interact with loan officers who had *higher* pre-litigation-period misconduct rates.

[25]The misconduct events in the NMLS data are typically instances where regulatory or legal action was taken against a loan officer. These events are rare, but represent breaches of laws or regulations. The events range from court cases or investigations where loan officers are found to have misled clients, to smaller licensing violations, such as the failure to complete continuing education requirements.

6. Effect of the DOJ Litigation on Total Credit to Low-Income Households

In the decade following the 2008 Financial Crisis, there was a significant shift in the mortgage credit distribution away from smaller loans toward larger loans (D'Acunto and Rossi (2022)), accompanied by a decrease in lending to low-income borrowers (Bhutta et al. (2017)). Our analysis reveals a parallel decline in FHA lending, which is an important source of mortgage credit for low-income households. This raises the question of whether the increase in FHA litigation risk contributed to the overall decline in mortgage credit available to low-income households.

We follow HUD and define low-income households as those having an income below 50% of the FFIEC median family income in the county. We then examine the total share of mortgage credit (across FHA, conventional, and all other loan types) going to these borrowers in terms of the number of loans and their total dollar volume. Our tests then estimate the effect of *Exposure* to large banks' FHA exit on low-income mortgage shares and explore cross-sectional variation in the effect.

Table 10 presents the results. In columns 1–3, the dependent variable is the low-income loan share. Column 1 reports the baseline difference-in-differences specification. The results show that moving from a county with no exposure to large banks to one with only large banks would result in a 1.2 percentage point reduction in the share of mortgages to low-income households in the post period (roughly 11% of the unconditional mean). Columns 2 and 3 explore the cross-sectional variation in this effect by interacting it with indicators for the county being "rural or underserved" according to the CFPB, or for having a high (top tercile) minority population share, respectively.[26] Column 2 shows that the effect of

[26]Regulation Z states that an area is "underserved" during a calendar year if, according to HMDA data for the preceding calendar year, it is a county in which no more than two creditors extended covered transactions, as defined in Regulation Z, secured by first liens on properties in the county five or more times (see https://www.consumerfinance.gov/rules-policy/final-rules/truth-lending-regulation-z-underserved-areas-home-mortgage-disclosure-act-data/).

Exposure is strongest in rural areas, where there are likely fewer lenders to fill the void when large banks retreated from the FHA market. Column 3 shows no significant difference in the effect of *Exposure* based on local demographics (high minority share). Columns 4–6 show a similar set of results using the low-income share of mortgage dollar volume as the dependent variable.

[Insert Table 10 Here]

Overall, the evidence in Table 10 suggests that the False Claims Act litigation wave and large banks' subsequent retreat from the FHA market had a significant impact on low-income households' total access to mortgage credit. This effect was most pronounced in rural and underserved areas, and played an important role in reshaping low-income mortgage lending in the U.S. in the decade following the financial crisis.

7. Conclusion

Beginning in 2012, the DOJ brought lawsuits under the False Claims Act against many large financial institutions for alleged fraud in the origination of FHA mortgages. This litigation activity resulted in 31 large FHA lenders paying over $5 billion in settlements to the federal government, although we find no evidence that targeted FHA lenders had higher default rates on their loans than peer firms.

We document that this wave of litigation resulted in a striking retreat of large banks with franchise value at risk from the FHA mortgage insurance program. We then show that in local areas most exposed to large banks' exit, total FHA lending volume decreased significantly. However, we find no evidence of an improvement in underwriting standards or a reduction in default risk for FHA loans. Small shadow banks, who had higher loan officer misconduct rates prior to the litigation wave, partially filled the void left by exiting large banks. Importantly, we connect the local exposure to large banks exiting the FHA program

to a broader market-wide decline in mortgage lending to low-income borrowers during the 2010s.

Our findings suggest that fines, while often considered an efficient form of punishment, can still have unintended consequences. In this case, large legal settlements drove large firms out of the market, and ultimately reduced borrowers' access to credit. Our results highlight the importance of considering potential unintended societal costs when disciplining firms.

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Figure 1: Share of Mortgages to Low-Income Borrowers

This figure shows the annual share of all home purchase mortgages that went to low-income borrowers from 2009 to 2017. Low-income borrowers are defined by HUD as those with incomes below 50% of the FFIEC median family income in their county. Panel A presents the low-income share decomposed by loan type: Federal Housing Administration loans, conventional loans, or all others (Veterans Administration, Rural Housing Service, or Farm Service Agency). Panel B presents the low-income share decomposed by lender type: large banks, small banks, or shadow banks.

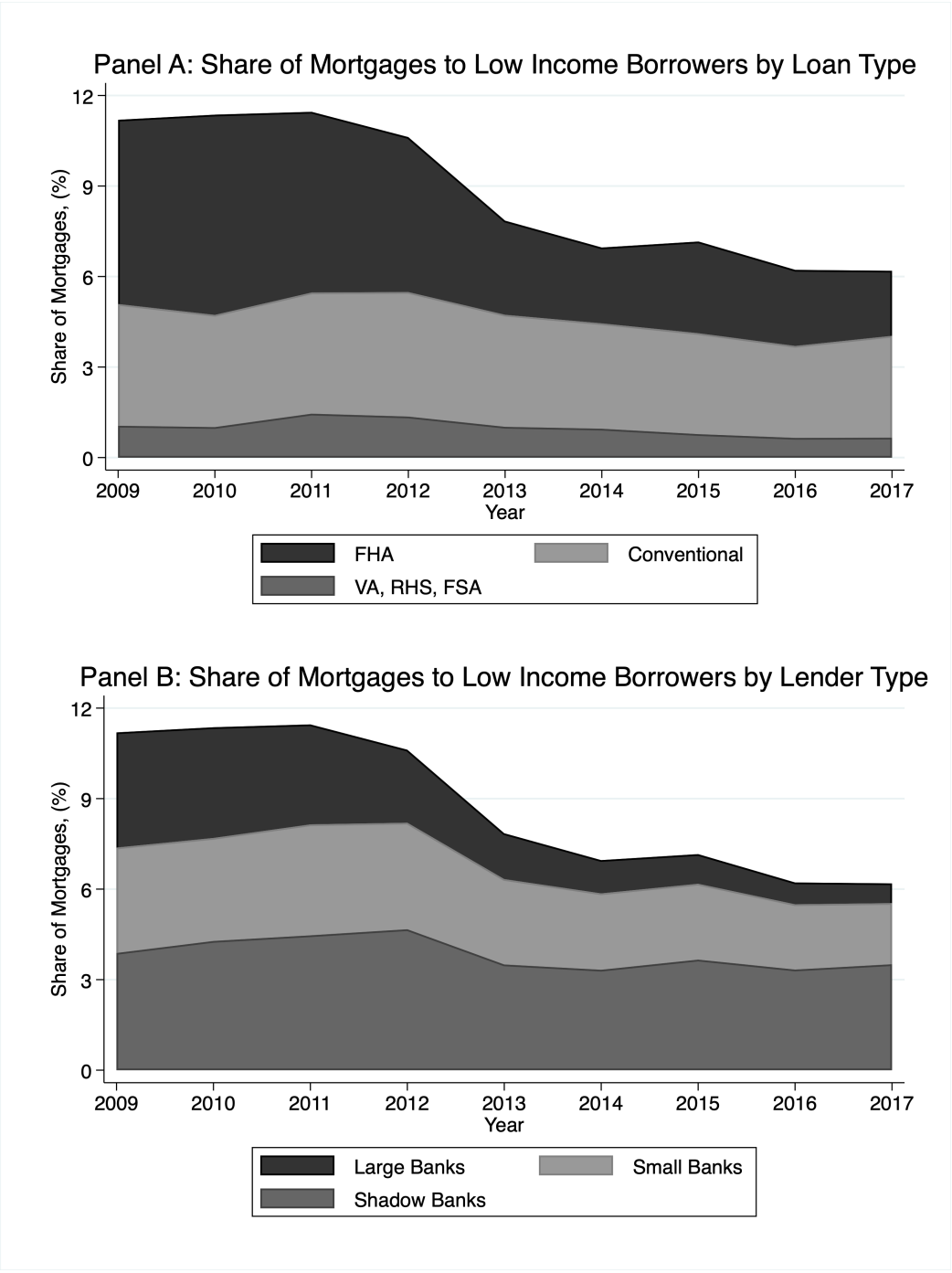


Figure 2: Composition of the U.S. Mortgage Market

This figure shows the composition of the U.S. home purchase mortgage market (by loan type) over time and across borrower income deciles. Panel A presents the share of home purchase mortgages from 2009 to 2017 by loan type: Federal Housing Administration loans, conventional loans, or all others (Veterans Administration, Rural Housing Service, or Farm Service Agency). Panel B presents a similar loan type decomposition across borrower income deciles using 2010 originations. The deciles are formed within states based on borrower incomes on originated loans.

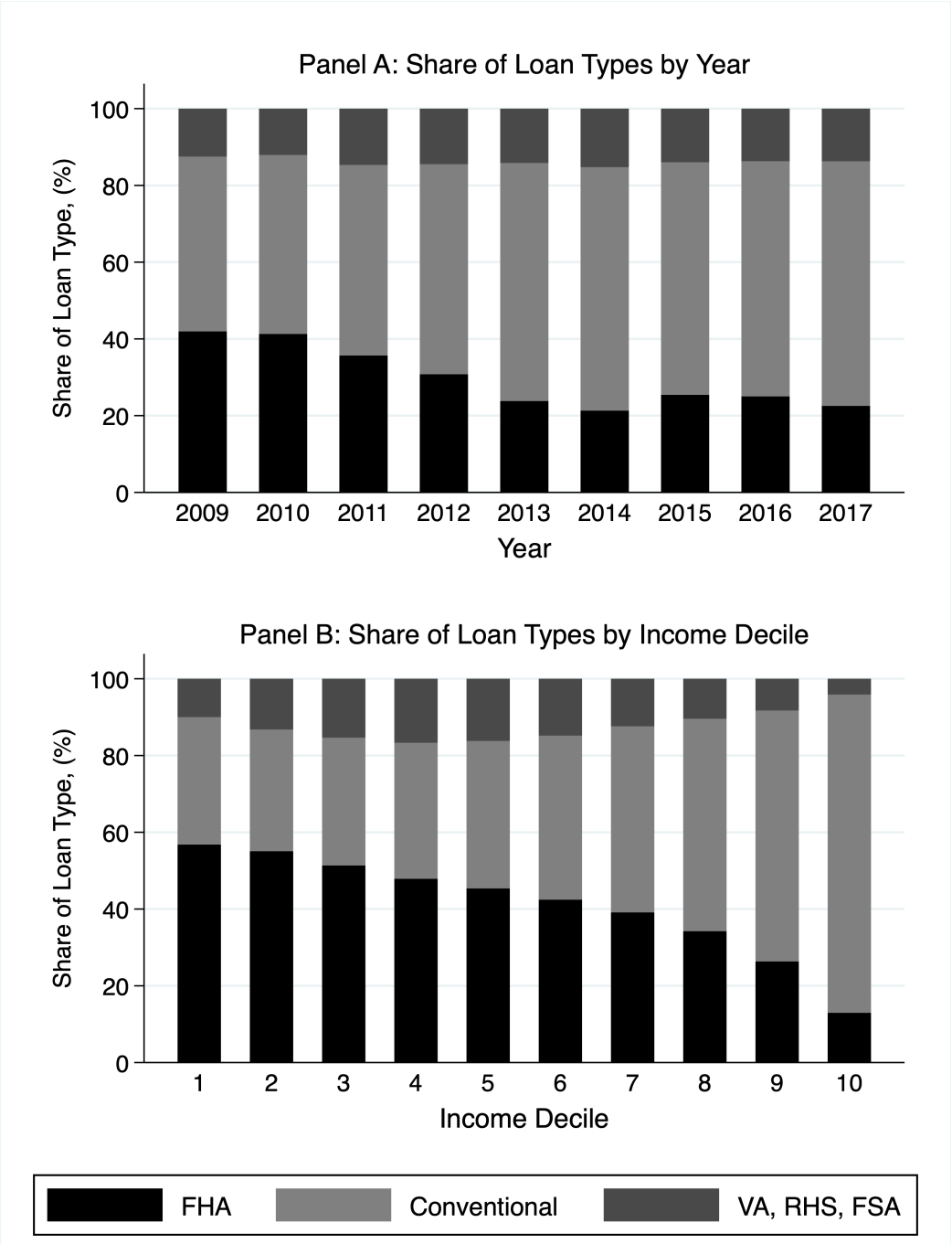


Figure 3: False Claims Act Settlements by Year

This figure describes the settlements resulting from the wave of False Claims Act litigation brought by the Department of Justice and HUD against FHA mortgage lenders. Panel A presents the settlement counts each year from 2008 to 2019. Panel B presents the total settlement amounts (in millions) each year.

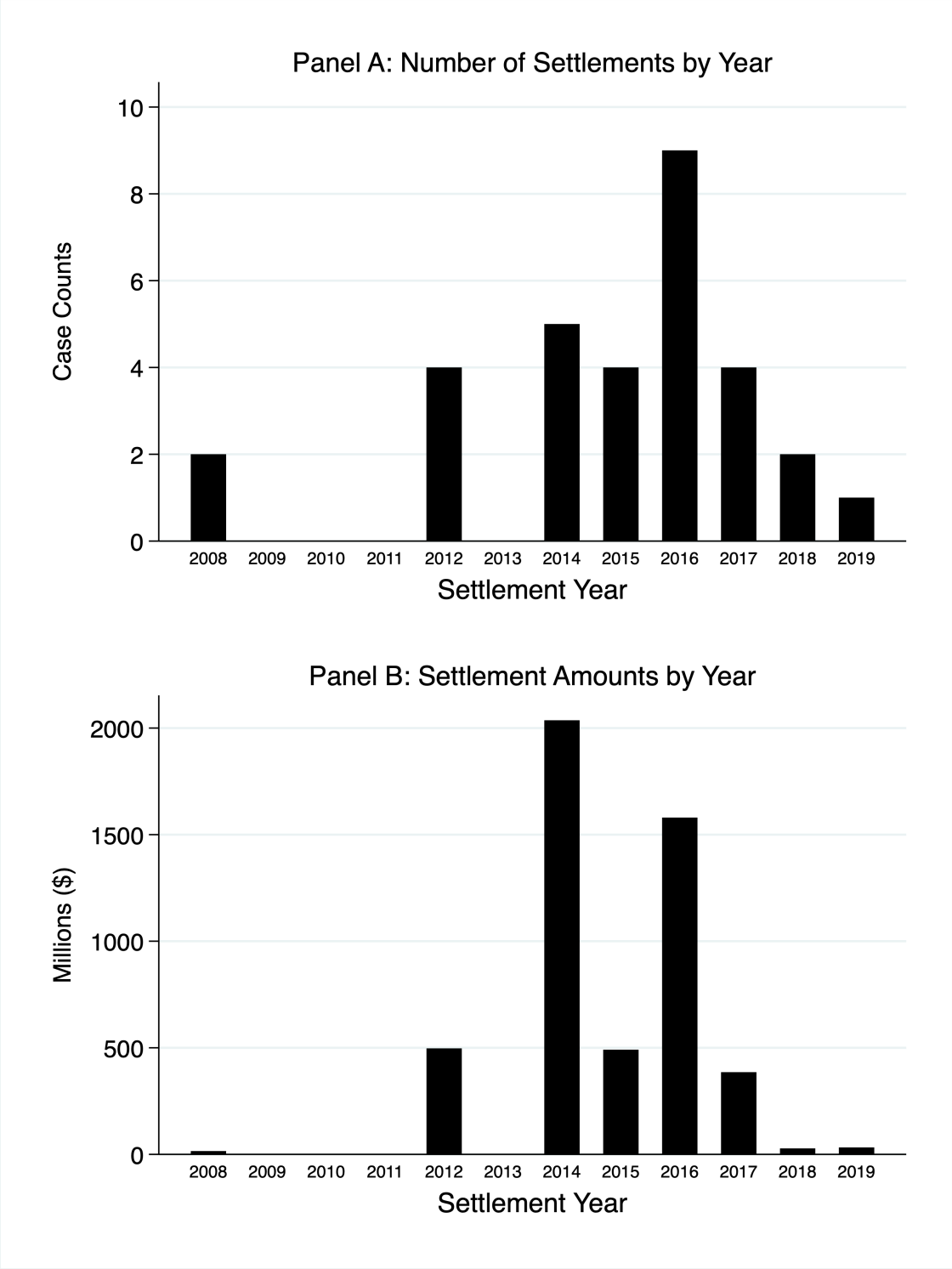


Figure 4: Settlements and Early Default Rates Across FHA Lender Size Bins

This figure describes litigation activity and early default rates on FHA mortgages based on lender size. Panel A presents the number of litigated lenders that settled with the DOJ during 2008-2019, sorted across 20 quantiles based on their FHA lending volume in 2010. The black shading represents banks and the gray shading represents shadow banks. We note that the following litigated lenders were not observed in the 2010 HMDA data: National City Mortgage, MortgageIT, Capmark Financial, and MDR Mortgage. Panel B presents the average early default rates of FHA lenders from 2004 to 2010, sorted across the same 20 quantiles of lender size. Lenders' early default rates are computed as the fraction of loans that became 90 or more days delinquent within two years of origination, based on administrative loan level data from the FHA.

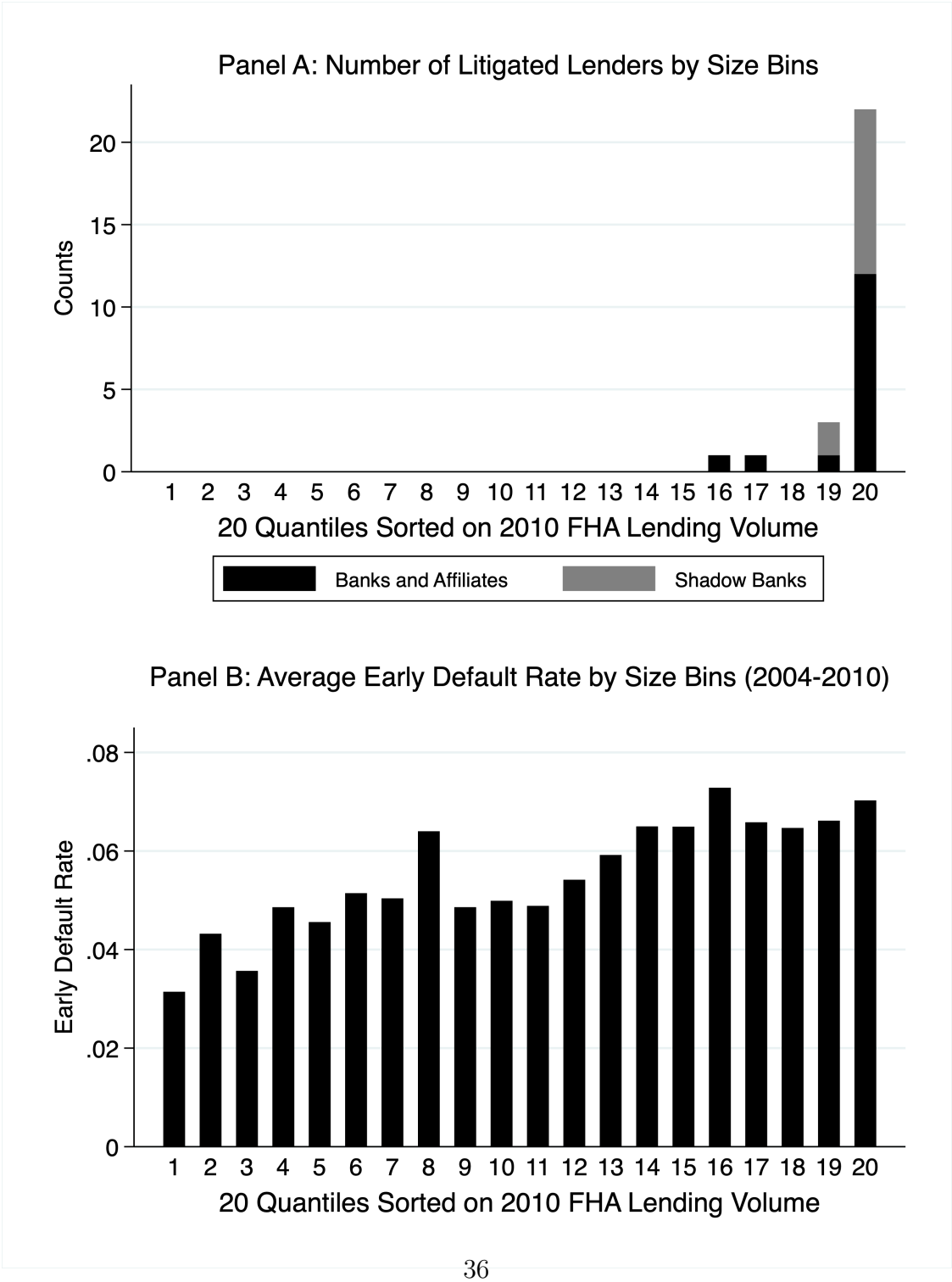


Figure 5: FHA Market Shares by Year

This figure describes the evolution of market shares in the FHA home purchase mortgage market by lender type from 2009 to 2017. We classify lenders into six mutually exclusive groups, based on their status as banks versus shadow banks, and then their status as large litigated lenders versus large non-litigated lenders versus small lenders. Large lenders are those in the top five percent in terms of FHA lending volume in 2010. Panel A presents the market shares for the three groups of banks over time. Panel B presents the same breakdown for shadow banks. In both panels, the vertical red line marks February 2012, the beginning of the wave of large settlements.

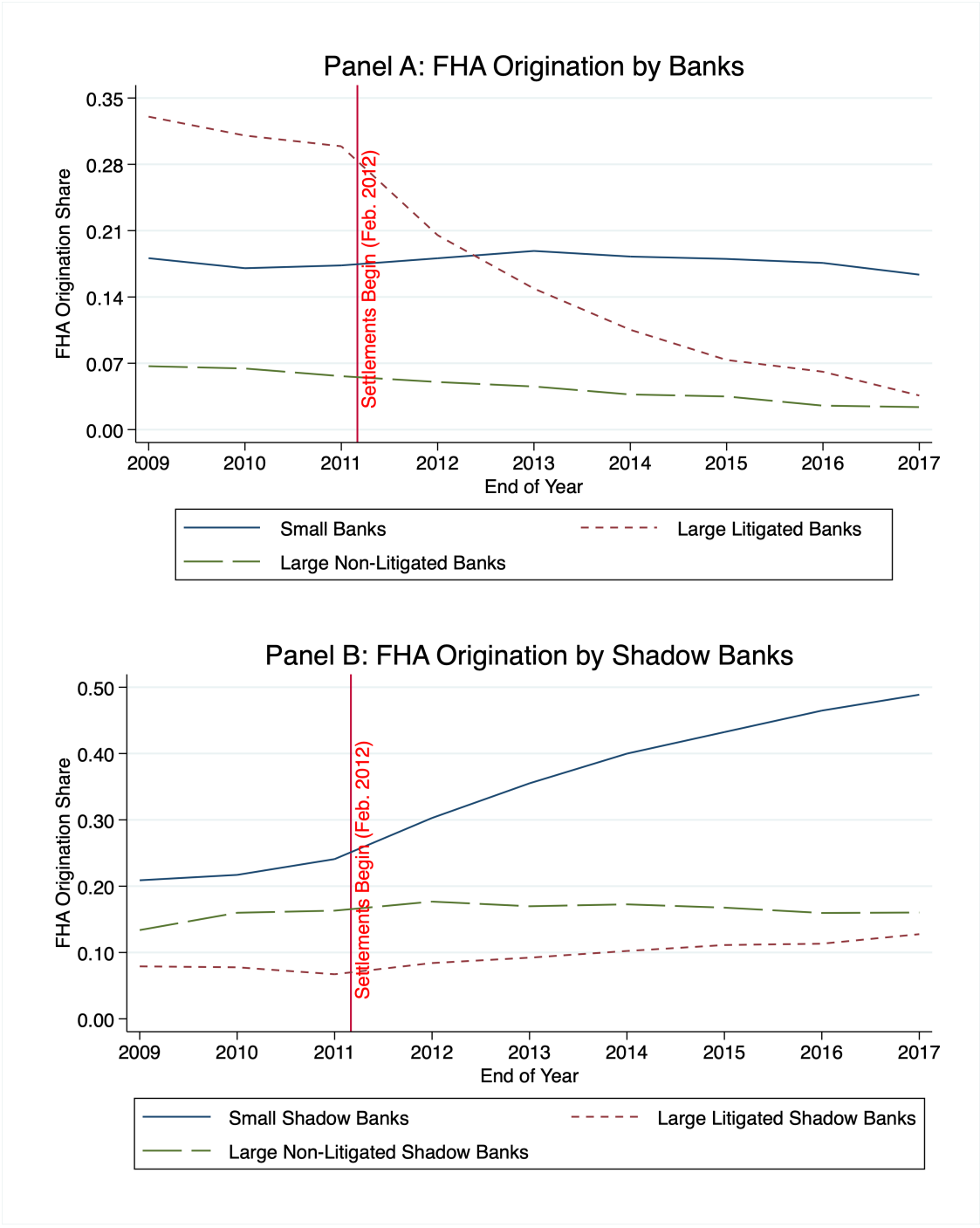


Figure 6: Dynamic Difference-in-Differences Estimates: County-Year Level FHA Mortgages

This figure presents the dynamics of the main difference-in-differences results showing the effect of *Exposure* on FHA lending volume at the county-year level. *Exposure* is defined as the 2010 market share of banks in the top five percent of FHA origination volume. To produce the dynamic estimates, we regress measures of lending volume on the *Exposure* variable interacted with dummies for each year from 2009 to 2017 (with 2011 omitted), as well as the controls and fixed effects outlined in Table 5. Panels A, B, and C plot the estimated effects on FHA lending volume measured in terms of *ln(Volume)*, *Volume per Capita*, and *Loans per 1,000*, respectively. In each panel, the dashed vertical line marks the baseline year (2011) and the point estimates are accompanied by 95% confidence intervals.

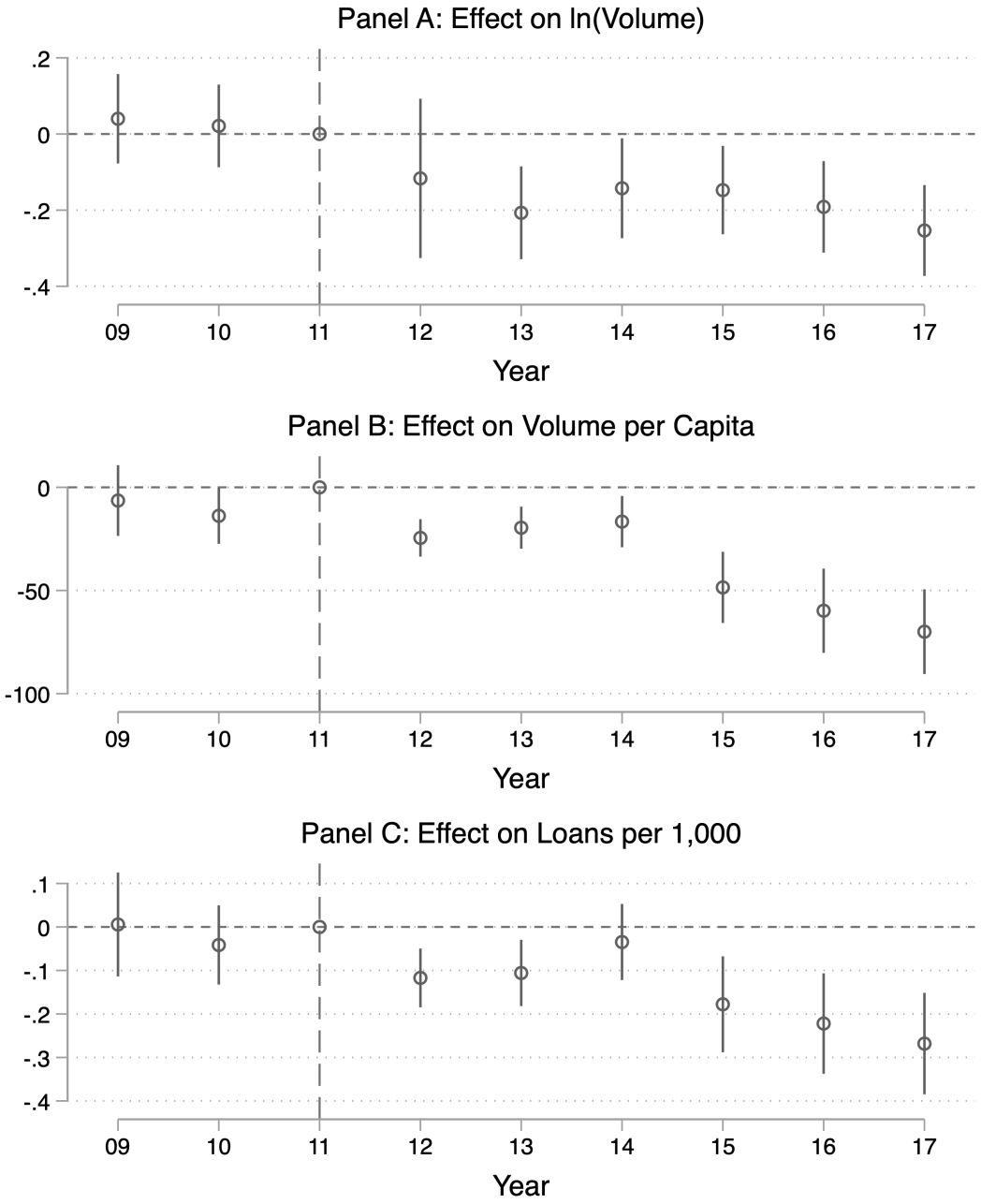


Figure 7: Dynamic Difference-in-Differences Estimates: County-Year Level Conventional Mortgages

This figure presents the dynamics of the (placebo) difference-in-differences results showing the lack of effect of *Exposure* on conventional mortgage lending volume at the county-year level. *Exposure* is defined as the 2010 market share of banks in the top five percent of FHA origination volume. To produce the dynamic estimates, we regress measures of conventional lending volume on the *Exposure* variable interacted with dummies for each year from 2009 to 2017 (with 2011 omitted), as well as the controls and fixed effects outlined in Table 5. Panels A, B, and C plot the estimated effects on conventional lending volume measured in terms of *ln(Volume)*, *Volume per Capita*, and *Loans per 1,000*, respectively. In each panel, the dashed vertical line marks the baseline year (2011) and the point estimates are accompanied by 95% confidence intervals.

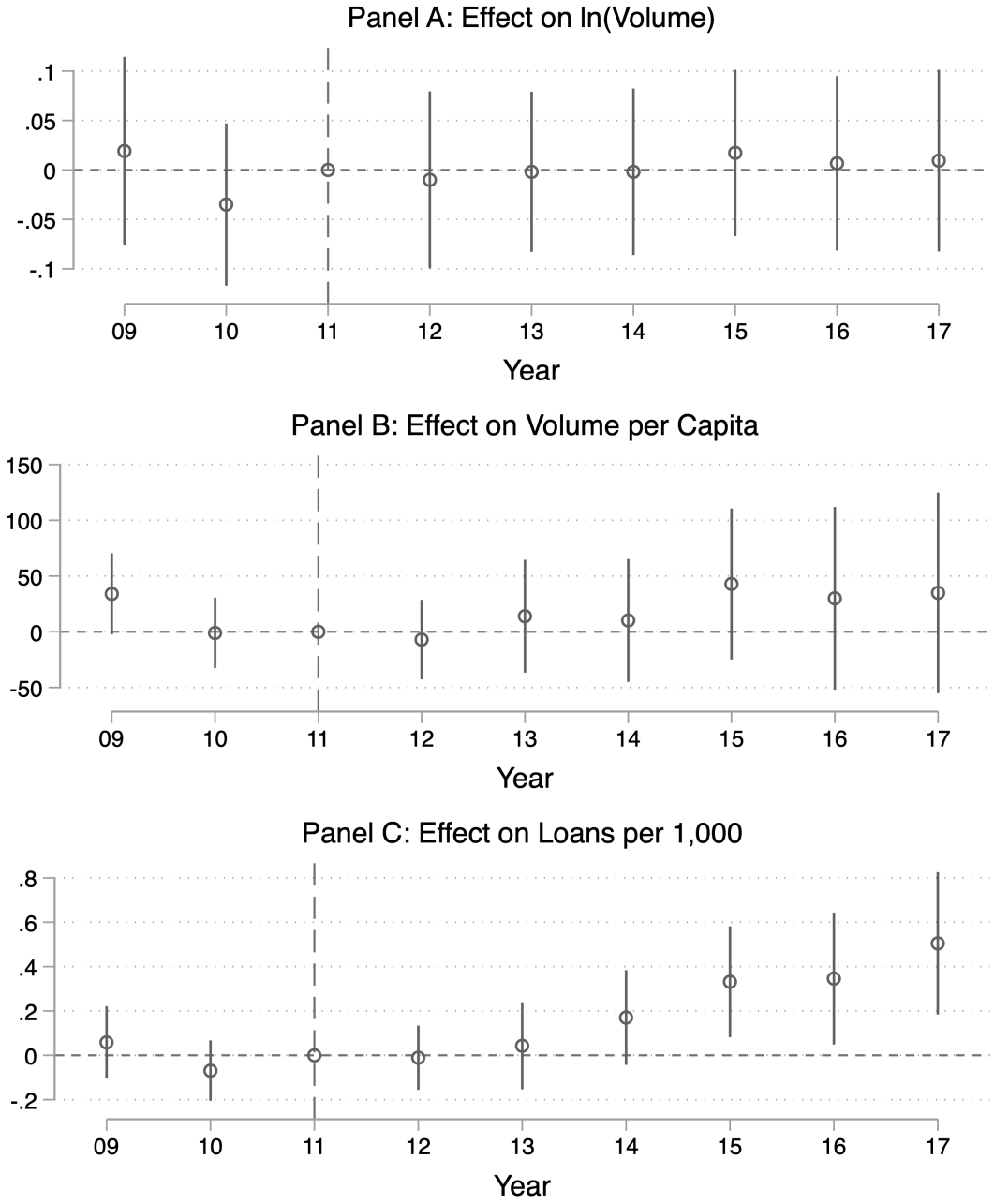


Table 1: List of Litigated FHA Lenders

This table lists the lenders that were litigated by the Department of Justice under the False Claims Act for alleged fraudulent lending activities in the FHA mortgage market. The settlement dates are the month and year in which each lender settled with the DOJ, ranging from 2008 to 2019. The settlement amounts (in millions) are hand-collected from legal documents and DOJ press releases. See Appendix A for further details on the False Claims Act litigation and settlements.

Lender	**Settlement Date**	**Settlement Amount ($M)**
Banks and Bank-Affiliates		
National City Mortgage Inc.	May. 2008	4.6
RBC Mortgage Company	Nov. 2008	10.7
Citimortgage, Inc. (Citibank)	Feb. 2012	158.3
Flagstar Bank	Feb. 2012	132.8
Deutsche Bank (MortgageIT)	May 2012	202.3
JPMorgan Chase	Feb. 2014	614.0
U.S. Bank	Jun. 2014	200.0
SunTrust Mortgage Inc.	Jun. 2014	418.0
Bank of America (Countrywide)	Aug. 2014	800.0
MetLife Home Loans LLC	Feb. 2015	123.5
First Tennessee Bank	Jun. 2015	212.5
Fifth Third Bancorp	Oct. 2015	84.9
Wells Fargo Bank	Apr. 2016	1,200.0
M&T Bank	May 2016	64.0
Regions Bank	Sep. 2016	52.4
BB&TC	Sep. 2016	83.0
IberiaBank	Dec. 2017	11.6
Shadow Banks		
Capmark Financial LLC	Feb. 2012	3.9
John Adams Mortgage Company	Dec. 2014	4.2
Franklin American Mort. Co.	Dec. 2015	70.0
Freedom Mortgage Corp.	Apr. 2016	113.0
Primary Residential Mortgage Inc.	Oct. 2016	5.0
SecurityNational Mort. Co.	Oct. 2016	4.3
MDR Mortgage Corp.	Nov. 2016	10.4
United Shore F.S. LLC	Dec. 2016	48.0
Prospect Mortgage, LLC	Jul. 2017	4.2
PHH	Aug. 2017	74.0
Allied Home Mortgage	Sep. 2017	296.0
Universal American Mort. Co. LLC	Oct. 2018	13.2
Gateway Funding	Dec. 2018	14.5
Quicken Loans	Jun. 2019	32.5

Table 2: Analysis of FHA Mortgage Default Rates Prior to the Litigation Wave

This table presents results from mortgage default regressions for loans made prior to the DOJ lawsuits to explore whether performance varied by whether the lender was: (i) later litigated by the DOJ, (ii) a top 5% lender, and (iii) a bank. The analysis uses the population of Federal Housing Administration (FHA) home purchase loans originated from 2004 to 2010. The dependent variable, *I(Early Default)*, is an indicator for the loan becoming more than 90 days delinquent within 24 months of origination. The key independent variables are indicators for the lender later being litigated by the Department of Justice (*Litigated Lender*), for the lender's FHA volume being in the top five percent of all lenders in 2010 (*Top 5% Lender*), and for the lender being a depository institution (*Bank*). The control variables include narrow bins for FICO scores, DTI ratios, and LTV ratios, the natural logs of income and loan amount, and indicators for first-time homebuyers, female borrowers, and minority borrowers, as well as county fixed effects, and year of origination fixed effects. Standard errors are clustered at the lender and county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	I(Early Default)			
	(1)	(2)	(3)	(4)
Litigated Lender	-0.007***			-0.002
	(0.002)			(0.002)
Top 5% Lender		-0.005***		-0.002
		(0.002)		(0.002)
Bank			-0.011***	-0.010***
			(0.002)	(0.001)
Controls	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.094	0.094	0.094	0.094
# Loans	3,171,158	3,171,158	3,171,158	3,171,158

Table 3: HMDA Summary Statistics

This table presents summary statistics describing FHA and conventional mortgage lending based on Home Mortgage Disclosure Act (HMDA) data. Panel A presents statistics on FHA and conventional mortgage applications and originations aggregated at the lender-county-year level from 2009 to 2017. We include only first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. Lending is described in terms of both counts and dollar volumes (in thousands of dollars). Panel B presents similar statistics describing FHA and conventional lending at the county-year level, as well as per capita measures of lending volume and a range of socioeconomic characteristics. Appendix Table A.1 provides variable definitions.

Panel A: Lender-County-Year (N=2,701,435)

	Mean	SD	P25	P50	P75
FHA Application, Count	3.55	26.07	0.00	0.00	1.00
FHA Origination, Count	2.51	18.63	0.00	0.00	0.00
FHA Origination, Dollar Volume ('000)	461.60	3,809.86	0.00	0.00	0.00
Conventional Application, Count	6.25	45.00	0.00	0.00	2.00
Conventional Origination, Count	4.62	33.53	0.00	0.00	1.00
Conventional Origination, Dollar Volume ('000)	1,253.54	13,776.74	0.00	0.00	218.00

Panel B: County-Year (N=23,820)

	Mean	SD	P25	P50	P75
FHA, Application Count	404.31	1,355.40	19.00	53.00	218.00
FHA, Origination Count	286.08	935.75	12.00	36.00	158.00
FHA, Loans per 1,000 Residents	1.56	1.18	0.69	1.21	2.10
FHA, Volume per Capita	234.55	222.41	82.46	157.47	311.55
FHA, ln(Volume)	8.72	2.01	7.27	8.45	10.05
FHA, Misconduct Rate 2012-2017, (%)	0.37	0.26	0.20	0.33	0.48
FHA, Approval Rate, (%)	71.67	11.99	66.67	73.33	78.57
Conventional, Application Count	780.84	2,498.93	51.00	129.00	432.00
Conventional, Origination Count	572.96	1,809.99	32.00	89.00	318.00
Conventional, Loans per 1,000 Residents	3.47	2.35	1.81	2.89	4.47
Conventional, Volume per Capita	644.14	685.50	224.82	412.02	787.30
Conventional, ln(Volume)	9.73	1.93	8.31	9.46	10.94
Conventional, Misconduct Rate 2012-2017, (%)	0.15	0.13	0.06	0.12	0.21
Conventional, Approval Rate, (%)	73.78	9.84	68.83	75.37	80.27
FHA Share, (%)	31.59	14.49	21.05	30.34	40.82
Low Income Loan Share, (%)	8.53	6.33	4.00	7.46	11.76
Low Income Volume Share, (%)	4.64	4.11	1.79	3.73	6.35
Exposure to Large Banks	0.39	0.20	0.25	0.37	0.51
Unemployment Rate$_{t-1}$, (%)	7.34	2.89	5.20	6.90	9.00
Poverty Rate$_{t-1}$, (%)	16.07	5.82	11.70	15.40	19.50
Minority Share$_{t-1}$, (%)	20.67	18.07	6.22	14.03	31.36
Bachelor's Degree Share$_{t-1}$, (%)	14.02	6.19	9.67	12.46	16.70
HPI Change$_{t-1}$, (%)	0.03	5.29	-2.76	0.02	2.78
Population$_{t-1}$	115,952.33	344,588.95	16,130.00	33,155.50	83,114.50
Median Income$_{t-1}$	46,457.69	11,676.01	38,574.00	44,392.00	51,707.00
Avg. Credit Score$_{t-1}$	672.81	26.30	653.46	673.89	692.03

Table 4: Effect of the DOJ Litigation Wave on Large FHA Lenders

This table presents regressions examining whether large FHA lenders responded to the increase in DOJ litigation risk in 2012. We examine mortgage lending activity from 2009 to 2017 using a lender-county-year panel constructed from HMDA data on first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. The sample is restricted to: (i) lenders that originated FHA loans during the sample period, and (ii) lender-county-year pairs for which there was at least one mortgage application of any type. Panel A presents difference-in-differences tests examining the effect on FHA lending volume using the lender-county-year panel. The dependent variable, *Number of Loans*, is the number of FHA loan originations in the lender-county-year. The key independent variable is the interaction between *Top 5% Lender*, which is an indicator equal to one if the lender was in the top five percent when ranked by its FHA origination volume in 2010, and *Post*, an indicator for the year being 2012 or later. The specifications also include lender fixed effects and county-year fixed effects. Column 1 presents results for the full sample of lenders, column 2 focuses on the subsample of banks and bank-affiliates, and column 3 focuses on the subsample of shadow banks. Panel B presents triple differences tests examining the same effects. These tests use a lender-county-year-loan type panel, which is expanded to include an observation for both the lender's FHA volume and their conventional volume (which are measured with *Number of Loans* for the respective loan type). The key independent variable is the triple interaction between *Top 5% Lender*, *Post*, and the *FHA* indicator for the observation corresponding to FHA lending. Standard errors are clustered at the lender and county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: FHA Loan Originations

	Number of Loans		
	All	Banks	Non-Banks
	(1)	(2)	(3)
Top 5% Lender × Post	-3.547**	-7.387**	-0.624
	(1.545)	(2.923)	(0.686)
Lender FE	Yes	Yes	Yes
County × Year FE	Yes	Yes	Yes
2010 Mean of Top 5% Lenders	7.686	8.969	6.275
Adjusted R^2	0.078	0.055	0.106
# Observations	2,701,435	1,329,870	1,371,249

Panel B: FHA and Conventional Loan Originations

	Number of Loans		
	All	Banks	Non-Banks
	(1)	(2)	(3)
Top 5% Lender × Post × FHA	-4.978***	-7.079***	-3.924***
	(1.263)	(2.459)	(0.814)
Top 5% Lender × Post	1.947**	0.272	3.522***
	(0.981)	(1.714)	(1.026)
Top 5% Lender × FHA	1.360***	0.681	2.044***
	(0.498)	(0.628)	(0.542)
Post × FHA	-1.691***	-2.243***	-1.435***
	(0.155)	(0.192)	(0.213)
FHA	-0.517***	-1.421***	0.581***
	(0.115)	(0.144)	(0.179)
Lender FE	Yes	Yes	Yes
County × Year FE	Yes	Yes	Yes
2010 Mean of Top 5% Lenders	7.064	9.111	4.805
Adjusted R^2	0.069	0.057	0.095
# Observations	5,402,870	2,659,908	2,742,962

Table 5: Aggregate Effect of the Litigation Wave: County-Year Level Evidence

This table presents regressions examining the effects of the 2012 increase in DOJ litigation risk and large banks' exit from the FHA market on total FHA lending volumes. We examine mortgage lending activity from 2009 to 2017 using a county-year panel constructed from HMDA data on first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. Panel A presents difference-in-differences tests using the county-year panel. The dependent variables in columns 1, 2, and 3, are *ln(Volume)*, the natural logarithm of one plus the dollar volume of FHA loan originations, *Volume per Capita*, the total dollar volume of FHA originations per capita, and *Loans per 1,000*, the total number of FHA originations per 1,000 residents in the county. The key independent variable is the interaction term *Exposure* × *Post*. *Exposure* is the FHA market share of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county. *Post* is an indicator for the year being 2012 or later. The specifications also include county-year level controls listed and defined in Appendix Table A.1, as well as county fixed effects and year fixed effects. Panel B presents triple differences tests examining the same effects. These tests use a county-year-loan type panel, which is expanded to include an observation for both FHA volume and conventional volume in the county-year. The key independent variable is the triple interaction between *Exposure*, *Post*, and the *FHA* indicator for the observation corresponding to FHA lending. Standard errors are clustered at the county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: FHA Loan Originations

	ln(Volume) (1)	Volume per Capita (2)	Loans per 1,000 (3)
Exposure × Post	-0.196***	-32.837***	-0.141***
	(0.039)	(5.818)	(0.042)
Controls	Yes	Yes	Yes
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
2010 Mean	8.784	246.385	1.709
Adjusted R^2	0.960	0.881	0.861
# Observations	23,820	23,820	23,820

Panel B: FHA and Conventional Loan Originations

	ln(Volume) (1)	Volume per Capita (2)	Loans per 1,000 (3)
Exposure × Post × FHA	-0.194***	-43.351	-0.378***
	(0.046)	(33.337)	(0.126)
Exposure × Post	0.003	10.109	0.235**
	(0.030)	(29.254)	(0.104)
Exposure × FHA	-0.370***	-123.112***	-0.755***
	(0.064)	(20.201)	(0.099)
Post × FHA	-0.479***	-347.076***	-1.538***
	(0.020)	(14.963)	(0.056)
FHA	-0.493***	-119.704***	-0.502***
	(0.028)	(8.455)	(0.044)
Controls	Yes	Yes	Yes
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
2010 Mean	9.040	317.151	2.021
Adjusted R^2	0.950	0.678	0.732
# Observations	47,640	47,640	47,640

Table 6: Summary Statistics for FHA Mortgages

This table presents summary statistics describing FHA mortgages originated from 2009 to 2017 using comprehensive administrative data on the population of FHA-insured single-family home purchase mortgages. Panel A presents statistics for the full sample of loans. Panel B compares loan and borrower characteristics for FHA loans originated by three different types of lenders: large banks, small banks, and shadow banks. Appendix Table A.1 provides variable definitions.

Panel A: Full Sample

	Mean	SD	P25	P50	P75
FICO	690	50	651	682	724
LTV	95.4	4.3	96.5	96.5	96.5
Mortgage Amount	176,867	90,343	113,898	157,102	220,873
Mortgage Rate	4.36	0.68	3.75	4.25	4.88
First-time Home Buyer	0.798	0.402	1	1	1
Borrower Age	37.1	11.2	28.0	34.0	44.0
Female	0.368	0.482	0	0	1
Married	0.502	0.500	0	1	1
White	0.674	0.469	0	1	1
Black	0.110	0.313	0	0	0
Asian	0.032	0.176	0	0	0
Hispanic	0.170	0.375	0	0	0
Borrower Income	64,878	34,202	40,032	56,556	80,796
Borrower Assets	19,769	33,355	6,859	11,398	20,758
DTI (back-end)	0.407	0.091	0.345	0.415	0.475
Default Rate (1-yr)	0.014	0.117	0	0	0
Default Rate (2-yr)	0.048	0.214	0	0	0
Default Rate (3-yr)	0.078	0.269	0	0	0
# Loans	5,277,476				

Panel B: By Lender Type

	Large Banks		Small Banks		Shadow Banks	
	Mean	SD	Mean	SD	Mean	SD
FICO	695	53	691	49	687	49
LTV	95.2	4.7	95.4	4.1	95.4	4.3
Mortgage Amount	169,509	92,916	160,281	78,830	185,239	91,969
Mortgage Rate	4.50	0.69	4.24	0.70	4.35	0.66
First-time Home Buyer	0.777	0.416	0.793	0.405	0.807	0.395
Borrower Age	36.5	11.2	36.2	11.1	37.5	11.2
Female	0.368	0.482	0.373	0.484	0.366	0.482
Married	0.489	0.500	0.493	0.500	0.511	0.500
White	0.693	0.461	0.742	0.437	0.644	0.479
Black	0.110	0.313	0.110	0.313	0.111	0.314
Asian	0.038	0.190	0.025	0.155	0.033	0.177
Hispanic	0.146	0.353	0.108	0.310	0.200	0.400
Borrower Income	64,320	35,306	61,837	32,481	66,115	34,276
Borrower Assets	20,815	34,223	16,988	29,772	20,314	34,109
DTI (back-end)	0.397	0.092	0.397	0.092	0.414	0.090
Default Rate (1-yr)	0.012	0.107	0.013	0.112	0.015	0.122
Default Rate (2-yr)	0.041	0.199	0.044	0.205	0.052	0.223
Default Rate (3-yr)	0.070	0.255	0.071	0.257	0.084	0.278
# Loans	1,160,258		1,039,156		3,078,062	

Table 7: Effect of Litigation Exposure on FHA Lending Standards

This table presents difference-in-differences regressions examining the effect of the 2012 increase in DOJ litigation risk on lending standards in the FHA mortgage market. The tests use comprehensive loan-level administrative data on all FHA-insured single-family home purchase mortgages originated from 2009 to 2017. The key independent variable is the interaction term *Exposure* × *Post*. *Exposure* is defined as the FHA market share of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county, which captures exposure to litigation risk. *Post* is an indicator for the year being 2012 or later. The specifications also include county fixed effects and year of origination fixed effects. In Panel A, lending standards are measured based on credit scores on originated FHA loans. Column 1 presents results where the dependent variable is the borrower's FICO score, and column 2 presents results where the dependent variable is an indicator for the borrower having a FICO score below 620. In Panel B, lending standards are measured based on debt-to-income ratios on originated FHA loans. Column 1 presents results where the dependent variable is the borrower's DTI, and column 2 presents results where the dependent variable is an indicator for the borrower having a DTI above 50%. Standard errors are clustered at the lender and county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: Credit Scores

	FICO	I(FICO $\leq$ 620)
	(1)	(2)
Exposure × Post	-2.020	-0.017
	(2.730)	(0.013)
Controls	No	No
County FE	Yes	Yes
Year FE	Yes	Yes
Adjusted R^2	0.041	0.014
# Loans	5,195,445	5,195,445

Panel B: Debt-to-Income Ratios

	DTI	I(DTI $\geq$ 50%)
	(1)	(2)
Exposure × Post	-0.003	0.002
	(0.004)	(0.014)
Controls	No	No
County FE	Yes	Yes
Year FE	Yes	Yes
Adjusted R^2	0.042	0.017
# Loans	5,195,445	5,195,445

Table 8: Effect of Litigation Exposure on FHA Default Risk

This table presents difference-in-differences regressions examining the effect of the 2012 increase in DOJ litigation risk on the level of default risk on newly-originated FHA loans. The tests use comprehensive loan-level administrative data on all FHA-insured single-family home purchase mortgages originated from 2009 to 2017. The dependent variable, *I(Early Default)*, is an indicator for the loan becoming more than 90 days delinquent within either 12, 24, or 36 months of origination in columns 1-2, 3-4, and 5-6, respectively. The key independent variable is the interaction term *Exposure* × *Post*. *Exposure* is defined as the FHA market share of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county, which captures exposure to litigation risk. *Post* is an indicator for the year being 2012 or later. All specifications include county fixed effects and year of origination fixed effects. Columns 2, 4, and 6 add loan-level controls including narrow bins for FICO scores, DTI ratios, and LTV ratios, the natural logs of income and loan amount, and indicators for first-time homebuyers, female borrowers, and minority borrowers. Standard errors are clustered at the lender and county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable = I(Early Default)						
	12 Months		24 Months		36 Months	
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure × Post	-0.002	-0.002	-0.006	-0.004	-0.013	-0.011
	(0.002)	(0.002)	(0.005)	(0.005)	(0.008)	(0.008)
Controls	No	Yes	No	Yes	No	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.003	0.016	0.007	0.042	0.010	0.060
# Loans	5,195,445	5,195,444	5,195,445	5,195,444	5,195,445	5,195,444

Table 9: Effect of Litigation Exposure on Borrowers' FHA Lending Experience

This table presents difference-in-differences regressions examining the effect of the 2012 increase in DOJ litigation risk on borrowers' experience in the FHA mortgage market in terms of the interest rates charged and the quality of service (based on loan officer misconduct rates). Panel A presents tests examining interest rates on newly-originated FHA loans. The tests use comprehensive loan-level administrative data on all FHA-insured single-family home purchase mortgages originated from 2009 to 2017. The dependent variable is the mortgage interest rate in percentage point units. The key independent variable is the interaction term *Exposure* × *Post*. *Exposure* is defined as the FHA market share of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county, which captures exposure to litigation risk. *Post* is an indicator for the year being 2012 or later. Column 1 presents the results for the full sample. Columns 2 and 3 present results focusing on high- and low-competition counties, respectively. Low-competition counties are those in the bottom third in terms of the number of non-large (i.e., not top five percent) FHA lenders in 2010. All specifications use county fixed effects, year of origination fixed effects, and loan-level controls including narrow bins for FICO scores, DTI ratios, and LTV ratios, the natural logs of income and loan amount, and indicators for first-time homebuyers, female borrowers, and minority borrowers. Standard errors are clustered at the lender and county level and are reported in parentheses.

Panel B presents tests that examine the effect of litigation exposure on the quality of the representative loan officer serving FHA borrowers in a county. The sample is a county-year panel from 2009 to 2017. The dependent variable in column 1, *Misconduct Rate 2012-2017, (%)*, is the weighted average across lenders, of the fraction of their loan officers with misconduct records, where weights are lenders' FHA market share in the county-year. Lender misconduct rates are computed based on NMLS data covering their loan officers from 2012-2017. The dependent variable in column 2, *Misconduct Rate 2012, (%)*, is similar, but defines lender misconduct rates based on misconduct records already in the NMLS as of 2012. In both cases, lender-level misconduct rates are applied to all of the sample years. The key independent variable is once again the interaction term *Exposure* × *Post*. The specifications include the county-year level controls listed and defined in Appendix Table A.1, as well as county fixed effects and year fixed effects. Standard errors are clustered at the county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: Mortgage Rates

	Full Sample	High Competition	Low Competition
	(1)	(2)	(3)
Exposure × Post	-0.060	-0.077	0.059**
	(0.045)	(0.051)	(0.027)
Controls	Yes	Yes	Yes
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adjusted R^2	0.679	0.679	0.682
# Loans	5,195,444	4,841,956	353,488

Panel B: Loan Officer Misconduct Rate

	Misconduct Rate 2012-2017, (%)	Misconduct Rate 2012, (%)
	(1)	(2)
Exposure × Post	0.126***	0.106***
	(0.021)	(0.025)
Controls	Yes	Yes
County FE	Yes	Yes
Year FE	Yes	Yes
2010 Mean	0.271	0.246
Adjusted R^2	0.361	0.266
# Observations	23,820	23,820

Table 10: Effect on Low-Income Households' Overall Access to Mortgage Credit

This table presents regressions examining the effect of the 2012 increase in DOJ litigation risk and large banks' exit from the FHA market on low-income households' total access to mortgage credit across all loan types (FHA and non-FHA). We examine mortgage lending activity from 2009 to 2017 using a county-year panel constructed from HMDA data on all first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. The dependent variable in columns 1-3 is *Low Income Loan Share*, which is defined as the fraction of mortgage loans made to borrowers with incomes below 50% of the FFIEC Median Family Income in the county. Column 1 presents the main difference-in-differences test, where the interaction term *Exposure* × *Post* is the key independent variable. *Exposure* is defined as the FHA market share of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county. *Post* is an indicator for the year being 2012 or later. Columns 2 and 3 present tests that include further interactions with *Rural*, an indicator for the county being considered rural/underserved by the CFPB, and with *Minority*, an indicator for the county being in the top tercile of minority population share. All specifications also include the county-year level controls listed and defined in Appendix Table A.1, as well as county fixed effects and year fixed effects. Columns 4-6 present a similar set of tests, where the low-income share of mortgage lending is measured based on dollar volumes rather than loan counts. Standard errors are clustered at the county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Low Income Loan Share			Low Income Volume Share		
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure × Post	-1.160***	-0.093	-1.092**	-0.858***	-0.167	-0.864**
	(0.428)	(0.502)	(0.533)	(0.301)	(0.348)	(0.373)
Exposure × Post × Rural		-1.770**			-1.146**	
		(0.780)			(0.547)	
Post × Rural		1.790***			1.153***	
		(0.330)			(0.222)	
Exposure × Post × Minority			-0.031			0.207
			(0.881)			(0.630)
Post × Minority			0.246			0.129
			(0.350)			(0.238)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
2010 Mean	10.380	10.380	10.380	5.831	5.831	5.831
Adjusted R^2	0.575	0.577	0.575	0.557	0.559	0.557
# Observations	23,820	23,820	23,820	23,820	23,820	23,820

Internet Appendix

A.1. FHA False Claims Allegations

A.1.1. Overview

To be eligible for FHA insurance, the mortgage must be originated by a lender that has been approved by the FHA, and the mortgage and the borrower must meet certain criteria. Qualified lenders participating in the FHA's direct endorsement program have the authority to deem mortgages eligible for FHA insurance and close loans without prior FHA approval. These delegated lenders must certify annually and for each loan originated that they comply with all relevant FHA lending guidelines and HUD rules regarding underwriting procedures and quality control plans. For each mortgage loan insured by FHA under the direct endorsement program, a direct endorser and its underwriter must make a number of certifications required by HUD. These certifications can be found in the HUD 1003 Addendum, also known as the HUD/VA Addendum to Uniform Residential Loan Application and the Direct Endorsement Approval for a HUD/FHA Insured Mortgage, including:

1. The loan terms furnished in the Uniform Residential Loan Application and the Addendum are true, accurate and complete;

2. The information contained in the Uniform Residential Loan Application and the Addendum was obtained directly from the borrower by an employee of the undersigned lender or its duly authorized agent and is true to the best of the lender's knowledge and belief;

3. The verification of employment was requested and received by the lender or its duly authorized agent without passing through the hands of any third persons and are true to the best of the lender's knowledge and belief;

4. The verification of deposit was requested and received by the lender or its duly authorized agent without passing through the hands of any third persons and are true to the best of the lender's knowledge and belief;

5. The proposed loan to the borrower meets the income and credit requirements of the governing law in the lender's judgment;

6. That the statements made in its application for insurance and the Lender's Certificate as part of the Direct Endorsement Approval for a HUD/FHA Insured Mortgage are true and correct;

7. That complete disbursement of the loan has been made to the borrower, or to his/her creditors for his/her account and with his/her consent;

8. No charge has been made to or paid by the borrower except as permitted under HUD regulations;

9. The Lender has not paid any kickbacks, fee or consideration of any type, directly or indirectly, to any party in connection with the transaction except as permitted under HUD regulations and administrative instructions;

10. The Lender's officer has personally reviewed the mortgage loan documents, closing statements, application for insurance endorsement, and all accompanying documents;

11. All certifications required for the mortgage by the Direct Endorsement Handbook.

The Department of Justice (DOJ) asserts that any violation of HUD rules in connection with the submission of a claim for FHA insurance constitutes a false claim, as defined in the False Claims Act, thereby giving rise to legal actions against FHA lenders. In particular, the agencies alleged that mortgage lenders knowingly originated and underwrote non-compliant mortgage loans submitted for insurance coverage and guarantees by the FHA, thus falsifying their compliance certifications. In order to further describe FHA False Claims allegations, we hand-collect all the detailed legal filings associated with each settled lender in our sample. We then read the filings and classify FHA False Claims allegations into four broad categories:

1. Failure to verify information, including sources of gift funds, debt obligations, derogatory credit histories, employment, rental histories, etc.;

2. Lack of documentation regarding income, assets, liabilities, etc.;

3. Overstatement of income and assets, and understatement of liabilities;

4. Failure to notice or reconcile conflicting information regarding income, social security number, primary residence, etc.

A.1.2. Example 1: Wells Fargo Bank

The Department of Justice filed a formal complaint against Wells Fargo Bank on October 9th, 2012, and settled with the bank on April 8th, 2016, on the basis that the bank failed to self-report to HUD certain FHA loans that Wells Fargo Bank's quality assurance personnel had determined contained a material finding and submitted loans for FHA mortgage insurance that did not meet the underwriting requirements contained in HUD's handbooks and mortgagee letters. In particular, the Department of Justice alleged that:

> Wells Fargo, the largest HUD-approved Federal Housing Administration ("FHA") residential mortgage lender, engaged in a regular practice of reckless origination and underwriting of its retail FHA loans over the course of more than four years, from May 2001 through October 2005, all the while knowing that it would not be responsible when the materially deficient loans went into default. Rather, as explained below, under FHA's Direct Endorsement program, HUD insured the loans that Wells Fargo was originating. During this four and a half year period, Wells Fargo certified to HUD that over 100,000 retail FHA loans met HUD's requirements for proper origination and underwriting, and therefore were eligible for FHA insurance, when the bank knew that a very substantial percentage of those loans - nearly half of the loans in certain months - had not been properly underwritten, contained unacceptable risk, and were ineligible for FHA insurance.
>
> Moreover, the extremely poor quality of Wells Fargo's loans was a function of management's nearly singular focus on increasing the volume of FHA originations (and the bank's profits), rather than on the quality of the loans being originated. Management's

> actions included hiring temporary staff to churn out and approve an ever-increasing quantity of FHA loans, failing to provide its inexperienced staff with proper training, paying improper bonuses to its underwriters to incentivize them to approve as many FHA loans as possible, and applying pressure on loan officers and underwriters to originate and approve more and more FHA loans as quickly as possible. As a consequence of Wells Fargo's misconduct, FHA was required to pay hundreds of millions of dollars in insurance claims on defaulted loans that the bank had falsely certified met HUD's requirements, and thousands of Americans lost their homes through mortgage foreclosures across the country.
>
> To compound matters, from January 2002 through December 2010, Wells Fargo purposely violated HUD reporting requirements and kept its materially deficient loans a secret. Wells Fargo was well aware that HUD regulations required it to perform monthly reviews of its FHA loan portfolio and to self-report to HUD any loan that was affected by fraud or other serious violations. This requirement permits HUD to investigate the bad loans and request reimbursement or indemnification, as appropriate. But, although the bank generally performed the monthly loan reviews and internally identified over 6,000 materially deficient loans during this period, including over 3,000 loans that had gone into default within the first six months after origination (known as "Early Payment Defaults" or "EPDs"), it chose not to comply with its self-reporting obligation to HUD.

For further details about the allegation and subsequent settlement, see the complaint filing, the settlement filing, and the press release by the Department of Justice.

A.1.3. Example 2: Bank of America

The Department of Justice filed a formal complaint against Bank of America on August 6th, 2013, and settled with the bank on August 20th, 2014, on the basis that the bank underwrote FHA loans to borrowers who did not qualify for loans under the criteria set by HUD. In particular, the Department of Justice, along with state prosecutors from California, Delaware, Illinois, Maryland, New York, and Kentucky, alleged that:

> Review of Bank of America's early default loans indicates that for many loans, Bank of America did not always meet FHA requirements. The deficiencies include noncompliance with the applicable regulations. Bank of America engaged in the following types of conduct: (a) it did not establish income stability; (b) it did not verify income; (c) it inaccurately evaluated borrower's previous mortgage or rental payment history; (d) it did not account for a major derogatory on a borrower's credit; (e) it did not verify and document earnest money; (f) it did not verify and document checking and savings account information; (g) it did not document gift fund monies and verify wire transfers of same; (h) it did not document and verify the borrower's investment in the property; (i) it under-reported borrower liabilities; (j) it did not always present adequate compensating factors when the borrower exceeded HUD-established income-to-debt ratios; and (k) it sometimes incorrectly calculated income for purposes of such ratios.

For further details about the allegation and subsequent settlement, see the complaint filing, the settlement filing, and the annex to the settlement filing.

A.1.4. Example 3: JPMorgan Chase

The Department of Justice formally settled with JPMorgan Chase on February 4th, 2014, on the basis that the bank knowingly originated and underwrote non-compliant mortgage loans submitted for insurance coverage and guarantees by HUD. In particular, the Department of Justice alleged that:

> During the period January 1, 2002, through the date of the signing of this Stipulation ("Covered Period"), Chase: (a) approved loans for FHA insurance and refinancing in violation of DEL Program rules, and submitted false loan level certifications to the FHA and HUD concerning compliance with DEL Program rules; (b) failed to self-report to the FHA and HUD loans that it identified as having been affected by borrower or correspondent fraud or other material deficiencies, in violation of DEL Program rules; (c) entered information into its automated underwriting system/TOTAL Mortgage Scorecard that lacked integrity, in violation of DEL Program rules; and (d) approved loans for VA insurance and refinancing in violation of the rules governing the Loan Guaranty Program, and submitted false certifications to the VA concerning compliance with the Loan Guaranty Program (collectively, "Covered Conduct").

For further details about the allegation and subsequent settlement, see the complaint filing, the settlement filing, and the press release by the U.S. Attorney's Office and the Southern District of New York.

A.2. Summary of the Search Process for Litigated Lenders

To identify lenders that were litigated by the DOJ for alleged fraudulent activity in the FHA mortgage market, we search the DOJ News website for any FHA-related False Claims Act settlement agreements and settlement dates relating to DOJ/HUD and mortgage lenders from 2006 to 2021.[1] The keyword searches include "federal housing administration," "fha," and "false claims act, fha." Relevant settlements must discuss alleged fraudulent lender activity that violated the False Claims Act in the context of FHA mortgage lending. We identify the settlement dates either from attached settlement agreements or from DOJ press statements. We also exclude press statements involving alleged False Claims Act violations of reverse mortgage lending. In 2006 and 2007, there were no articles relating to alleged fraudulent FHA activity violating the False Claims Act. Consequently, we stop the search process in 2006. In addition to using the DOJ News website, we also conduct a broad search for False Claims Act-related FHA litigation on Google and Nexus Uni.

[1] For news dated after January 19, 2009, see: https://www.justice.gov/news. For news dated earlier, see: https://www.justice.gov/archives/justice-news-archive.

Figure A.1: County Exposure to Large Banks

This figure presents a map categorizing U.S. counties based on the market share of large banks and their affiliates in 2010. We define large banks as banks whose FHA lending in 2010 was in the top five percent when ranked by their FHA origination volume. Darker shades represent counties where large banks have a higher market share in the FHA mortgage market.

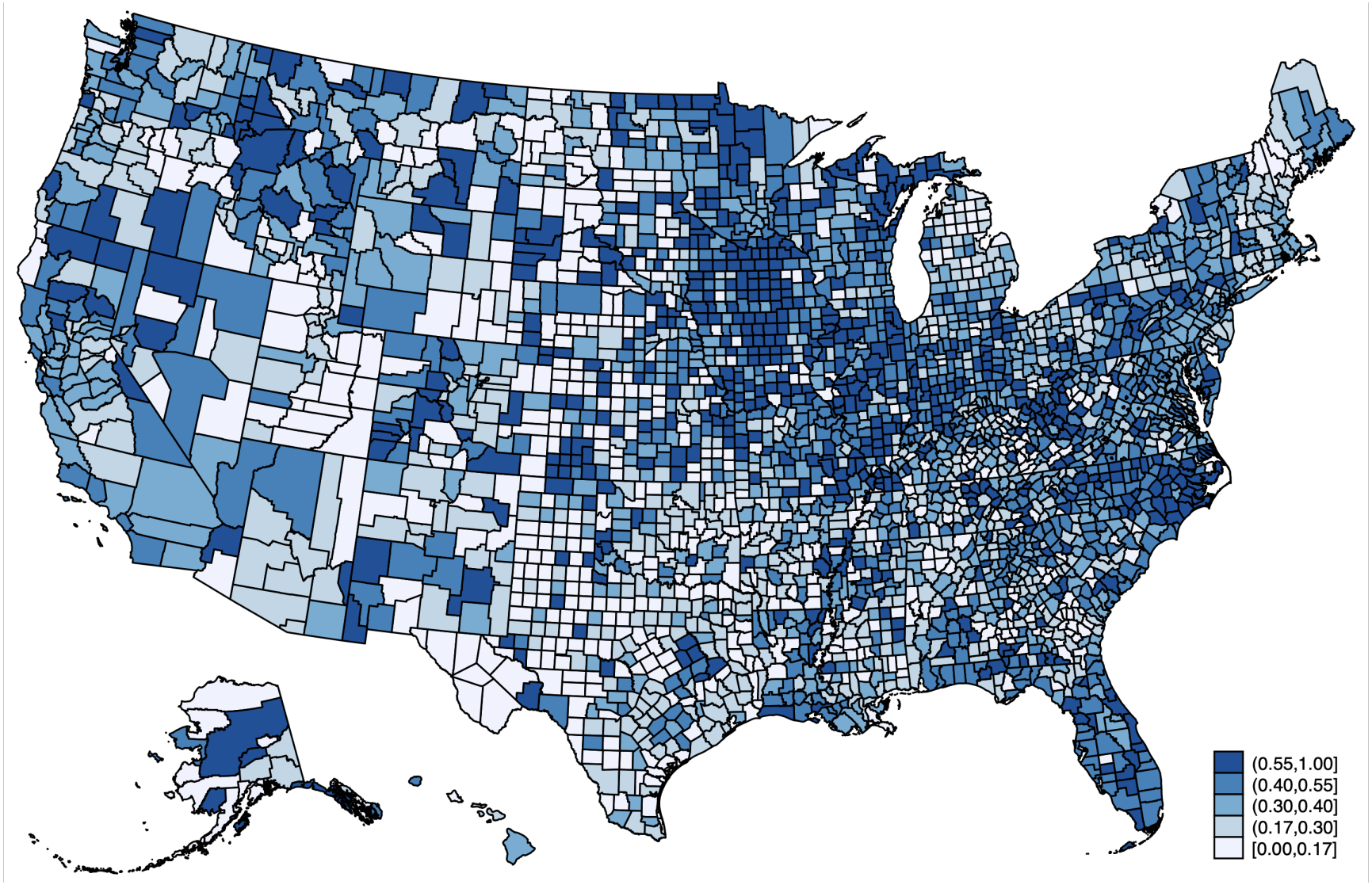


Table A.1: Variable Definitions

Panel A: Variables Used in the Lender-County-Year Level Analysis

Variable	Description
Dependent Variables	
FHA (Conventional) Application, Count	Number of FHA (or conventional) mortgage applications in a lender-county-year
FHA (Conventional) Origination, Count	Number of FHA (or conventional) mortgage originations in a lender-county-year
FHA (Conventional) Origination, Dollar Volume ('000)	Dollar volume of FHA (or conventional) mortgage originations in thousands of dollars in a lender-county-year
Number of Loans	Total number of loan originations in a lender-county-year
Key Independent Variables	
Top 5% Lender	Indicator variable that equals one if the lender was in the top five percent for FHA originations in 2010
Post	Indicator variable that equals one if the year is 2012 or afterwards
FHA	Indicator variable that equals one for FHA lending

Panel B: Variables Used in the County-Year Level Analysis

Variable	Description
Dependent Variables	
FHA (Conventional), Application Count	Number of FHA (or conventional) mortgage applications in a county-year
FHA (Conventional), Origination Count	Number of FHA (or conventional) mortgage originations in a county-year
FHA (Conventional), Loans per 1,000 Residents	Number of FHA (or conventional) mortgage originations per 1,000 persons in a county-year
FHA (Conventional), ln(Volume)	Natural logarithm of one plus the dollar volume of FHA (or conventional) mortgage originations in a county-year
FHA (Conventional), Volume per Capita	The dollar volume of FHA (or conventional) mortgage originations per capita in a county-year
FHA (Conventional), Misconduct Rate 2012–2017, (%)	Weighted average county-year level percentage of loan officers with at least one misconduct record (based on the loan officers' 2012–2017 misconduct records and weighted by each lenders' FHA (conventional) lending in the county-year)
FHA (Conventional), Misconduct Rate 2012, (%)	Weighted average county-year level percentage of loan officers with at least one misconduct record (based on the loan officers' 2012 misconduct records and weighted by each lenders' FHA (conventional) lending in the county-year)
FHA (Conventional), Approval Rate, (%)	Mortgage approval rate of FHA (or conventional) loan applications in a county-year
FHA Share, (%)	Percentage of FHA originations among FHA and conventional originations in a county-year
Low Income Loan (Volume) Share	Fraction of the total number (dollar volume) of FHA and conventional loans that were made to borrowers with incomes below 50% of the FFIEC Median Family Income in the county

Panel B: Variables Used in the County-Year Level Analysis (Continued)

Variable	Description
Key Independent Variables	
Exposure	FHA market share in terms of dollar volume of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county
Post	Indicator variable that equals one if the year is 2012 or later
FHA	Indicator variable that equals one for FHA lending
Rural	Indicator variable that equals one if a county is defined as rural/underserved by the Consumer Financial Protection Bureau
Minority	Indicator variable that equals one if a county is in the top tercile of minority population share in 2010
Control Variables	
Unemployment Rate, (%)	County unemployment rate in percentage points
Poverty Rate, (%)	County poverty rate in percentage points
Population	County population
Minority Share, (%)	Share of the county population (in percentage points) who do not identify as non-Hispanic white
Bachelor's Degree Share, (%)	Share of the county population (in percentage points) who have a bachelor's degree or higher
HPI Change, (%)	Annual change in a county's House Price Index in percentage points
Avg. Credit Score	Average credit score in a county

Panel C: Variables Used in the FHA Loan Level Analysis

Variable	Description
Dependent Variables	
I(Early Default)	Indicator variable that equals one if the loan becomes more than 90 days delinquent within 12, 24, and 36 months of origination, respectively
Default Rate (1-yr), (2-yr), (3-yr)	Same as *I(Early Default)*
FICO	Borrower's FICO score
DTI (back-end)	Borrower's debt-to-income ratio
Mortgage Rates	Interest rate of mortgage loan
Key Independent Variables	
Exposure	FHA market share in terms of dollar volume of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county
Post	Indicator variable that equals one if the year is 2012 or later
Litigated Lender	Indicator variable that equals one if the lender has been litigated, audited, or investigated by the DOJ for FHA-related False Claims Act cases and settled with the DOJ
Top 5% Lender	Indicator variable that equals one if the lender's FHA lending volume is in the top five percent of all lenders in 2010
Bank	Indicator variable that equals one if the lender is a depository institution

Panel C: Variables Used in the FHA Loan Level Analysis (Continued)

Variable	**Description**
Control Variables	
FICO	Borrower's FICO score, controlled for with 10-point bins
DTI (back-end)	Borrower's debt-to-income ratio, controlled for with bins for each percentage point
LTV	Loan-to-value ratio, controlled for with bins for each percentage point
Borrower Income	Borrower's income in dollars
Mortgage Amount	Loan amount in dollars
First-time Home Buyer	Indicator variable that equals one if the borrower is a first-time home buyer
Female	Indicator variable that equals one if the borrower is female
Minority	Indicator variable that equals one if the borrower is Black or Hispanic
Additional Variables	
Borrower Age	Borrower's age in years
Borrower Assets	Borrower's assets in dollars
Married	Indicator variable that equals one if the borrower is married
White	Indicator variable that equals one if the borrower is white
Black	Indicator variable that equals one if the borrower is Black
Asian	Indicator variable that equals one if the borrower is Asian
Hispanic	Indicator variable that equals one if the borrower is Hispanic

Table A.2: Effect of the Litigation Wave on Large FHA Lenders – Poisson

This table presents Poisson regressions examining whether large FHA lenders responded to the increase in DOJ litigation risk in 2012. We examine mortgage lending activity from 2009 to 2017 using a lender-county-year panel constructed from HMDA data on first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. The sample is restricted to: (i) lenders that originated FHA loans during the sample period, and (ii) lender-county-year pairs for which there was at least one mortgage application of any type. Panel A presents difference-in-differences tests examining the effect on FHA lending volume using the lender-county-year panel. The dependent variable, *Number of Loans*, is the number of FHA loan originations in the lender-county-year. The key independent variable is the interaction between *Top 5% Lender*, which is an indicator equal to one if the lender was in the top five percent when ranked by its FHA origination volume in 2010, and *Post*, an indicator for the year being 2012 or later. The specifications also include lender fixed effects and county-year fixed effects. Column 1 presents results for the full sample of lenders, column 2 focuses on the subsample of banks and bank-affiliates, and column 3 focuses on the subsample of shadow banks. Panel B presents triple differences tests examining the same effects. These tests use a lender-county-year-loan type panel, which is expanded to include an observation for both the lender's FHA volume and their conventional volume (which are measured with *Number of Loans* for the respective loan type). The key independent variable is the triple interaction between *Top 5% Lender*, *Post*, and the *FHA* indicator for the observation corresponding to FHA lending. Standard errors are clustered at the lender and county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: FHA Loan Originations

	Number of Loans		
	All	Banks	Non-Banks
	(1)	(2)	(3)
Top 5% Lender × Post	-0.458**	-0.871***	-0.069
	(0.186)	(0.205)	(0.123)
Lender FE	Yes	Yes	Yes
County × Year FE	Yes	Yes	Yes
2010 Mean of Top 5% Lenders	7.737	9.127	6.445
Pseudo R^2	0.517	0.554	0.521
# Observations	2,543,000	1,168,251	1,340,699

Panel B: FHA and Conventional Loan Originations

	Number of Loans		
	All	Banks	Non-Banks
	(1)	(2)	(3)
Top 5% Lender × Post × FHA	-0.392***	-0.509***	-0.331**
	(0.087)	(0.123)	(0.133)
Top 5% Lender × Post	-0.127	-0.381**	0.265
	(0.157)	(0.155)	(0.189)
Top 5% Lender × FHA	0.403***	0.667***	0.231
	(0.097)	(0.082)	(0.141)
Post × FHA	-0.549***	-0.744***	-0.670***
	(0.051)	(0.060)	(0.097)
FHA	-0.283***	-0.748***	0.353***
	(0.059)	(0.068)	(0.111)
Lender FE	Yes	Yes	Yes
County × Year FE	Yes	Yes	Yes
2010 Mean of Top 5% Lenders	7.075	9.146	4.879
Pseudo R^2	0.503	0.528	0.523
# Observations	5,392,702	2,655,112	2,713,196

Table A.3: Effect of the Litigation Wave on Large FHA Lenders – ln(Volume)

This table presents regressions examining whether large FHA lenders responded to the increase in DOJ litigation risk in 2012. We examine mortgage lending activity from 2009 to 2017 using a lender-county-year panel constructed from HMDA data on first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. The sample is restricted to: (i) lenders that originated FHA loans during the sample period, and (ii) lender-county-year pairs for which there was at least one mortgage application of any type. Panel A presents difference-in-differences tests examining the effect on FHA lending volume using the lender-county-year panel. The dependent variable, *ln(Volume)*, is the natural logarithm of one plus the dollar volume of FHA loan originations in the lender-county-year. The key independent variable is the interaction between *Top 5% Lender*, which is an indicator equal to one if the lender was in the top five percent when ranked by its FHA origination volume in 2010, and *Post*, an indicator for the year being 2012 or later. The specifications also include lender fixed effects and county-year fixed effects. Column 1 presents results for the full sample of lenders, column 2 focuses on the subsample of banks and bank-affiliates, and column 3 focuses on the subsample of shadow banks. Panel B presents triple differences tests examining the same effects. These tests use a lender-county-year-loan type panel, which is expanded to include an observation for both the lender's FHA volume and their conventional volume. The key independent variable is the triple interaction between *Top 5% Lender*, *Post*, and the *FHA* indicator for the observation corresponding to FHA lending. Standard errors are clustered at the lender and county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: FHA Loan Originations

	ln(Volume)		
	All	Banks	Non-Banks
	(1)	(2)	(3)
Top 5% Lender × Post	-0.422**	-0.898***	-0.090
	(0.188)	(0.208)	(0.246)
Lender FE	Yes	Yes	Yes
County × Year FE	Yes	Yes	Yes
2010 Mean of Top 5% Lenders	2.807	2.774	2.845
Adjusted R^2	0.276	0.238	0.308
# Observations	2,701,435	1,329,870	1,371,249

Panel B: FHA and Conventional Loan Originations

	ln(Volume)		
	All	Banks	Non-Banks
	(1)	(2)	(3)
Top 5% Lender × Post × FHA	-0.519***	-0.548***	-0.550***
	(0.141)	(0.166)	(0.178)
Top 5% Lender × Post	0.109	-0.311*	0.453
	(0.181)	(0.183)	(0.290)
Top 5% Lender × FHA	0.788***	0.985***	0.514***
	(0.125)	(0.132)	(0.165)
Post × FHA	-0.483***	-0.803***	-0.351***
	(0.052)	(0.066)	(0.066)
FHA	-0.486***	-1.071***	0.223***
	(0.053)	(0.067)	(0.073)
Lender FE	Yes	Yes	Yes
County × Year FE	Yes	Yes	Yes
2010 Mean of Top 5% Lenders	2.606	2.779	2.415
Adjusted R^2	0.262	0.256	0.311
# Observations	5,402,870	2,659,908	2,742,962

Table A.4: Effect of the Litigation Wave on Litigated Lenders

This table presents regressions examining whether large FHA lenders responded to the increase in DOJ litigation risk in 2012. We examine mortgage lending activity from 2009 to 2017 using a lender-county-year panel constructed from HMDA data on first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. The sample is restricted to: (i) lenders that originated FHA loans during the sample period, and (ii) lender-county-year pairs for which there was at least one mortgage application of any type. Panel A presents difference-in-differences tests examining the effect on FHA lending volume using the lender-county-year panel. The dependent variable, *Number of Loans*, is the number of FHA loan originations in the lender-county-year. The key independent variable is the interaction between *Litigated*, which is an indicator equal to one if the lender was litigated by the Department of Justice, and *Post*, an indicator for the year being 2012 or later. The specifications also include lender fixed effects and county-year fixed effects. Column 1 presents results for the full sample of lenders, column 2 focuses on the subsample of banks and bank-affiliates, and column 3 focuses on the subsample of shadow banks. Panel B presents triple differences tests examining the same effects. These tests use a lender-county-year-loan type panel, which is expanded to include an observation for both the lender's FHA volume and their conventional volume (which are measured with *Number of Loans* for the respective loan type). The key independent variable is the triple interaction between *Litigated*, *Post*, and the *FHA* indicator for the observation corresponding to FHA lending. Standard errors are clustered at the lender and county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: FHA Loan Originations

	Number of Loans		
	All	Banks	Non-Banks
	(1)	(2)	(3)
Litigated × Post	-4.788**	-8.576**	0.028
	(2.353)	(3.467)	(1.165)
Lender FE	Yes	Yes	Yes
County × Year FE	Yes	Yes	Yes
2010 Mean of Litigated Lenders	7.796	10.251	4.060
Adjusted R^2	0.079	0.055	0.106
# Observations	2,701,435	1,329,870	1,371,249

Panel B: FHA and Conventional Loan Originations

	Number of Loans		
	All	Banks	Non-Banks
	(1)	(2)	(3)
Litigated × Post × FHA	-5.622***	-7.268***	-3.352***
	(1.840)	(2.806)	(1.120)
Litigated × Post	1.380	-0.282	3.506**
	(1.465)	(2.098)	(1.769)
Litigated × FHA	-0.279	-0.649	0.776
	(0.613)	(0.734)	(0.569)
Post × FHA	-2.054***	-2.475***	-1.995***
	(0.180)	(0.204)	(0.268)
FHA	-0.139	-1.140***	0.991***
	(0.126)	(0.143)	(0.216)
Lender FE	Yes	Yes	Yes
County × Year FE	Yes	Yes	Yes
2010 Mean of Litigated Lenders	7.808	10.894	3.105
Adjusted R^2	0.069	0.058	0.095
# Observations	5,402,870	2,659,908	2,742,962

Table A.5: The (Lack of) Effect on Mortgage Approval Rates: County-Year Level Evidence

This table presents regressions examining the effects of the 2012 increase in DOJ litigation risk on mortgage approval rates. We examine mortgage lending activity from 2009 to 2017 using a county-year panel constructed from HMDA data on applications for first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. The dependent variables in columns 1 and 2, are *FHA Approval Rate, (%)*, the approval rate of FHA mortgage applications in a county-year, and *Conventional Approval Rate, (%)*, the approval rate of conventional mortgage applications in a county-year. The key independent variable is the interaction term *Exposure* × *Post*. *Exposure* is the FHA market share of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county. *Post* is an indicator for the year being 2012 or later. The specifications also include the county-year level controls listed and defined in Appendix Table A.1, as well as county fixed effects and year fixed effects. Standard errors are clustered at the county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	FHA Approval Rate, (%)	Conventional Approval Rate, (%)
	(1)	(2)
Exposure × Post	-0.240	0.559
	(0.981)	(0.703)
Controls	Yes	Yes
County FE	Yes	Yes
Year FE	Yes	Yes
2010 Mean	72.349	71.065
Adjusted R^2	0.237	0.533
# Observations	23,783	23,820

Table A.6: Correlations Between Exposure and County Level Characteristics

This table presents correlations between a county's *Exposure to Large Banks* and county level characteristics in 2010. The sample is restricted to counties for which we have full data on characteristics during our sample period.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Exposure to Large Banks	1.00								
(2) Unemployment Rate, (%)	-0.03	1.00							
(3) Poverty Rate, (%)	-0.10	0.50	1.00						
(4) Percent Minority, (%)	-0.14	0.21	0.46	1.00					
(5) Percent Bachelor's Degree, (%)	0.05	-0.36	-0.47	0.01	1.00				
(6) HPI Change, (%)	0.02	-0.37	-0.01	-0.09	-0.07	1.00			
(7) Population	-0.01	0.02	-0.06	0.29	0.32	-0.06	1.00		
(8) Median Income	0.04	-0.39	-0.78	-0.09	0.68	-0.08	0.24	1.00	
(9) Avg. Credit Score	0.18	-0.45	-0.70	-0.60	0.44	0.08	-0.04	0.47	1.00
Observations	2657								

Table A.7: Aggregate Effect of the Litigation Wave: Alternate Triple Differences Approach

This table presents regressions examining the effects of the 2012 increase in DOJ litigation risk and large banks' exit from the FHA market on total FHA lending volumes. We examine mortgage lending activity from 2009 to 2017 using a county-year-loan type panel constructed from HMDA data on first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. In this alternate triple differences approach, the tests rely on loan volumes/counts that include all FHA loan originations, but only conventional loan originations made to low-income borrowers. The dependent variables in columns 1, 2, and 3, are *ln(Volume)*, the natural logarithm of one plus the dollar volume of loan originations, *Volume per Capita*, the total dollar volume of originations per capita, and *Loans per 1,000*, the total number of originations per 1,000 residents in the county. The key independent variable is the triple interaction between *Exposure*, *Post*, and the *FHA* indicator for the observation corresponding to FHA lending. *Exposure* is the FHA market share of large banks (those among the top 5% largest FHA lenders) as of 2010 in a given county. *Post* is an indicator for the year being 2012 or later. The specifications also include the county-year level controls listed and defined in Appendix Table A.1, as well as county fixed effects and year fixed effects. Standard errors are clustered at the county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	ln(Volume)	Volume per Capita	Loans per 1,000
	(1)	(2)	(3)
Exposure × Post × FHA	-0.150	-35.077***	-0.173***
	(0.120)	(6.378)	(0.046)
Exposure × Post	-0.042	2.032	0.033**
	(0.115)	(1.468)	(0.014)
Exposure × FHA	-0.897***	-76.195***	-0.468***
	(0.149)	(15.639)	(0.095)
Post × FHA	-0.284***	11.277***	-0.084***
	(0.052)	(2.930)	(0.020)
FHA	3.563***	245.729***	1.588***
	(0.065)	(7.979)	(0.047)
Controls	Yes	Yes	Yes
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
2010 Mean	7.104	130.426	0.953
Adjusted R^2	0.840	0.636	0.671
# Observations	47,640	47,640	47,640

B.1. Staggered Difference-in-Differences Framework

B.1.1. Lender-County-Year Level Analysis

In this subsection, we implement a staggered difference-in-differences approach to estimate the effect of the litigation wave on FHA lenders. We assume only litigated lenders were affected and that they exited the FHA market in a staggered fashion. Litigated lenders are defined as lenders that have been subjected to litigation, audits, or investigations by the DOJ for FHA-related False Claims Act cases and have settled with the DOJ. We estimate the effect on FHA lending using a lender-county-year panel and the following specification:

$$Y_{i,c,t} = \beta \; Litigated_{i,t} + \delta_i + \gamma_{c,t} + \varepsilon_{i,c,t}. \tag{1}$$

where subscripts i, c, and t represent the lender, county, and year, respectively. The dependent variable, $Y_{i,c,t}$, is the number of FHA home purchase mortgage originations in a given lender-county-year. The key independent variable, $Litigated_{i,t}$, is determined by a combination of whether a lender was ever litigated and the year in which the lender had settled. In particular, $Litigated_{i,t}$ turns one when lender i was litigated and year t is in or after the year when lender i settled with the DOJ.[2] The specification also includes lender and county-year fixed effects denoted by δ_i and $\gamma_{c,t}$, respectively. Standard errors are double-clustered at the lender and county levels. We report the results in Panel A of Table B.1, which are overall consistent with the results in Panel A of Table 4.

[Insert Table B.1 Here]

Similar to the triple differences specifications in the paper, we also conduct staggered triple differences tests that account for lenders' origination activity in the conventional mortgage market. We construct a lender-county-year-loan type panel that includes two observations for each lender-county-year, one for FHA loan volume and one for conventional loan volume. We then estimate specifications of the form:

$$\begin{aligned} Y_{i,c,t,m} = \beta_1 \; Litigated_{i,t} \times FHA_m + \beta_2 \; Litigated_{i,t} \\ + \delta_{m,t} + \psi_{m,i} + \gamma_{c,t} + \varepsilon_{i,c,t,m}. \end{aligned} \tag{2}$$

where the new subscript m denotes the loan type (FHA versus conventional) and FHA_m is an indicator for the observation corresponding to FHA mortgage lending. $Y_{i,c,t,m}$ is the number of home purchase mortgage originations of the given type. We include FHA-year, FHA-lender, and county-year fixed effects denoted by $\delta_{m,t}$, $\psi_{m,i}$, and $\gamma_{c,t}$, respectively. Standard errors are double-clustered at the lender and county levels. We report the results in Panel B of Table B.1, which are overall consistent with the results in Panel B of Table 4.

B.1.2. County-Year Level Analysis

Next, we examine the aggregate effect of the DOJ litigation wave on FHA mortgage lending using county-year level data. In these tests, counties exhibit variation in their pre-period exposure

[2] We use June 30th as a cutoff for determining the settlement year. For example, a lender that settled between July 1, 2012, and June 30, 2013, is considered to have settled in 2013.

to litigated banks that exited the FHA market in a staggered fashion. We construct the key independent variable, *Exposure to Litigated Banks*, as the current fraction of lenders in the county that have already been litigated (weighted by pre-period market shares). Formally, this variable is defined as:

$$Exposure\ to\ Litigated\ Banks_{c,t} = \sum_i Market\ Share\ in\ 2010_{i,c} \times Litigated\ Bank_{i,t}, \quad (3)$$

where $Market\ Share\ in\ 2010_{i,c}$ is the fraction of the dollar volume of FHA lending in 2010 by lender i in county c relative to all FHA lending in the county. $Litigated\ Bank_{i,t}$ turns one when lender i is a bank and year t is in or after the year when lender i settled with the DOJ. We estimate a staggered difference-in-differences specification of the form:

$$Y_{c,t} = \beta_1\ Exposure\ to\ Litigated\ Banks_{c,t} + \beta_2\ Controls_{c,t-1} + \delta_c + \gamma_t + \varepsilon_{c,t}. \quad (4)$$

where $Y_{c,t}$ represents various dependent variables we use to measure FHA lending volume at the county-year level. $Controls_{c,t-1}$ represents one period lagged county-year level measures of: county population, median household income, poverty rate, unemployment rate, education levels, minority population share, change in house prices, and average credit scores. δ_c and γ_t are county and year fixed effects, respectively. Standard errors are clustered at the county level. We report the results in Panel A of Table B.2, which are overall consistent with the results in Panel A of Table 5.

[Insert Table B.2 Here]

To conduct staggered triple differences tests, we construct a county-year-loan type panel. This panel contains two observations for each county-year, one for FHA loan volume and one for conventional loan volume. We then estimate specifications of the form:

$$\begin{aligned} Y_{c,t,m} = {} & \beta_1\ Exposure\ to\ Litigated\ Banks_{c,t} \times FHA_m \\ & + \beta_2\ Exposure\ to\ Litigated\ Banks_{c,t} \\ & + \beta_3\ Controls_{c,t-1} + \delta_{m,c} + \psi_{m,t} + \varepsilon_{c,t,m}. \end{aligned} \quad (5)$$

where the subscript m denotes the loan type (FHA versus conventional) and FHA_m is an indicator for the observation corresponding to FHA mortgage lending. $Y_{c,t,m}$ represents three dependent variables we use to measure lending activity. We include FHA-county and FHA-year fixed effects denoted by $\delta_{m,c}$ and $\psi_{m,t}$, respectively. Standard errors are again clustered at the county level. We report the results in Panel B of Table B.2, which are overall consistent with the results in Panel B of Table 5.

Table B.1: Effect of the Litigation Wave on Litigated Lenders, Staggered Difference-in-Differences

This table presents regressions examining how litigated FHA lenders responded to the DOJ litigation. We examine mortgage lending activity from 2009 to 2017 using a lender-county-year panel constructed from HMDA data on first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. The sample is restricted to: (i) lenders that originated FHA loans during the sample period, and (ii) lender-county-year pairs for which there was at least one mortgage application of any type. Panel A presents staggered difference-in-differences tests examining the effect on FHA lending volume using the lender-county-year panel. The dependent variable, *Number of Loans*, is the number of FHA loan originations in the lender-county-year. The key independent variable is *Litigated*, which is an indicator that equals one if the lender was litigated and year t is in or after the year when the lender settled with the DOJ. The specifications also include lender fixed effects and county-year fixed effects. Column 1 presents results for the full sample of lenders, column 2 focuses on the subsample of banks and bank-affiliates, and column 3 focuses on the subsample of shadow banks. Panel B presents staggered triple differences tests examining the same effects. These tests use a lender-county-year-loan type panel, which is expanded to include an observation for both the lender's FHA volume and their conventional volume (which are measured with *Number of Loans* for the respective loan type). The key independent variable is the interaction between *Litigated* and the *FHA* indicator for the observation corresponding to FHA lending. The specifications also include lender-loan type fixed effects, year-loan type fixed effects, and county-year fixed effects. Standard errors are clustered at the lender and county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: FHA Loan Originations

	Number of Loans		
	All	Banks	Non-Banks
	(1)	(2)	(3)
Litigated	-4.492**	-5.764***	0.001
	(1.827)	(2.030)	(0.897)
Lender FE	Yes	Yes	Yes
County × Year FE	Yes	Yes	Yes
2010 Mean of Litigated Lenders	7.796	10.251	4.060
Adjusted R^2	0.078	0.052	0.106
# Observations	2,701,435	1,329,870	1,371,249

Panel B: FHA and Conventional Loan Originations

	Number of Loans		
	All	Banks	Non-Banks
	(1)	(2)	(3)
Litigated × FHA	-6.231***	-7.047***	-3.304
	(1.953)	(2.039)	(2.952)
Litigated	2.217	1.967	3.749
	(1.361)	(1.577)	(3.058)
FHA × Lender FE	Yes	Yes	Yes
FHA × Year FE	Yes	Yes	Yes
County × Year FE	Yes	Yes	Yes
2010 Mean of Litigated Lenders	7.808	10.894	3.105
Adjusted R^2	0.076	0.062	0.101
# Observations	5,402,870	2,659,908	2,742,960

Table B.2: Aggregate Effect of the Litigation Wave: County-Year Level Evidence, Staggered Difference-in-Differences

This table presents regressions examining the effects of the 2012 increase in DOJ litigation risk and large banks' exit from the FHA market on total FHA lending volumes. We examine mortgage lending activity from 2009 to 2017 using a county-year panel constructed from HMDA data on first-lien home purchase mortgages for owner-occupied one-to-four family dwellings. Panel A presents staggered difference-in-differences tests using the county-year panel. The dependent variables in columns 1, 2, and 3, are *ln(Volume)*, the natural logarithm of one plus the dollar volume of FHA loan originations, *Volume per Capita*, the total dollar volume of FHA originations per capita, and *Loans per 1,000*, the total number of FHA originations per 1,000 residents in the county. The key independent variable is *Exposure to Litigated Banks*, which is the current fraction of lenders in the county that have already been litigated (weighted by pre-period market shares). The specifications also include the county-year level controls listed and defined in Appendix Table A.1, as well as county fixed effects and year fixed effects. Panel B presents staggered triple differences tests examining the same effects. These tests use a county-year-loan type panel, which is expanded to include an observation for both FHA volume and conventional volume in the county-year. The key independent variable is the interaction between *Exposure to Litigated Banks* and the *FHA* indicator for the observation corresponding to FHA lending. The specifications also include county-loan type fixed effects and year-loan type fixed effects. Standard errors are clustered at the county level and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: FHA Loan Originations

	ln(Volume)	Volume per Capita	Loans per 1,000
	(1)	(2)	(3)
Exposure to Litigated Banks	-0.098**	-36.164***	-0.118***
	(0.044)	(6.687)	(0.040)
Controls	Yes	Yes	Yes
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
2010 Mean	8.784	246.385	1.709
Adjusted R^2	0.960	0.881	0.861
# Observations	23,820	23,820	23,820

Panel B: FHA and Conventional Loan Originations

	ln(Volume)	Volume per Capita	Loans per 1,000
	(1)	(2)	(3)
Exposure to Litigated Banks × FHA	-0.161***	-114.095***	-0.693***
	(0.049)	(31.850)	(0.117)
Exposure to Litigated Banks	0.064**	67.052**	0.546***
	(0.027)	(29.578)	(0.108)
Controls	Yes	Yes	Yes
FHA × County FE	Yes	Yes	Yes
FHA × Year FE	Yes	Yes	Yes
2010 Mean	9.040	317.151	2.021
Adjusted R^2	0.972	0.883	0.889
# Observations	47,640	47,640	47,640