

The Life Cycle of a Bank Enforcement Action and Its Impact on Minority Lending*

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Abstract

This paper studies the role banking supervision plays in improving access to credit for minorities by investigating how enforcement decisions and orders (EDOs) affect bank borrower base. Despite declines in most component portfolios, we find that bank-level residential mortgage portfolios remain relatively unchanged after an EDO. We document significant changes in the underlying demographic mix of residential mortgage borrowers: after an EDO's termination, banks significantly increase residential mortgage lending to minorities. EDO banks are also less likely to deny loans to minority borrowers, and their reasons for loan denial change. We propose several mechanisms to explain why lending to minorities might increase after an EDO and find evidence consistent with EDO banks' improvements due to the enforcement process expanding lending to minorities, as well as banks catering to regulators after EDO termination.

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1. Introduction

U.S. residential mortgages constitute a significant consumer finance market with outstanding loan amounts of around \$10 trillion in 2019 (NYFRB, 2020). Owning a home conveys a number of social and economic benefits, such as the ability to accumulate wealth, access to credit by building home equity, higher educational attainment, and lower likelihood of incarceration.¹ However, despite more than 50 years of legislative initiatives, mortgage lending discrimination remains an important social and political issue and the subject of ongoing research efforts.² Mortgage loans are originated by banks, which are subject to prudential regulation and oversight, and shadow banks, which are not (Buchak et al., 2018). Although the use of algorithmic scoring by shadow banks has increased access to credit, it has not solved the problem of discrimination in mortgage lending completely (Bartlett et al., 2019). This raises the important question of the special role bank regulators and supervisors play in shaping the lending decisions of commercial banks with respect to minority borrowers. In this paper, we investigate the influence of bank supervision and enforcement on the propensity of banks to make mortgage loans to minority borrowers. Specifically, we study changes in banks' portfolio composition and their borrower base during the life cycle of an enforcement action.

Enforcement decisions and orders (also referred to as enforcement actions or EDOs) are an important mechanism that bank supervisors have at their disposal to force a bank to take corrective actions and follow safe and sound practices (Curry et al., 1999; Hirtle et al., 2020; Srinivas et al., 2015). EDOs are issued against financial institutions for violations

¹For example, see Aaronson (2000); Blau & Graham (1990); Collins & Margo (2001); Di et al. (2007); Green et al. (1997); Newman & Holupka (2016); Shapiro (2006); Wainer & Zabel (2020).

²Legislative initiatives include the Fair Housing Act of 1968, the Equal Credit Opportunity Act of 1974, the Home Mortgage Disclosure Act (HMDA) of 1975, and the Community Reinvestment Act (CRA) of 1977. The Financial Institutions Reform, Recovery, and Enforcement Act of 1989 modified HMDA to require banks to keep track of the individual characteristics of borrowers and applicants; extended the number of institutions that were covered under HMDA; and required regulators to publish the CRA ratings of every bank. For research in this area, see Asiedu et al. (2012); Blanchflower et al. (2003); Holmes & Horvitz (1994); Horne (1997); Munnell et al. (1996).

of laws, rules, or regulations; unsafe or unsound practices; breaches of fiduciary duty; and other violations. Bank regulators bring enforcement actions against problem banks as a measure of last resort and exercise some discretion in issuing EDOs. If a bank fails to satisfy the requirements of the order, banking regulators could enforce the order in U.S. district courts, terminate the deposit insurance, or take further actions that might lead to bank closure.³ Even though bank regulators could issue enforcement actions after the passage of the Financial Institutions Supervisory Act of 1966 (FISA), enforcement actions only became public knowledge in 1989 after the implementation of the 1989 Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA).

Receiving an enforcement action is disruptive for a bank and forces it to make operational changes it would not have otherwise. For example, banks might have to cut risky lending, change management, increase capital and provisions, and improve internal control systems. The disruption caused by the issuance of an EDO and its public disclosure could affect bank borrower base for several reasons. First, the increased regulatory oversight might cause banks to remedy issues that previously prevented them from providing credit to specific types of borrowers. For example, if a bank received an EDO for violating fair lending laws, this intervention would naturally lead the bank to increase lending to minorities. An enforcement action could also force a bank to review and update its risk assessment procedures, enabling it to effectively collect and use additional sources of information to evaluate borrowers' credit-worthiness potentially increasing access to credit for minorities.

Second, EDO banks may lend more to minorities to improve their capital ratios. Residential mortgage loans have lower risk weights than unsecured lending. Therefore, shifting the loan portfolio toward mortgage loans and away from unsecured lending increases banks'

³Upon successful completion of the required actions and improved CAMELS ratings from bank examiners, a termination order is issued. If a bank fails, a formal termination order is issued. If a bank is acquired or merges with another bank, the EDO remains under the original name of the bank, and is only terminated once the regulators are satisfied that the new entity has met the requirements spelled out in the original order. Sometimes, EDOs are modified to include additional conditions or requirements. [Klymenova & Tomy \(2020\)](#) show a schematic example of the FDIC cease and desist (C&D) enforcement order process over time.

regulatory capital ratios without having to raise additional equity capital (which may be difficult for banks that have recently received enforcement actions).⁴ An expansion in residential mortgage lending may only be possible if EDO banks lend to borrowers who previously did not receive mortgage loans.

Third, banks receiving enforcement actions have an incentive to cater to their regulators. EDO banks lose credibility with their regulators and would likely invite more scrutiny in the future, even after the EDO has been terminated. Even if the EDO is not directly related to violations of fair lending laws, banks may still have an incentive to increase lending to minority borrowers in order to avoid additional regulatory scrutiny or increase the likelihood of future forbearance (FRB, 2009). Since bank regulators have some discretion in their oversight and may exercise forbearance in dealing with problem banks, EDO banks that lend to minority communities may receive greater forbearance from prudential regulators (Brown & Dinç, 2011; Cole & White, 2017; Morrison & White, 2013; Santomero & Hoffman, 1999).

Finally, the disruption caused by an EDO potentially makes affected banks less competitive because it reduces their deposit-generating and lending abilities (Danisewicz et al., 2018; Delis et al., 2017; Kleyменова & Tomy, 2020; Peek & Rosengren, 1995). Non-EDO banks might therefore compete away depositors and borrowers from EDO banks, causing the latter to expand lending to previously underserved borrowers, such as minorities.

Our analyses of the effect of bank enforcement actions on lending to minorities begin with a surprising finding. While we observe that EDOs result in significant disruptions to banks' ability to generate deposits and make loans, the decline in deposits and loans does not extend to EDO banks' residential mortgage lending. To investigate this result, we study the composition of banks' residential mortgage portfolios by utilizing transaction-level data from the annual Home Mortgage Disclosure Act (HMDA). We find that EDO banks

⁴Prior studies have documented that banks optimize their portfolios within risk-weight allocations. For example, see Aiyar et al. (2014); Duchin & Sosyura (2014); Jiménez et al. (2017); Uluc & Wieladek (2018).

expand their geographic footprint and lend to minorities (defined as nonwhite borrowers) in new markets. The share of residential mortgage lending to minorities in EDO banks' total residential mortgage portfolio also increases by 2.5% to 6.0% after EDO termination.

An important concern is that other changes in the economy (rather than the enforcement process itself) that affect all banks and not only EDO banks could be driving the increase in lending to minorities. To address this concern, we study changes in the market shares of EDO banks in the counties where they operate. Specifically, find that EDO banks increase their market shares of lending to minorities following EDO termination. Relative to the pre-EDO period, market shares of mortgage lending to minorities increase by 0.87% to 1.41%. On average, EDO banks' market share of lending to minorities in the residential mortgage market is 0.41%, making the increase economically significant.

Because market shares consider all banks that lend to minorities in a county, our approach allays concerns that general economic trends could drive our findings for EDO banks. Our results indicate that relative to non-EDO banks operating in the same county, EDO banks significantly expand their lending to minority borrowers. Furthermore, as EDOs are staggered in time and vary by geography, they provide variation that allows us to tie the increase in lending to minorities to banks' receipt of and exit from enforcement actions. We also control for bank-specific characteristics and county-level employment growth and include year and bank effects to control for any unobserved heterogeneity due to aggregate macroeconomic conditions and time-invariant bank characteristics.⁵

To provide further insights, we investigate changes in the type of loans rejected and the reasons for dismissing mortgage loan applications from minorities. In our sample, 34.5% of all mortgage loan applications from minorities are denied. The corresponding denial rate for white borrowers is 22.4%. We find that in the pre-EDO period, minority borrowers are 11% more likely to be denied a mortgage loan than white borrowers. Following EDO termi-

⁵In robustness tests, we create a sample of non-EDO banks matched on observable bank characteristics. We also create a second sample of non-EDO banks selected randomly by year and geography. Our main result that EDO banks expand lending to minority borrowers holds using these control samples.

nation, EDO banks are 6% *less* likely to reject a loan application from minority borrowers. However, over two-thirds of this decline in mortgage application rejection rates for minority applicants comes from loans for refinancing existing properties, investment properties, and home improvement rather than for home purchases. Homeownership has been tied to intergenerational wealth transfers and cited as a reason for the wealth gap between whites and minorities (Blau & Graham, 1990; Collins & Margo, 2001; Di et al., 2007; Newman & Holupka, 2016; Shapiro, 2006; Wainer & Zabel, 2020). Also, children of homeowners have higher educational achievement and a lower likelihood of incarceration (Aaronson, 2000; Green et al., 1997). Our findings suggest that although banks increase lending to minorities following termination of an enforcement action, aspiring first-time minority borrowers do not drive this result. Therefore, although an enforcement action reduces the gap in denial rates between white and minority borrowers by roughly a half, this drop is unlikely to translate to a corresponding increase in the percentage of homeownership in minority communities.

Our analysis also offers insights into the channels that banks employ to increase lending to minorities. For example, when we consider reasons for denying a mortgage loan application, we find that after the EDO termination, applications from minority borrowers are 0.86% less likely to be rejected due to their credit history. Banks have used nonprice terms such as credit history, collateral, and debt-to-income ratios to ration credit (Stiglitz & Weiss, 1981). Minority borrowers are more likely to be constrained by such nonprice terms because they are also more likely to have lower wealth (Acolin et al., 2016; Bostic, 1997; Gyourko et al., 1999). Our findings suggest that banks are less likely to reject loan applications from minorities based on nonprice terms following EDO termination.

We provide potential explanations for why banks increase lending to minorities after an EDO. In particular, we find banks that receive more severe EDOs and banks with stricter regulators increase lending to minorities more. These banks are more likely to experience greater operational improvements (e.g., implement better risk assessment procedures) than banks with less severe EDOs or with more lenient regulators. We also do not find any

increase in the riskiness of loans indicating that EDO banks do not take on additional risk when they increase lending to minorities. In addition to our findings that banks rely less on nonprice terms following EDO termination, these results collectively suggest that improvements following an EDO lead to greater access to credit for minority borrowers.

Our findings are also consistent with a catering mechanism. Banks that receive enforcement actions lose credibility with their regulators and are more likely to invite future regulatory scrutiny, even after EDO termination. Such scrutiny could be higher for banks with more severe enforcement actions and banks with stricter regulators. Consistent with a catering mechanism, we also find banks with low Community Reinvestment Act (CRA) ratings prior to receiving an EDO are more likely to increase lending to minorities following EDO termination. Banks need to maintain a satisfactory CRA rating if they plan to expand or make any substantial changes to their operations. Finally, we do not find that banks expand residential mortgage lending to minority borrowers to improve their capital ratios, or that an increase in competition from non-EDO banks drives EDO banks to lend more to minority borrowers.

Our paper contributes to two main streams of the literature. First, we contribute to the work on bank supervision and enforcement actions by exploring the impact of EDOs on bank borrower base (Berger et al., 2021; Flannery, 1998; Granja & Leuz, 2017; Hirtle et al., 2020; Passalacqua et al., 2019). Although prior research has studied the causes and consequences of bank enforcement actions (Danisewicz et al., 2018; Delis et al., 2017; Kleymenova & Tomy, 2020), to the best of our knowledge, we are the first to investigate the effect of the supervisory enforcement process on changes in bank borrower base and study the direct and indirect channels through which it manifests.

Second, we contribute to the literature on discrimination in mortgage lending. A large body of work in this area finds a disparity in credit access across different borrower groups. However, this literature has not reached a consensus on whether non-economic factors such as race and gender play a role in lenders' decisions to extend credit (Asiedu et al., 2012;

Blanchflower et al., 2003; Holmes & Horvitz, 1994; Horne, 1997; Munnell et al., 1996). Our findings also suggest that although banks may have increased lending to minority borrowers following an enforcement action, the increase is driven by less risky refinancing and home equity loans. Therefore, the increase in lending to minorities is unlikely to lead to a corresponding rise in homeownership among minority communities.

2. Data and sample

Our data come from different sources. We identify all enforcement actions issued by bank regulators starting from 1997 using the S&P Global SNL Financial database. Several types of enforcement actions exist and they vary by degree of severity. Similar to other research using EDOs (Delis et al., 2017; Kleymenova & Tomy, 2020), we restrict our analyses to the most common and severe EDO types that require banks to take corrective actions: cease and desist (C&D) orders, formal or supervisory agreements, consent orders and prompt corrective action (PCA) orders. C&D orders are enforceable, injunction-type orders that may be issued to a banking organization when it engages, has engaged, or is about to engage in an unsafe or unsound banking practice or violation of the law. Formal agreements prescribe restrictions, corrective measures, and remedies that banks must take to return to a safe and sound condition. PCA orders require banks to take certain corrective measures to protect or raise the level of their regulatory capital. Our main sample consists of 1,350 unique severe EDOs issued by all federal bank regulators for years 1997 to 2013 and we use the first EDO that a bank receives.⁶ Our analyses focus primarily on EDO banks during the life cycle of an EDO, which is three years before an EDO is received, the period when a bank is subject to the EDO and five years that follow the EDO's termination.⁷

⁶Among the 1,350 EDO banks in our sample, 981 have only one EDO; 293 banks have two EDOs; 67 banks have three EDOs; 7 banks have four EDOs; and only 2 banks have five EDOs. In our sample, C&D orders are the most common with 769 EDOs, followed by formal agreements and consent orders (537) and PCA orders (44). We use EDOs from the FDIC, Federal Reserve System, and the Office of the Comptroller of the Currency (OCC).

⁷We start our sample in 1997 so that the three-year pre-EDO period begins in 1994 when the Summary of Deposits data (SOD) begins. We stop our EDO sample in 2013 so that the post-termination period is five

We focus our empirical analyses on commercial banks and obtain their financial data from the Federal Financial Institutions Examination Council (FFIEC) call reports. [Table 1, Panel A](#) shows the summary statistics for our main dependent and control variables for EDO banks using quarterly call report data. On average, 65.3% of EDO banks' assets are in total loans. Commercial and industrial (C&I) loans represent 10.3% of banks' total assets, mortgages represent 47.4% of total assets on average (of which commercial mortgages represent 10.2% of total assets and residential mortgages represent 17.9% of total assets on average). Total loans are on average 78.6% funded by deposits. The average size of EDO banks in our sample is \$149.79 million (based on total assets), implying that an average bank in our sample is a small community bank.

For the county-level analyses of deposits, we utilize the annual summary of deposits (SOD) data available from the Federal Deposit Insurance Corporation (FDIC). SOD data is only available publicly from 1994, which constrains our sample. [Table 1, Panel A](#) shows the average level of deposits EDO banks have at the county level and their corresponding deposit market shares. The average level of deposits for EDO banks at the county level is \$54 million and an average county market share is 10.10%.

For our main analyses of residential loan mortgage portfolios and their composition, we use the HMDA data that provides transaction-level disclosure of residential mortgage loan applications and underwritten loans as well as reasons for denial of an application. These data are available annually. The HMDA data cover 999 unique EDO banks. Focusing on EDO banks during the life cycle of an EDO, [Table 1, Panel A](#) shows that the percentage market share of residential mortgage lending to minorities in a given county is 0.41%.⁸ [Table 1, Panel B](#) shows the breakdown of the number of loans originated and the number of applications denied by applicants' race and gender, and loan type and purpose. On average, EDO banks deny 33.8% of all applications. However, minority and female borrowers represent a smaller

years for all EDO banks.

⁸Among originated loans, 12.7% do not report race and 9.2% do not report gender.

portion of originated loans and a higher portion of denied loan applications (34.5% for minorities and 28.4% for females). We use the reported race and gender of the primary applicant and define minority borrowers as applicants whose race was specified in the loan disclosure documents as nonwhite.⁹ As can be seen from [Panel B of Table 1](#), the majority of originated loans are for nonminority (76.1%) and male borrowers (67.6%).

[Table 1, Panel B](#) also provides some color on the types of loans in our sample. The majority of originated loans and loan applications overall is conventional (86.6% and 89.1%, respectively). Conventional loan applications are also more likely to be denied (35.7%). As for the specified loan purpose, the largest proportion of loans and applications are for refinancing of existing loans for properties that are owner-occupied (44.9% for originated loans and 49.5% for all loan applications). Home purchases of primary residences (*Home Purchase-Owner occupied*) represents the second largest category of originated loans (31.9%) and overall applications (27.7%). We winsorize all of the continuous variables at the the 1% and 99% tails of their respective distributions in each sample year and provide detailed definitions of all variables used in our analyses in [Appendix A](#).

3. The life cycle of an enforcement action

3.1. EDO banks' deposits

We begin our analyses by investigating the impact of EDOs on deposits during the time a bank is subject to an EDO and after its termination. Consistent with depositors imposing market discipline, [Kleymenova & Tomy \(2020\)](#) find that deposits decline after a bank receives an enforcement action. Therefore, in our first set of tests, we explore whether EDO banks lose deposits while an EDO is in effect and whether deposits recover following the termination of the enforcement action. Specifically, we estimate variations of the following model for our

⁹Minorities are defined as reporting the following race on the application: American Indian or Alaska Native, Asian, Black or African American, or Native Hawaiian or Other Pacific Islander. Non-white hispanics are also included in this definition.

sample of EDO banks:

$$Deposits_{it} = \beta_0 + \beta_1 During\ EDO_i + \sum_{j=1}^5 \theta_j Post\ EDO_{ij} + \gamma X_{it-1} + \alpha_i + \delta_t + \epsilon_{it}, \quad (1)$$

where $Deposits_{it}$ refers to the natural logarithm of total deposits at a bank i in period t ; $During\ EDO$ is an indicator that equals 1 for the time period an EDO is in effect and 0 otherwise; $Post\ EDO$ is an indicator that equals 1 for the j^{th} year after the termination of the EDO and 0 otherwise; X is a vector of control variables, lagged by a quarter, and includes size, profitability, liquidity, capital ratio, nonperforming assets, and county-level employment growth as a control for local economic conditions; and α_i and δ_t are bank and year-quarter fixed effects, respectively. The benchmark period is three years prior to the issuance of the EDO. We only retain data for EDO banks for the benchmark period, the duration of the EDO, and five years after the termination of the EDO. We apply this restriction in all of our specifications.

Columns (1) and (2) of [Table 2](#) present the results from estimating [Equation 1](#) using quarterly bank-level data. Column (1) of the table does not include bank level controls, whereas column (2) does. As column (2) shows, deposits at the EDO bank decline by 1.6% while the EDO is in effect and increase to pre-EDO levels after the termination of the EDO. To address the concern that the decline in deposits could be driven by local market conditions that might simultaneously affect all banks in a county as opposed to only EDO banks, we reestimate [Equation 1](#) using county-level deposit market shares as the dependent variable. This variable represents the total county-level deposits for EDO banks scaled by the total county-level deposits for all banks operating in that county. We present these shares in percentages.

[Table 2](#), columns (3) and (4) present the results from this reestimation using the FDIC's SOD data aggregated to the bank-county level. Because SOD data is only available at the annual level, the analyses in columns (3) and (4) use observations at the bank-county-

year level. Column (3) of [Table 2](#) includes the control variables described above as well as bank and year fixed effects. Column (4) includes bank \times county fixed effects and therefore drops the bank fixed effects but retains the control variables and year fixed effects. This specification allows us to more precisely estimate any changes in deposit market shares for a given bank within a particular county. The results in both columns indicate that EDO banks lose deposit market shares during an enforcement action. The magnitude of the decline in market shares is 0.17%–0.24%. This decline is economically significant, as the median EDO bank has a county-level deposit market share of 3.7% ([Table 1, Panel A](#)), but not persistent (market shares revert to their pre-EDO levels following the termination of the enforcement action).

Overall, our results in this section indicate that EDO banks lose deposits when the enforcement action is in effect. However, deposits revert to the pre-EDO levels following the enforcement action’s termination. Furthermore, our analysis of deposit market shares indicates that the decline in deposits is not driven by local market conditions (that would affect non-EDO banks as well) and helps rule out the concern that EDOs are systematically issued in distressed counties that may already be experiencing deposit declines. Moreover, EDOs are spread out over many years and cover multiple geographies, reducing concerns that year- or location-specific effects could be driving our results. Therefore, these findings allow us to tie the decline in deposits to the enforcement action.

3.2. EDO banks’ loan portfolio and lending to minority borrowers

EDO banks in our sample predominantly rely on deposits for their funding needs. The mean loans to deposits ratio is 0.79 for our sample ([Table 1, Panel A](#)). Therefore, the decline in deposits that we document in [Table 2](#) is expected to affect banks’ lending activity. To assess the impact on banks’ loan portfolios, we estimate the following model:

$$Loans_{it} = \beta_0 + \beta_1 During\ EDO_i + \sum_{j=1}^5 \theta_j Post\ EDO_{ij} + \gamma X_{it-1} + \alpha_i + \delta_t + \epsilon_{it}, \quad (2)$$

where *Loans* corresponds to total loans and components of the loan portfolio as a share of total assets. In particular, *Loans* represents total loans, C&I loans, total mortgages, commercial mortgages, and residential mortgages as a share of total assets. The remaining variables are defined as before.

Table 3 shows our results from estimating Equation 2. All specifications include bank and year-quarter fixed effects, as well as bank-level controls. In addition, we include county-level employment growth as a control for changes in local economic conditions. As predicted, EDO banks' total lending activity declines during the time a bank is subject to an enforcement action (column (1)). The decline in lending lasts for one year after the EDO is terminated, and reverts to its pre-EDO levels in the two to five years after termination. Total loans decline by 2.1%–2.4% and this decline is driven by the reduction in lending to commercial customers. In particular, the share of C&I loans decreases by 0.3% during the EDO (column (2)). Also, the decline in total mortgage lending of 1.1%–1.2% (column (3)) is driven by lending to commercial customers (column (4)). Surprisingly, we find no decline in residential mortgage lending (column (5)). To better understand why the decline in EDO banks' total and commercial loans portfolios does not correspond to a similar decline in residential mortgage loans, we investigate the composition of banks' residential mortgage portfolios in more detail.

We begin by exploring EDO banks' borrower bases and their geographic footprints for residential mortgages. First, we examine whether EDO banks expand their geographic reach following the termination of their enforcement actions. Column (1) of Table 4, Panel A shows that the number of distinct counties in which an average EDO bank operates increases from 21 counties during the time of an EDO to 31 counties in the five years following its termination, indicating that an average EDO bank expands to ten more counties after an EDO is terminated. Column (2) of the table shows that the average number of counties in which EDO banks lend to minorities also increases from six during an EDO to eleven in the five years after. However, as column (3) shows, EDO banks do not substantially expand to counties where minorities represent more than 50% of the population. For comparison,

we also report the average number of counties in which the EDO banks operate three years before receiving the enforcement action. The number of counties in which EDO banks operate shows little variation in the pre-EDO period. Overall, this table indicates that, following the termination of enforcement orders, EDO banks expand their mortgage lending operations' geographic footprint. Furthermore, they also expand lending to minorities in new locations.

To further explore changes in lending to minorities for our sample of EDO banks, we reestimate [Equation 2](#) with the dependent variable representing lending to minorities as a share of banks' portfolios of residential mortgage lending at the bank-county level. This variable contains many zero values because banks do not lend to minorities in all counties where they operate.¹⁰ Therefore, we estimate [Equation 2](#) using a Tobit regression model ([Boulton & Williford, 2018](#); [Tobin, 1958](#)), including bank, county and year random effects.¹¹ We present our results from this estimation in [Table 4, Panel B](#). The sample includes all counties where EDO banks make residential mortgage loans. Column (1) shows that the share of residential mortgage loans to minorities in banks' total residential mortgage portfolio increases by 2.5% to 6.0% following the termination of the EDO. These results demonstrate that EDO banks increase lending to minorities as a share of their total residential mortgage portfolio following the termination of the enforcement action.

To assess whether the increase in lending to minorities was due to underlying local economic or other changes affecting all banks, including those that did not receive an EDO, we examine changes in the county-level market shares of mortgage lending to minorities. Specifically, we reestimate [Equation 2](#) using county-level market shares in mortgage lending to minorities (measured as a percentage) as the dependent variable. As before, given the high number of zeros, we employ a Tobit regression model with bank, county and year random effects.

¹⁰As can be seen in [Table 4, Panel A](#), EDO banks lend to minorities in only 29% (6/21) of the counties where they are active during the EDO. This figure increases to 35% (11/31) in the five years after EDO termination.

¹¹A Tobit specification is appropriate when it is assumed the zero and positive observations are generated by the same underlying mechanism ([Silva et al., 2015](#)).

Table 4, Panel B presents the results from this estimation in column (2). The sample in this table includes all counties with mortgage lending to minorities. EDO banks significantly expand lending to minorities in the years following EDO termination. Relative to the pre-EDO period, the market share in mortgage lending to minorities increases by 0.87% to 1.41%. On average, as reported in Panel A of Table 1, EDO banks have a market share of 0.41% in mortgage lending to minorities over our sample period, suggesting that the changes in market shares are economically significant. These market shares results mitigate concerns that macroeconomic changes in the local market could have driven the increase in lending to minorities by EDO banks because, relative to non-EDO banks operating in the county, EDO banks disproportionately expand their lending to minority communities. The results in Table 4, Panel B, combined with the fact that EDOs are staggered in time and by geography, allow us to tie the increase in lending to minorities to the receipt of and exit from an EDO.

Overall, our findings in this section suggest several implications for banks receiving enforcement actions. First, because an enforcement action is publicly disclosed, it results in a decline in deposits consistent with funding providers imposing market discipline. Second, the decline in deposits is associated with a decline in lending as most EDO banks rely on deposits to meet their funding needs. Surprisingly, the decline in lending is concentrated in commercial lending (commercial mortgages and C&I loans) with no significant changes in residential mortgages. Further analyses reveal that, although there are no changes in residential mortgages overall, EDO banks shift their residential mortgage portfolios to lend more to minorities. To further support our findings of increased mortgage lending to minorities due to an EDO, we explore changes in denials of residential mortgage applications next.

4. Changes in mortgage application denials for minorities

We evaluate changes in denials by loan purpose and reasons for denying an application provided by banks for residential mortgage applications from minorities relative to white borrowers. Because banks could deny different loan application types and provide various

reasons for denial with no clear ordering, we use a multinomial logistic regression to model banks’ choices. In particular, we estimate the probability that a bank i takes an action ϕ as follows:

$$Pr(Y_i = \phi) = \frac{\exp(\beta_\phi X_i)}{\sum_{\phi=1}^k \exp(\beta_\phi X_i)}, \text{ for } \phi = 1, \dots, k, \quad (3)$$

where X represents a vector of variables including *Borrower*, *During EDO*, and *Post EDO* indicators and the interaction of *Borrower* with these indicators; X also includes the control variables (size, profitability, liquidity, capital ratio, nonperforming assets, and county-level employment growth) and year fixed effects.

In our first set of tests, ϕ represents denial by loan type. Relative to a baseline of no denial, we define mutually exclusive categories based on whether the home is owner-occupied (primary home for the borrower) or non-owner-occupied (an investment property), and whether the purpose of the loan is a home purchase, home improvement, or refinancing.

Table 5, Panel A presents the results from the estimation. For ease of interpretation, we suppress coefficient estimates and report only marginal effects. Consistent with prior studies (Black et al., 1978; Duca & Rosenthal, 1993; Munnell et al., 1996; Wheeler & Olson, 2015), the marginal effects for *Borrower* indicate that minorities are more likely to be denied loans relative to white borrowers. Furthermore, the denial likelihood is consistently higher for minorities across all but one loan type (refinancing loans for non-owner-occupied properties), for which it is the same as for white borrowers. However, following EDO termination, banks are *less* likely to deny loan applications from minority borrowers (column (1) shows the marginal effect for “No Denial” is 6.4%). This decline in denials is driven by refinancing, home purchase, and home improvement loans for owner-occupied properties, for which denials decrease by 2.3%, 1.8%, and 1.5%, respectively. The likelihood of denial also decreases, albeit by a lesser extent, for non-owner-occupied home purchase loans (−0.73%).

These results suggest that although there is a decline in mortgage application denials for minorities after EDO termination, two-thirds of this decline comes from loans for refinancing existing properties, loans for investment property, and home-improvement loans rather

than from home purchase loans, suggesting that borrowers with a proven credit and loan repayment track record are more likely to get loans post EDO termination. Importantly, denials of applications for primary residence purchases (column (2)) decrease by less than for refinancing. Loans for primary residence purchases include applications from borrowers who are aspiring first-time homeowners. Minority borrowers in this category are 4.0% more likely to be denied loans in the pre-EDO period relative to white borrowers, and this figure declines by only 1.8% following EDO termination. On the other hand, the pre-EDO denial likelihood for owner-occupied refinancing loans for minorities is 2.95% and this likelihood drops by 2.30% following EDO termination (column (6)), largely closing the gap in denials between minorities and white borrowers in this category of loans.

Next, we reestimate [Equation 3](#) while focusing on the reasons for denying a mortgage loan application. Banks have the choice to accept a loan application or to deny it for various reasons, which may change following an enforcement action. Relative to a baseline of no denial, we define mutually exclusive categories based on the reasons for denial specified by EDO banks. These include a high debt-to-income ratio, poor credit history, lack of collateral, information reasons (including denials due to unverifiable information or incomplete credit applications), and a residual category “Other.” While there are multiple reasons for denying a loan, we focus on those that appear more frequently in our sample. In our sample of mortgage loan applications, 33.8% get denied ([Table 1, Panel B](#)). The denial rate due to lack of collateral is 32.2%, poor credit history is 17.8%, a high debt-to-income ratio is 8.4%, and information reasons is 8.0% (untabulated). The residual category (33.6%) includes all loan applications where a reason for denial is not specified or appears with a low frequency and also when there are multiple reasons for denial.¹²

Mortgage application requirements such as collateral, credit history, and debt-to-income ratios are nonprice terms that lenders use to ration credit ([Stiglitz & Weiss, 1981](#)). Lenders

¹²Besides denials for unspecified reasons, the residual category includes denials due to employment history, insufficient cash, denial of mortgage insurance, or multiple reasons. 31.9% of all denials in the residual category are due to unspecified reasons.

use such nonprice terms to limit moral hazard or adverse selection, and borrowers who do not meet the thresholds for these terms may not receive credit even if they are willing to pay higher interest rates. Minority borrowers are more likely to be constrained by nonprice terms because they are also more likely to have lower wealth (Acolin et al., 2016; Bostic, 1997; Gyourko et al., 1999). For example, Bostic (1997) finds that minority applicants get rejected more often if debt-to-income ratios are used in credit assessment because they have lower incomes and are therefore prone to default in case of income shocks.

Table 5, Panel B presents marginal effects from the estimation of Equation 3 and indicates that following EDO termination, minorities are 0.86% less likely to be denied a loan due to their credit history, suggesting that banks potentially change their credit assessment techniques to rely less on nonprice terms following an enforcement action. They may also use additional sources of information to assess borrowers' creditworthiness, as opposed to relying solely on their credit scores. We also find that minority borrowers are less likely to be denied a loan due to other reasons (-4.66%). This category primarily includes denials where the bank does not specify the reason for denial or if it specifies multiple reasons for denial.

In the analyses in Table 5, we control for time-varying bank-level variables, year effects, and county-level employment growth. Our estimates provide incremental changes in banks' post-EDO residential mortgage lending to minorities relative to whites. We are unable to control for additional borrower characteristics due to lack of data. However, if the increase in lending to minorities is driven by higher borrower quality, this raises the question of why EDO banks did not lend to these better quality borrowers before receiving the enforcement action. Also, in later analysis (Section 5) we do not find any increase in the riskiness of loans post EDO termination, suggesting that EDO banks do not expand lending to riskier customers.

Overall, our findings in this section highlight that, although mortgage loan application denials to minorities decrease following an EDO termination, two-thirds of this decline comes

from non-home-purchase loans. Homeownership has been tied to intergenerational wealth transfers and cited as a reason for the wealth gap between whites and minorities (Blau & Graham, 1990; Collins & Margo, 2001; Di et al., 2007; Newman & Holupka, 2016; Shapiro, 2006; Wainer & Zabel, 2020). Prior research has also found positive externalities of homeownership. For example, homeownership creates stability, which results in homeowners’ children having higher educational achievement and a lower likelihood of incarceration (Aarons, 2000; Green et al., 1997). Our findings suggest that although banks increase lending to minorities following the termination of an enforcement action, such an increase is not driven by loans to minorities who are aspiring first-time homeowners. Therefore, although an enforcement action reduces the gap in mortgage application denials between white and minority borrowers by roughly half (a 6% reduction of an 11% gap), this drop is unlikely to translate to a corresponding increase in the percentage of homeownership in minority communities.

Our analyses offer insights into the reasons that lending to minorities increases following EDO termination. We find that EDO banks are less likely to deny loans to minority applicants based on nonprice terms indicating changes in credit assessment procedures. Reduced reliance on nonprice terms such as credit history disproportionately affects lending to minorities because this category of borrowers is more likely to be constrained by such terms (Acolin et al., 2016; Bostic, 1997; Gyourko et al., 1999). In Section 6, we further explore potential mechanisms to explain the increase in lending to minorities following EDO termination.

5. Changes in risk

We next investigate whether increased lending to minority borrowers is associated with a rise in risky lending. If EDO banks were to increase lending to less creditworthy customers, such an increase should result in higher nonperforming assets. Accordingly, we study the changes in EDO banks’ nonperforming assets in the years following EDO termination relative

to the pre-EDO period by estimating the following model:

$$NPA_{it} = \beta_0 + \beta_1 \textit{During EDO}_i + \sum_{j=1}^5 \theta_j \textit{Post EDO}_{ij} + \gamma X_{it-1} + \alpha_i + \delta_t + \epsilon_{it}, \quad (4)$$

where *NPA* is the total and residential nonperforming assets scaled by total loans. The remaining variables are as defined before.

Table 6, Panel A, presents our findings from estimating Equation 4. Columns (1) and (2) show changes in total nonperforming assets during and following the termination of an EDO relative to the period prior to the EDO. Column (1) does not include bank-level controls whereas column (2) does. Total nonperforming assets increase during an EDO, consistent with regulators inducing banks to recognize previously hidden nonperforming loans. However, nonperforming assets revert to their pre-EDO levels in the two years following EDO termination. The asset quality of the EDO bank improves in the three to five years following EDO termination and is 0.6%–0.9% *lower* than pre-EDO levels. In column (3), the dependent variable is nonperforming assets for residential mortgages. Due to data restrictions, we can only analyze NPAs for residential mortgages starting from 2001. Consistent with the results for total nonperforming assets, column (3) shows that NPAs for residential mortgages decline by 0.2% during the EDO and to 0.3% in the five years after EDO termination. Overall these results show that EDO banks witness a decline in their nonperforming assets in the years following the termination of EDOs, suggesting a reduction in risk-taking.

We also study changes in the share of risky loans made by EDO banks at the county level by reestimating Equation 4, the results of which are presented in Panel B of Table 6. The dependent variable (*Risky loans*) is defined as higher-priced closed-end mortgages as a share of the total residential mortgage loans at the county-level.¹³ Given data limitations, this analysis is restricted to 2004–2017. Our results indicate no change in *Risky loans* fol-

¹³Loans are classified as higher-priced if the annual percentage rate (APR) exceeds the average prime offer rate (APOR) for loans of a similar type by at least 1.5 percentage points for first-lien loans or 3.5 percentage points for junior-lien loans.

lowing EDO termination, suggesting that the increase in lending to minority borrowers is not associated with an increase in risky lending.

6. Potential mechanisms

Next, we investigate potential mechanisms that might drive the increase in lending to minorities following EDO termination. First, the enforcement action may have made improvements at the bank resulting in increased lending to minority borrowers. Second, EDO banks may have expanded residential mortgage lending to improve their capital ratios, and such expansion may only be possible if they lent to previously underserved borrowers. Third, the EDO bank may have increased lending to minority borrowers to cater to regulators to invite future regulatory leniency. Finally, increased competition from non-EDO banks may have resulted in EDO banks expanding their lending to minority borrowers. Overall, we find evidence consistent with improvements at EDO banks due to the enforcement process and banks catering to regulators explaining the increase in lending to minorities.

6.1. Improvements at EDO banks due to the enforcement process

The enforcement action could have led to improvements in credit assessment processes at EDO banks, resulting in increased lending to underserved categories of borrowers. Several of our findings suggest that the enforcement process led to such improvements. First, our results in [Section 4](#) that EDO banks are less likely to deny credit to minority borrowers based on nonprice terms indicates changes in banks' credit assessment procedures following EDO termination. Second, as discussed in [Section 5](#), EDO banks witness a reduction in nonperforming assets and no change in the county-level share of risky loans, further suggesting improvements in credit assessment. Finally, we assess the differential lending behavior of banks likely to have witnessed more significant improvements relative to the pre-EDO

period. Specifically, we estimate variations of the following model for EDO banks:

$$\begin{aligned}
 Y_{it} = & \beta_0 + \beta_1 \text{During EDO}_i + \sum_{j=1}^5 \theta_j \text{Post EDO}_{ij} + \beta_2 \text{During EDO}_i \times \text{Treat}_{it} \\
 & + \sum_{j=1}^5 \omega_j \text{Post EDO}_{ij} \times \text{Treat}_{it} + \gamma X_{i\tau-1} + \delta_t + \epsilon_{it},
 \end{aligned} \tag{5}$$

where the dependent variable Y_{it} represents lending to minorities as a share of total residential lending at the bank-county level for our sample of EDO banks. *Treat* represents variables associated with greater improvements (e.g., better risk assessment procedures) following the receipt of an enforcement action. The remaining variables are as defined before.

In our first set of tests, *Treat* represents the strictness of the regulator. We expect that EDO banks in states with stricter regulators are more likely to witness greater improvements as a result of the enforcement process. We use the measure developed by [Agarwal et al. \(2014\)](#) who find that, due to institutional differences, varying incentives, and resource constraints, state and federal banking regulators are inconsistent in implementing the same supervisory rules. Specifically, based on regulatory ratings, [Agarwal et al. \(2014\)](#) find that federal regulators are generally stricter than state regulators, and there is variation across states in their level of strictness. Although this measure pertains to state regulators, federal and state regulators collaborate in issuing enforcement actions to state-chartered banks.

We present our results from this analysis in column (1) of [Table 7, Panel A](#). As before, we use a random effects Tobit estimator because EDO banks do not lend to minorities in all counties where they operate, resulting in many zero values for the dependent variables. The sample only includes banks state-chartered banks, as the [Agarwal et al. \(2014\)](#) measure applies only to state-chartered banks by construction. Our results indicate that EDO banks with stricter regulators expand their portfolio shares of lending to minorities by 4.2%–11.5% following EDO termination.

Next, we estimate [Equation 5](#) with *Treat* representing the severity of the enforcement action, measured as the length of time it takes a bank to exit an EDO from its issuance to

resolution. Banks with more severe enforcement actions are more likely to be required to make greater changes to their operations. These banks have problems on several fronts which need to be resolved before the regulator agrees to terminate the enforcement action. Therefore, EDO banks with more severe enforcement actions are more likely to experience greater improvements in their operations following EDO termination, relative to the pre-EDO period. Column (2) of [Table 7, Panel A](#) shows that banks with more severe EDOs significantly increase lending to minorities after the EDO. Specifically, for these banks lending to minorities increases by 2.2%–5.5% during an EDO and in the years following its termination. Overall, our findings suggest that improvements of banks’ operations due to the enforcement process lead to an increase in lending to minorities.

6.2. Improving capital ratios

Because secured loans have relatively lower risk weights, EDO banks could increase their capital ratio by expanding residential mortgage lending. However, an increase in residential mortgage lending may only be possible if EDO banks expand lending to minorities. To test this hypothesis, we re-estimate [Equation 5](#) where *Treat* represents low capital, measured as an indicator for EDO banks in the lowest tercile of regulatory capital in the period prior to receiving an EDO. We present our findings from from this estimation in column (3) of [Table 7, Panel A](#) and show that they do not provide consistent evidence to suggest that EDO banks expand lending to minorities to manage their capital.

6.3. Catering to regulators

We next explore whether EDO banks increase lending to minorities to cater to regulators following the termination of enforcement actions. Regulators have some discretion in their oversight and may exercise forbearance in dealing with problem banks ([Brown & Ding, 2011](#); [Cole & White, 2017](#); [Morrison & White, 2013](#); [Santomero & Hoffman, 1999](#)). The existence of regulatory discretion gives banks an incentive to cater to regulators so as to ensure favorable outcomes in the future. Furthermore, because banks receiving enforcement

actions lose credibility with their regulators, they are also more likely to invite increased regulatory scrutiny in the future. Therefore, we hypothesize that banks increase lending to minorities following an EDO to avoid regulatory attention and gain leniency from regulators.

The results presented in columns (1) and (2) of [Table 7, Panel A](#) are also consistent with a catering mechanism. For example, banks in states with stricter regulators and those that receive more severe enforcement actions may have a greater incentive to influence regulators' perceptions. We also conduct tests using banks' CRA ratings. The Community Reinvestment Act (CRA) was enacted by Congress in 1977 to encourage credit availability in low- and moderate-income areas. Regulators rate banks based on their record in meeting the credit needs of communities in which they operate. These ratings are used to evaluate banks' applications for deposit facilities which include new charters, deposit insurance, mergers or acquisitions, opening a new branch, or the relocation of a branch or home office. Therefore, banks need to maintain a satisfactory CRA rating if they plan to expand or make any substantial changes to their operations. Furthermore, if banks' failure to comply with the CRA is correlated with the racial makeup of underserved neighborhoods, intentional discrimination in violation of the FHA or ECOA can be inferred ([Schwemm, 1994](#)).¹⁴

CRA rating changes are relatively infrequent and take one of four possible values: outstanding, satisfactory, needs to improve, and substantial noncompliance. The majority (75%) of bank-year observations in our sample of EDO banks have a rating of outstanding or satisfactory. Because the rating changes are infrequent, we collapse our *Post EDO* indicators for the five years following EDO termination into a single *Post EDO* indicator and reestimate [Equation 5](#). [Table 7, Panel B](#) shows that banks with a low CRA rating (needs to improve or substantial noncompliance) in the pre-EDO period expand their lending to minority borrowers by 8.9% in the post-EDO period relative to EDO banks that had an outstanding or

¹⁴Noncompliance and low CRA ratings do not result in formal enforcement actions. In 1994, the Department of Justice issued an opinion that formal EDOs, such as C&D or civil money penalties do not fall into the scope of CRA (for more details, please see "Community Reinvestment Act: Challenges Remain to Successfully Implement CRA" (Chapter Report, 11/28/95, GAO/GGD-96-23)).

satisfactory rating. This result is consistent with EDO banks catering to regulators following the receipt of an enforcement action by expanding their lending to minorities. Although these banks did not receive enforcement actions for violations of the CRA, they nonetheless take measures to improve their CRA ratings, consistent with these banks taking actions to rebuild their credibility with regulators.¹⁵ Overall, the results in this section provide evidence consistent with EDO banks' increasing lending to minority borrowers to rebuild credibility with and gain leniency from regulators.

6.4. Competition from non-EDO banks

Next, we assess whether competition from banks that did not receive enforcement actions led EDO banks to expand their lending to minorities. Increased competition could result in greater lending to minority borrowers for two reasons. First, because EDO banks lose deposits and likely face reputational costs due to the public disclosure of EDOs, they may lose their more profitable customers to competing non-EDO banks forcing them to expand their reach to new borrowers who previously did not qualify for a loan. Second, because competition erodes excess margins, it increases the cost of discriminating. If banks were previously engaged in taste-based discrimination (Becker, 1957), they would have had to pay a cost for the utility derived from not lending to specific groups of borrowers. An increase in competition reduces banks' ability to pay this cost, resulting in greater lending to minority borrowers. This argument is consistent with prior work that finds increased competition results in a more equitable distribution of rents (Ashenfelter & Hannan, 1986; Black & Brainerd, 1999; Black & Strahan, 2001).

To evaluate whether this mechanism is at work, we study the impact of market concentra-

¹⁵In additional analysis, we search the content of our sample of severe enforcement orders and remove from our sample any enforcement actions that were received due to violations of the Fair Housing Act (FHA) of 1968, the Equal Credit Opportunity Act (ECOA) of 1974, or the Community Reinvestment Act (CRA) of 1977. This process results in the removal of 12 EDOs from our sample. We reestimate Table 4, Panel B with the reduced sample and find similar results (untabulated), suggesting that remediation of issues related to the violation of fair lending laws is unlikely to explain our findings of increased lending to minorities following EDO termination.

tion in the funding market on EDO banks' lending. If, driven by competition from non-EDO banks, EDO banks were to increase their lending to minorities then such an increase should be higher in counties where EDO banks face greater competition for deposits. Accordingly, we estimate the following model for our sample of EDO banks:

$$\begin{aligned}
Y_{it} = & \beta_0 + \beta_1 \text{During EDO}_i + \sum_{j=1}^5 \theta_j \text{Post EDO}_{ij} + \beta_2 \text{During EDO}_i \times \text{High Competition}_{it} \\
& + \sum_{j=1}^5 \omega_j \text{Post EDO}_{ij} \times \text{High Competition}_{it} + \gamma X_{it-1} + \delta_t + \epsilon_{it},
\end{aligned}
\tag{6}$$

where the dependent variable Y_{it} represents lending to minorities as a share of total residential lending at the bank-county level. The variable *High Competition* is a measure of deposit market competition and is the lowest tercile of the Herfindahl-Hirschman index (HHI) measured in the year prior to the EDO issuance in a given county. The remaining variables are as defined before.

We present the results from this analysis in [Table 8](#). The coefficient for *High Competition* indicates that lending to minorities forms a greater share of banks' lending portfolios in highly competitive counties. This finding is consistent with prior work that competition results in a more equitable distribution of rents ([Ashenfelter & Hannan, 1986](#); [Black & Brainerd, 1999](#); [Black & Strahan, 2001](#)), and supports the validity of our measure as capturing product market competition.

The table also shows that while in counties with high deposit-market competition, EDO banks increase lending to minorities during an EDO and in the first year following EDO termination, there is no significant change in their portfolio shares in years two to five after EDO termination. These findings suggest that competition from non-EDO banks is unlikely to be the main driver of our finding that EDO banks expand lending to minorities following EDO termination.

Furthermore, our results in [Section 5](#) that banks do not witness an increase in the riskiness

of loans following EDO termination is also inconsistent with the competition channel. If, driven by a loss of better customers to competitors, EDO banks were to increase lending to less creditworthy customers, such an increase should result in higher nonperforming assets or an increase in risky lending. Therefore, our results that EDO banks witness a decline in their nonperforming assets in the years following the termination of EDOs and no increase in risky lending is inconsistent with the explanation that increased competition from non-EDO banks results in an expansion of loans to lower quality borrowers. These results, combined with weak results from the funding market concentration analysis, suggest that competition from non-EDO banks is unlikely to drive our findings.

7. Supplemental analyses: lending to women

To further support our hypothesis that EDO banks increase lending to historically marginalized borrowers following termination of enforcement actions, we explore lending to another category of borrowers: women who are primary or solo mortgage borrowers. Similar to our analyses for minority borrowers, we explore whether EDO banks expand their portfolio and market shares of lending to women. Specifically, we reestimate [Equation 2](#) with the dependent variables representing lending to borrowers who are women.

[Table 9](#) presents the results from this analysis. The dependent variable in column (1) represents lending to women as a share of banks' portfolio of residential mortgage lending at the bank-county level. Consistent with our results for minority borrowers, EDO banks expand their portfolio share of lending to women by 4.1%–8.7% following EDO termination. We also find an increase of 3.2% in mortgage lending to women during the time the EDO is in effect. Column (2) of [Table 9](#) shows the market share results. Banks expand lending to women significantly following EDO termination. Relative to the pre-EDO period, market share in mortgage lending to women increases by 0.57%–1.03%. The results in [Table 9](#) indicate that, consistent with our results for minority borrowers, EDO banks also expand lending to women. These results are consistent with improvements in credit assessment pro-

cedures as part of the enforcement process driving access to credit for previously underserved categories of borrowers.

8. Conclusion

We study the role banking supervision plays in improving access to credit for minorities by investigating how EDOs affect bank borrower base. In particular, we investigate what happens to banks' portfolios and their borrower bases during an EDO and after its termination and study how the supervisory enforcement process affects bank borrower base, particularly minorities, over the life cycle of an enforcement action.

At the bank level, we find that banks subject to an EDO suffer a decline in deposits, deposit market shares, and total loans. Disaggregating a bank's loan portfolio into individual lending lines, we find that despite declines in most component portfolios, bank-level residential mortgage portfolios remain relatively unchanged. However, while the level of residential mortgage lending does not change, we document significant changes in the underlying demographic mix of mortgage borrowers. Surprisingly, we find that after an EDO's termination, banks significantly increase residential mortgage lending to minorities and increase their market share of lending to this group of borrowers within the counties where they operate.

Further investigation reveals that, following the termination of enforcement actions, banks are less likely to reject loan applications from minority borrowers, and their reasons for loan denial change. However, we also find that over two-thirds of this decline comes from loans for refinancing existing properties, investment properties, and home-improvement rather than from home purchase loans, suggesting that not all of the increased credit to minorities following EDO termination goes toward financing first-time home purchases. Therefore, the increase in minority lending following EDO termination is unlikely to lead to a corresponding increase in homeownership. When considering specific reasons provided by banks for rejecting a loan, we find that EDO banks are less likely to deny a mortgage loan application from minorities due to poor credit history after EDO termination. Banks have

used nonprice thresholds such as credit history to ration credit and these thresholds tend to disproportionately constrain lending to minorities ([Acolin et al., 2016](#); [Bostic, 1997](#); [Gyourko et al., 1999](#)). Therefore, the finding that EDO banks rely less on credit history to approve loan applications from minority borrowers is consistent with the observed increase in lending to this group. We also find a decline in nonperforming assets and no increase in the share of risky residential mortgage loans post EDO termination. Overall, these findings suggest changes in EDO banks' credit assessment practices and no increase in loan portfolio risk.

We propose and explore several mechanisms to explain why lending to minorities might increase after an EDO's termination. These mechanisms include banks improving their processes and remediating issues that might have previously constrained their lending to minority borrowers, managing capital, catering to regulators to encourage future leniency, or responding to increased competitive pressure. Our findings are consistent with the enforcement process resulting in EDO banks' improvement and catering to regulators. Our results contribute to the literature on discrimination in mortgage lending and the role bank supervision plays in improving access to credit.

References

- Aaronson, D. (2000). A note on the benefits of homeownership. *Journal of Urban Economics*, 47, 356–369.
- Acolin, A., Bricker, J., Calem, P., & Wachter, S. (2016). Borrowing constraints and homeownership. *American Economic Review*, 106, 625–29.
- Agarwal, S., Lucca, D., Seru, A., & Trebbi, F. (2014). Inconsistent regulators: Evidence from banking. *The Quarterly Journal of Economics*, 129, 889–938.
- Aiyar, S., Calomiris, C. W., & Wieladek, T. (2014). Does macro-prudential regulation leak? Evidence from a UK policy experiment. *Journal of Money, Credit and Banking*, 46, 181–214.
- Ashenfelter, O., & Hannan, T. (1986). Sex discrimination and product market competition: The case of the banking industry. *The Quarterly Journal of Economics*, 101, 149–173.
- Asiedu, E., Freeman, J. A., & Nti-Addae, A. (2012). Access to credit by small businesses: How relevant are race, ethnicity, and gender? *American Economic Review*, 102, 532–37.
- Bartlett, R., Morse, A., Stanton, R., & Wallace, N. (2019). Consumer-lending discrimination in the FinTech era. National Bureau of Economic Research.
- Becker, G. S. (1957). *The Economics of Discrimination*. University of Chicago Press.
- Berger, A. N., Cai, J., Roman, R. A., & Sedunov, J. (2021). Supervisory enforcement actions against banks and systemic risk. *Journal of Banking & Finance*, (p. 106222).
- Black, H., Schweitzer, R. L., & Mandell, L. (1978). Discrimination in mortgage lending. *The American Economic Review*, 68, 186–191.
- Black, S. E., & Brainerd, E. (1999). Importing equality? The effects of increased competition on the gender wage gap. *FEB of New York Staff Report*, 74.
- Black, S. E., & Strahan, P. E. (2001). The division of spoils: Rent-sharing and discrimination in a regulated industry. *American Economic Review*, 91, 814–831.
- Blanchflower, D. G., Levine, P. B., & Zimmerman, D. J. (2003). Discrimination in the small-business credit market. *Review of Economics and Statistics*, 85, 930–943.
- Blau, F. D., & Graham, J. W. (1990). Black-white differences in wealth and asset composition. *The Quarterly Journal of Economics*, 105, 321–339.
- Bostic, R. W. (1997). The role of race in mortgage lending: Revisiting the Boston Fed study. *Board of Governors of the Federal Reserve System Finance and Econ. Disc. Series*, 97–2.
- Boulton, A. J., & Williford, A. (2018). Analyzing skewed continuous outcomes with many zeros: A tutorial for social work and youth prevention science researchers. *Journal of the Society for Social Work and Research*, 9, 721–740.

- Brown, C. O., & Dinç, I. S. (2011). Too many to fail? Evidence of regulatory forbearance when the banking sector is weak. *The Review of Financial Studies*, *24*, 1378–1405.
- Buchak, G., Matvos, G., Piskorski, T., & Seru, A. (2018). Fintech, regulatory arbitrage, and the rise of shadow banks. *Journal of Financial Economics*, *130*, 453–483.
- Cole, R. A., & White, L. J. (2017). When time is not on our side: The costs of regulatory forbearance in the closure of insolvent banks. *Journal of Banking & Finance*, *80*, 235–249.
- Collins, W. J., & Margo, R. A. (2001). Race and home ownership: A century-long view. *Explorations in Economic History*, *38*, 68–92.
- Curry, T. J., O’Keefe, J. P., Coburn, J., & Montgomery, L. (1999). Financially distressed banks: How effective are enforcement actions in the supervision process? *FDIC Banking Review*, *12*, 1–18.
- Danisewicz, P., McGowan, D., Onali, E., & Schaeck, K. (2018). The real effects of banking supervision: Evidence from enforcement actions. *Journal of Financial Intermediation*, *35*, 86–101.
- Delis, M. D., Staikouras, P. K., & Tsoumas, C. (2017). Formal enforcement actions and bank behavior. *Management Science*, *63*, 959–987.
- Di, Z. X., Belsky, E., & Liu, X. (2007). Do homeowners achieve more household wealth in the long run? *Journal of Housing Economics*, *16*, 274–290.
- Duca, J. V., & Rosenthal, S. S. (1993). Borrowing constraints, household debt, and racial discrimination in loan markets. *Journal of Financial Intermediation*, *3*, 77–103.
- Duchin, R., & Sosyura, D. (2014). Safer ratios, riskier portfolios: Banks’ response to government aid. *Journal of Financial Economics*, *113*, 1–28.
- Flannery, M. J. (1998). Using market information in prudential bank supervision: A review of the U.S. empirical evidence. *Journal of Money, Credit and Banking*, *30*, 273–305.
- FRB (2009). Interagency fair lending examination procedures. Board of Governors of the Federal Reserve System.
- Granja, J., & Leuz, C. (2017). *The death of a regulator: Strict supervision, bank lending and business activity*. Technical Report National Bureau of Economic Research.
- Green, R. K., White, M. J. et al. (1997). Measuring the benefits of homeownership: Effects on children. *Journal of Urban Economics*, *41*, 441–461.
- Gyourko, J., Linneman, P., & Wachter, S. (1999). Analyzing the relationships among race, wealth, and home ownership in America. *Journal of Housing Economics*, *8*, 63–89.
- Hirtle, B., Kovner, A., & Plosser, M. (2020). The impact of supervision on bank performance. *The Journal of Finance*, *75*, 2765–2808.

- Holmes, A., & Horvitz, P. (1994). Mortgage redlining: Race, risk, and demand. *The Journal of Finance*, *49*, 81–99.
- Horne, D. K. (1997). Mortgage lending, race, and model specification. *Journal of Financial Services Research*, *11*, 43–68.
- Jiménez, G., Ongena, S., Peydró, J.-L., & Saurina, J. (2017). Macroprudential policy, countercyclical bank capital buffers, and credit supply: Evidence from the Spanish dynamic provisioning experiments. *Journal of Political Economy*, *125*, 2126–2177.
- Kleymenova, A., & Tomy, R. E. (2020). Observing enforcement: Evidence from banking. Chicago Booth Research Paper No. 19-05.
- Morrison, A. D., & White, L. (2013). Reputational contagion and optimal regulatory forbearance. *Journal of Financial Economics*, *110*, 642–658.
- Munnell, A. H., Tootell, G. M., Browne, L. E., & McEneaney, J. (1996). Mortgage lending in Boston: Interpreting HMDA data. *The American Economic Review*, (pp. 25–53).
- Newman, S. J., & Holupka, C. S. (2016). Is timing everything? Race, homeownership and net worth in the tumultuous 2000s. *Real Estate Economics*, *44*, 307–354.
- NYFRB (2020). Quarterly report on household debt and credit, 2020:Q3. Federal Reserve Bank of New York, Research and Statistics Group.
- Passalacqua, A., Angelini, P., Lotti, F., & Soggia, G. (2019). The real effects of bank supervision: Evidence from on-site bank inspections. *Available at SSRN 3705558*, .
- Peek, J., & Rosengren, E. (1995). Bank regulation and the credit crunch. *Journal of Banking & Finance*, *19*, 679–692.
- Santomero, A. M., & Hoffman, P. (1999). Problem bank resolution: Evaluating the options. In B. E. Gup (Ed.), *International Banking Crises: Large-Scale Failures, Massive Government Interventions*. Greenwood Publishing.
- Schwemm, R. G. (1994). Introduction to mortgage lending discrimination law. *The John Marshall Law Review*, *28*, 317.
- Shapiro, T. M. (2006). Race, homeownership and wealth. *Wash. UJL & Pol’y*, *20*, 53–74.
- Silva, J. M. S., Tenreiro, S., & Windmeijer, F. (2015). Testing competing models for non-negative data with many zeros. *Journal of Econometric Methods*, *4*, 29–46.
- Srinivas, V., Byler, D., Wadhvani, R., Ranjan, A., & Krishna, V. (2015). Enforcement actions in the banking industry: Trends and lessons learned. Deloitte University Press.
- Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, *71*, 393–410.

- Tobin, J. (1958). Estimation of relationships for limited dependent variables. *Econometrica*, 26, 24–36.
- Uluc, A., & Wieladek, T. (2018). Capital requirements, monetary policy and risk shifting in the mortgage market. *Journal of Financial Intermediation*, 35, 3–16.
- Wainer, A., & Zabel, J. (2020). Homeownership and wealth accumulation for low-income households. *Journal of Housing Economics*, 47, 101624.
- Wheeler, C. H., & Olson, L. M. (2015). Racial differences in mortgage denials over the housing cycle: Evidence from US metropolitan areas. *Journal of Housing Economics*, 30, 33–49.

Appendix A. Variable definitions

Variable	Definition	Source	Code
Dependent Variables			
Commercial and Industrial Loans	Ratio of commercial and industrial loans to total assets.	Call Reports	Prior to 2011: RCFD1766 / RCFD2170 From 2011 to 2018: (RCFD1763 + RCFD1764) / RCFD2170
Denials	Indicator variable which takes the value of 1 if a mortgage application is denied by financial institution and 0 otherwise	HMDA	Action Taken = 3
Deposit Market Shares	Total county deposits for EDO banks / Total county deposits for all banks (county-bank-level).	Summary of Deposits	
Deposits	Natural logarithm of Total deposits (bank-level).	Call Reports	log(RCFD2200)
Loan Size	Loan amount in thousands of dollars	HMDA	
Loans	Net total loans scaled by total assets.	Call Reports	(RCFD1400 - RCFD3123 - RCFD2123) / RCFD2170
Market Share of Lending to Minorities (Women)	Total residential mortgage loans to minorities (women) for EDO banks / Total residential mortgage loans to minorities (women) in the county	HMDA and authors' calculations	
Portfolio Share of Lending to Minorities (Women)	Total residential mortgage loans to minorities (women) / Total residential mortgage loans	HMDA and authors' calculations	
Real Estate Loans	Ratio of real estate loans to total assets.	Call Reports	Prior to 2011: RCFD1410 / RCFD2170 From 2011 to 2018: (RCFDF158 + RCFDF159 + RCFD1420 + RCFD1797 + RCFD5367 + RCFD5368 + RCFD1460 + RCFDF160 + RCFDF161) / RCFD2170
Real Estate Loans = Commercial (Commercial Mortgages)	Ratio of commercial mortgages to total assets.	Call Reports	Prior to 2011: (RCON1415 + RCON1420) / RCFD2170 From 2011 to 2018: (RCFDF158 + RCFDF159 + RCFD1420) / RCFD2170
Real Estate Loans = Residential (Residential Mortgages)	Ratio of residential mortgages to total assets.	Call Reports	Prior to 2011: (RCON1797 + RCON1798 + RCON1460) / RCFD2170 From 2011 to 2018: (RCFD1797 + RCFD5367 + RCFD5368 + RCFD1460) / RCFD2170

Independent Variables

Conventional Loans	Indicator variable which takes the value of 1 if loan type is conventional and 0 otherwise. Conventional loans are any loans other than FHA, VA, FSA, or RHS loans/	HMDA	Loan Type = 1
Denial: Collateral	Indicator variable which takes the value of 1 if collateral is the only reason provided among three reasons for denial in HMDA data and 0 otherwise.	HMDA	Reasons for Denial = 4
Denial: Credit history	Indicator variable which takes the value of 1 if credit history is the only reason provided among three reasons for denial in HMDA data and 0 otherwise.	HMDA	Reasons for Denial = 3
Denial: Debt to income ratio	Indicator variable which takes the value of 1 if debt-to-income ratio is the only reason provided among three reasons for denial in HMDA data and 0 otherwise.	HMDA	Reasons for Denial = 1
Denial: Information	Indicator variable which takes the value of 1 if either unverifiable information or credit application incomplete is the reason provided among three reasons for denial in HMDA data and 0 otherwise.	HMDA	Reasons for Denial = 6 or 7
Denial: Other	Indicator variable which takes the value of 1 for all the other combinations of denial reasons and 0 otherwise.	HMDA	Reasons for Denial = all other combinations
During EDO	Indicator variable which takes the value of 1 from the year EDO was issued to the year EDO was terminated and 0 otherwise.	SNL and authors' calculations	
EDO Length	EDO length in years	SNL	
FHA-insured Loans	Indicator variable which takes the value of 1 if loan type is FHA(Federal Housing Administration) -insured loans and 0 otherwise.	HMDA	Loan Type = 2
FSA/RHS Loans	Indicator variable which takes the value of 1 if loan type is FSA/RHS (Farm Service Agency or Rural Housing Service) and 0 otherwise.	HMDA	Loan Type = 4

High Competition	Indicator variable which takes the value of 1 for the lowest deposit market HHI tercile in a given county and 0 otherwise.	Summary of Deposits	
Home Improvement, Non-Owner occupied	Indicator variable which takes the value of 1 if loan purpose is home improvement and the property is not owner-occupied and 0 otherwise.	HMDA	Loan Purpose = 2 & Owner-Occupancy = 2
Home Improvement, Owner occupied	Indicator variable which takes the value of 1 if loan purpose is home improvement and the property is owner-occupied as a principal dwelling and 0 otherwise.	HMDA	Loan Purpose = 2 & Owner-Occupancy = 1
Home Purchase, Non-Owner occupied	Indicator variable which takes the value of 1 if loan purpose is home purchase and the property is not owner-occupied and 0 otherwise.	HMDA	Loan Purpose = 1 & Owner-Occupancy = 2
Home Purchase, Owner occupied	Indicator variable which takes the value of 1 if loan purpose is home purchase and the property is owner-occupied as a principal dwelling and 0 otherwise.	HMDA	Loan Purpose = 1 & Owner-Occupancy = 1
Low Capital	Indicator variable which takes the value of 1 if an EDO bank is in the lowest tercile of capital ratio in the period prior to receiving an EDO.	Call Reports	RCFD3210 / RCFD2170
Low CRA	Indicator variable which takes the value of 1 if an EDO bank receives CRA rating of 3 (Needs to Improve) or 4 (Substantial Non-compliance) at least once in the 3 years of pre-EDO period and 0 otherwise.	FFIEC Database	Intergency CRA Ratings
Male	Indicator variable which takes the value of 1 if a mortgage applicant is male and 0 otherwise.	HMDA	Sex = 1
Minorities	Indicator variable which takes the value of 1 if a mortgage applicant is non-white and 0 otherwise.	HMDA	Race = 1, 2, 3, or 4
Post EDO (year 1–year 5)	Indicator variable which takes the value of 1 for each year after the EDO was terminated and 0 otherwise.	SNL and authors' calculations	

Refinancing, Non-Owner occupied	Indicator variable which takes the value of 1 if loan purpose is refinancing and the property is not owner-occupied and 0 otherwise.	HMDA	Loan Purpose = 3 & Owner-Occupancy = 2
Refinancing, Owner occupied	Indicator variable which takes the value of 1 if loan purpose is refinancing and the property is owner-occupied as a principal dwelling and 0 otherwise.	HMDA	Loan Purpose = 3 & Owner-Occupancy = 1
Regulatory Strictness	Indicator variable which takes the value of 1 for the lowest regulatory leniency tercile in the year before EDO and 0 otherwise. Regulatory leniency measure of Agarwal et al. (2014) measured as the difference between average regulatory ratings of federal and state regulators.	Agarwal et al. (2014)	
VA-guaranteed Loans	Indicator variable which takes the value of 1 if loan type is VA (Veterans Administration)-guaranteed loans and 0 otherwise.	HMDA	Loan Type = 3
Women	Indicator variable which takes the value of 1 if a mortgage applicant is female and 0 otherwise.	HMDA	Sex = 2
Control Variables			
Capital Ratio	Total equity as a proportion of total assets.	Call Reports	RCFD3210 / RCFD2170
Employment Growth	The growth of employment level (Total employment is defined as the number of jobs)	Bureau of Economic Analysis	(Total Employment - Lagged Total Employment) / Lagged Total Employment
Liquidity Ratio	Ratio of cash and cash equivalents to total assets, where cash is defined as the sum of interest-bearing balances, noninterest bearing balances, and currency and coin.	Call Reports	(RCFD0071 + RCFD0081) / RCFD2170
Nonperforming Assets Ratio (NPA)	The sum of nonaccruing loans and accruing loans past 90 days divided by net total loans.	Call Reports	(RCFD1403 + RCFD1407) / (RCFD1400 - RCFD3123 - RCFD2123)
Return on Assets (ROA)	Net income divided by average total assets	Call Reports	RIAD4340 / RCFD2170
Size	Natural logarithm of total assets	Call Reports	log(RCFD2170)

Table 1: Descriptive statistics

This table presents the summary statistics for the variables we use in our analyses. [Panel A](#) shows the main bank-level variables using Call Report data, county-level deposit variables using SOD data, and county-bank-level portfolio and market shares using HMDA data. Call Reports data is quarterly and SOD and HMDA data are annual. [Panel B](#) shows the breakdown of loans originated and applications declined. To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#).

Panel A: Bank and county-level data

	N	Mean	Std	P1	P25	Median	P75	P99
Bank-Level Dependent Variables								
Total loans / Assets	41,015	0.653	0.137	0.259	0.573	0.673	0.753	0.891
C&I loans / Assets	41,015	0.103	0.071	0.001	0.052	0.088	0.137	0.338
Total mortgages / Assets	41,015	0.474	0.173	0.035	0.356	0.491	0.603	0.802
Commercial mortgages / Assets	41,015	0.102	0.086	0.000	0.040	0.081	0.141	0.410
Residential mortgages / Assets	41,015	0.179	0.106	0.004	0.102	0.165	0.237	0.500
Deposits / Assets	41,015	0.837	0.077	0.567	0.804	0.854	0.889	0.939
Total loans / Deposits	41,012	0.786	0.181	0.319	0.676	0.794	0.902	1.225
Bank-Level Control Variables								
Size	41,015	11.917	1.268	9.363	11.056	11.825	12.628	15.767
Return on Assets	41,015	0.001	0.011	-0.043	0.000	0.003	0.006	0.022
Liquidity Ratio	41,015	0.067	0.064	0.008	0.027	0.045	0.083	0.328
Capital Ratio	41,015	0.103	0.042	0.036	0.082	0.096	0.114	0.265
Nonperforming Assets Ratio	41,015	0.029	0.034	0.000	0.006	0.017	0.040	0.168
County-Level Dependent Variables								
Log Deposits	23,321	10.898	1.287	7.897	10.078	10.855	11.690	14.280
Deposit Market Shares	23,352	10.103	15.570	0.012	0.727	3.696	12.434	75.881
Residential Mortgage Portfolio Shares (of loans to minorities)	162,769	6.542	19.871	0.000	0.000	0.000	0.000	100.000
Residential Mortgage Market Share (of loans to minorities)	497,594	0.408	3.936	0.000	0.000	0.000	0.000	9.721
Residential Mortgage Portfolio Shares (of loans to women)	162,769	17.409	29.564	0.000	0.000	0.000	22.411	100.000
Residential Mortgage Market Share (of loans to women)	529,238	0.452	3.218	0.000	0.000	0.000	0.000	10.664

Table 1: Descriptive statistics, continued

Panel B: The number of loans originated or denied

	Number of Loans Originated	Number of Applications Denied	% denied
Total	2,772,382	1,414,587	33.8%
Race			
Majority	2,156,439	621,376	22.4%
Minority	264,161	139,329	34.5%
Gender			
Male	1,883,706	567,325	23.1%
Female	632,973	250,883	28.4%
Loan Type			
Conventional	2,401,190	1,330,381	35.7%
FHA-insured	251,607	61,429	19.6%
VA-guaranteed	100,965	18,203	15.3%
FSA/RHS	18,620	4,574	19.7%
Loan Purpose & Owner-occupancy			
Home Purchase: Owner-occupied	885,538	275,244	23.7%
Home Purchase: Not-owner-occupied	233,856	74,891	24.3%
Home Improvement: Owner-occupied	194,062	169,741	46.7%
Home Improvement: Not-owner-occupied	24,440	10,029	29.1%
Refinancing: Owner-occupied	1,244,578	826,978	39.9%
Refinancing: Not-owner-occupied	187,144	57,271	23.4%
Others	2,764	433	13.5%

Table 2: Change in bank-level deposits and county-level deposit market shares for EDO banks

This table presents change in bank-level deposits and banks' county-level deposit market shares during the life cycle of an EDO. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO (year)* corresponds to the indicator variables for the five years after an EDO's termination. Columns (1) and (2) present the results for bank-level deposits (measured as natural logarithms using Call Report data). Columns (3) and (4) show the results for banks' deposit market shares in a given county in %. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). Columns (1) and (2) use quarterly data and include year-quarter fixed effects. Columns (3) and (4) use annual data and include year fixed effects. To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

	Deposits	Deposits	Deposit Market Shares	Deposit Market Shares
	(1)	(2)	(3)	(4)
During EDO	-0.023 (-1.035)	-0.016*** (-3.642)	-0.241* (-1.861)	-0.174* (-1.922)
Post EDO (year 1)	0.014 (0.385)	0.008 (0.772)	0.058 (0.289)	-0.113 (-0.752)
Post EDO (year 2)	0.075 (1.577)	0.013 (1.137)	0.299 (1.171)	-0.106 (-0.561)
Post EDO (year 3)	0.140** (2.409)	0.016 (1.210)	0.474 (1.490)	0.057 (0.250)
Post EDO (year 4)	0.214*** (3.030)	0.019 (1.262)	0.732* (1.809)	0.255 (0.837)
Post EDO (year 5)	0.281*** (3.459)	0.019 (1.135)	1.066** (2.298)	0.428 (1.156)
Observations	41,015	41,015	23,352	23,352
Adjusted R ²	0.948	0.993	0.479	0.980
Reg Type	OLS	OLS	OLS	OLS
Controls	No	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	No
Bank x County FE	No	No	No	Yes
Cluster	Bank	Bank	Bank	Bank
Years	1994–2018	1994–2018	1994–2018	1994–2018

Table 3: Loan portfolio changes at EDO banks

This table presents loan portfolio changes at the bank-level during the life cycle of an EDO. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO (year)* corresponds to the indicator variables for the five years after an EDO's termination. Loan portfolio shares are relative to banks' corresponding total assets. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

	Total loans / Assets	C&I loans / Assets	Total mortgages / Assets	Commercial mortgages / Assets	Residential mortgages / Assets
	(1)	(2)	(3)	(4)	(5)
During EDO	-0.024*** (-5.729)	-0.003* (-1.759)	-0.012*** (-2.809)	-0.008*** (-3.972)	-0.003 (-0.893)
Post EDO (year 1)	-0.021*** (-3.475)	-0.003 (-1.212)	-0.011* (-1.700)	-0.007** (-2.406)	-0.004 (-0.909)
Post EDO (year 2)	-0.009 (-1.213)	0.000 (0.002)	-0.006 (-0.767)	-0.002 (-0.494)	-0.005 (-0.885)
Post EDO (year 3)	0.002 (0.265)	0.004 (0.847)	-0.002 (-0.233)	0.001 (0.261)	-0.002 (-0.375)
Post EDO (year 4)	0.012 (1.101)	0.007 (1.399)	-0.000 (-0.010)	0.005 (0.785)	-0.003 (-0.359)
Post EDO (year 5)	0.018 (1.409)	0.008 (1.388)	0.002 (0.113)	0.007 (1.073)	-0.004 (-0.479)
Observations	41,015	41,015	41,015	41,015	41,015
Adjusted R ²	0.747	0.752	0.851	0.798	0.839
Reg Type	OLS	OLS	OLS	OLS	OLS
Controls	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Cluster	Bank	Bank	Bank	Bank	Bank
Years	1994–2018	1994–2018	1994–2018	1994–2018	1994–2018

Table 4: Lending to minorities for EDO banks

This table presents a county-level analysis for the number of counties covered by EDO banks and their portfolio allocation and market shares of lending to minorities. [Panel A](#) shows the number of counties covered by EDO banks in which they lend to minorities. [Panel B](#) shows EDO banks' allocation of credit to minorities within their county-level residential loan portfolios (column 1) and EDO banks' county-level market shares of residential mortgage portfolio allocated to minorities (column 2). The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Pre EDO (year)* and *Post EDO (year)* correspond to indicator variables for the years before an EDO and after EDO termination. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

Panel A: Number of counties with lending to minorities

	Average number of distinct counties where EDO banks are active (per bank)	Average number of distinct counties where EDO banks lend to minorities (per bank)	Of which: minority population greater than 50% of county population
	(1)	(2)	(3)
Pre EDO (year -3)	22	6	3
Pre EDO (year -2)	22	7	3
Pre EDO (year -1)	22	7	3
During EDO (annualized, on average)	21	6	3
Post EDO (year 1)	25	8	3
Post EDO (year 2)	27	9	3
Post EDO (year 3)	29	9	4
Post EDO (year 4)	31	10	4
Post EDO (year 5)	31	11	4

Table 4: Lending to minorities by EDO banks, continued

Panel B: Portfolios shares and county-level market shares

	Portfolio shares of residential mortgage loans to minorities	Market shares of residential mortgage loans to minorities
	(1)	(2)
During EDO	-1.380** (-2.269)	-0.074 (-1.612)
Post EDO (year 1)	1.010 (1.222)	0.916*** (14.342)
Post EDO (year 2)	2.474*** (3.050)	0.947*** (15.085)
Post EDO (year 3)	1.177 (1.477)	0.869*** (13.958)
Post EDO (year 4)	4.423*** (5.476)	1.133*** (18.202)
Post EDO (year 5)	6.046*** (7.334)	1.413*** (21.971)
Observations	162,769	497,594
Wald χ^2	414***	8873***
Estimation method	RE Tobit	RE Tobit
Controls	Yes	Yes
Year, County, Bank RE	Yes	Yes
Years	1994–2018	1994–2018

Table 5: Lending to minorities by EDO banks (reasons for denial)

This table presents county-level analysis using multinomial logit estimation for type of loan denied and the reasons EDO banks give when they deny a loan. [Panel A](#) shows the marginal effects of a likelihood of a loan application being denied by loan type. [Panel B](#) shows the marginal effects of a likelihood of a specific reason given by an EDO bank for denying an application. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post (EDO)* corresponds an indicator variable taking the value of one for the five years after an EDO's termination; *Borrower* is an indicator taking the value of one if an application is by a minority borrower. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

Panel A: Denials by loan application type

	Borrower = Minority						
	No Denial	Denial: Home Purchase, Owner-occupied	Denial: Home Purchase, Not-owner-occupied	Denial: Home Improvement, Owner-occupied	Denial: Home Improvement, Not-owner-occupied	Denial: Refinancing, Owner-occupied	Denial: Refinancing, Not-owner-occupied
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
During EDO	-0.0370* (-1.73)	0.0046 (0.35)	-0.0005 (-0.12)	0.0123*** (3.57)	0.0012*** (3.32)	0.0184** (2.55)	0.0010 (0.77)
Post EDO	-0.1380*** (-7.21)	0.0589*** (5.16)	0.0223*** (9.10)	0.0003 (0.04)	0.0006 (0.97)	0.0466*** (4.93)	0.0094*** (6.77)
Borrower	-0.1110*** (-5.56)	0.0401*** (8.65)	0.0086*** (3.92)	0.0265*** (4.38)	0.0027*** (4.94)	0.0295*** (2.99)	0.0036 (1.43)
During EDO x Borrower	-0.0054 (-0.48)	0.0023 (0.37)	0.0006 (0.30)	-0.0032 (-0.52)	0.0003 (1.19)	0.0042 (0.61)	0.0012 (1.00)
Post EDO x Borrower	0.0640** (2.24)	-0.0180** (-2.35)	-0.0073*** (-2.81)	-0.0150** (-2.26)	-0.0009 (-1.34)	-0.0230* (-1.78)	0.0000 (0.01)
Observations	3,102,329						
Pseudo R ²	0.068						
Reg Type	Multinomial						
	Logit						
Controls	Yes						
Year FE	Yes						
Cluster	Bank						
Years	1994–2018						

Table 5: Lending to minorities by EDO banks, continued

Panel B: Denials by reason type

	Borrower = Minority					
	No Denial	Denial: Debt to income ratio	Denial: Credit history	Denial: Collateral	Denial: Information	Denial: Other
	(1)	(2)	(3)	(4)	(5)	(6)
During EDO	-0.0388 (-1.61)	-0.0011 (-0.36)	0.0132*** (3.18)	-0.00115 (-0.09)	-0.0120*** (-2.81)	0.0399*** (3.02)
Post EDO	-0.1440*** (-7.60)	0.0108** (2.15)	0.0067 (1.29)	0.0642*** (7.54)	0.0034 (0.61)	0.0588*** (3.72)
Borrower	-0.1130*** (-6.93)	0.0081*** (5.81)	0.0227*** (7.06)	0.0060 (1.64)	0.0043** (2.27)	0.0718*** (6.51)
During EDO x Borrower	0.0074 (0.62)	-0.0009 (-0.56)	0.0024 (0.67)	-0.0029 (-0.73)	0.0034*** (3.74)	-0.0096 (-0.93)
Post EDO x Borrower	0.0612** (2.49)	-0.0005 (-0.16)	-0.0086** (-2.16)	-0.0068 (-1.54)	0.0013 (0.50)	-0.0466*** (-3.20)
Observations	3,105,384					
Pseudo R ²	0.091					
Reg Type	Multinomial					
	Logit					
Controls	Yes					
Year FE	Yes					
Cluster	Bank					
Years	1994–2018					

Table 6: Loan portfolio quality for EDO banks

This table presents banks' loan portfolio quality changes during the life cycle of an EDO. The dependent variables in [Panel A](#) refer to bank-level nonperforming assets. The dependent variable in [Panel B](#) is risky mortgages (defined as higher-priced closed-end mortgages) as a share of total residential mortgages at the bank-county-level. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO (year)* corresponds to the indicator variables for the five years after an EDO's termination. All regressions include lagged bank-level control variables (size, profitability, liquidity, and capital ratio) and a county-level macro variable (employment growth). In addition, model (3) of [Panel A](#) includes lagged bank-level NPA scaled by total loans. To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

Panel A: Nonperforming assets of EDO banks

	Total NPA / Total loans	Total NPA / Total loans	NPA for residential mortgages / Total loans
	(1)	(2)	(3)
During EDO	0.013*** (11.470)	0.009*** (8.756)	-0.002*** (-2.738)
Post EDO (year 1)	0.000 (0.172)	0.000 (0.255)	-0.001** (-1.973)
Post EDO (year 2)	-0.003 (-1.414)	-0.002 (-1.258)	-0.001 (-1.279)
Post EDO (year 3)	-0.006** (-2.314)	-0.005** (-2.105)	-0.002 (-1.517)
Post EDO (year 4)	-0.008*** (-2.685)	-0.006** (-2.440)	-0.003** (-2.251)
Post EDO (year 5)	-0.009*** (-2.807)	-0.007** (-2.510)	-0.003** (-2.445)
Observations	41,010	41,010	37,322
Adjusted R ²	0.553	0.613	0.851
Reg Type	OLS	OLS	OLS
Controls	No	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Cluster	Bank	Bank	Bank
Years	1994–2018	1994–2018	2001–2018

Table 6: Loan portfolio quality for EDO banks, continued

Panel B: County-level share of risky lending by EDO banks

	Risky loans	Risky loans
	(1)	(2)
During EDO	-0.369 (-1.019)	-0.380 (-0.550)
Post EDO (year 1)	-0.353 (-0.740)	-0.423 (-0.438)
Post EDO (year 2)	-0.665 (-1.277)	-0.271 (-0.240)
Post EDO (year 3)	-0.272 (-0.367)	-0.328 (-0.224)
Post EDO (year 4)	0.347 -0.44	0.023 -0.015
Post EDO (year 5)	1.960 -1.462	-0.098 (-0.052)
Observations	42,157	42,157
Adjusted R-squared	0.468	0.593
Reg Type	OLS	OLS
Controls	Yes	Yes
Year FE	Yes	Yes
Bank FE	No	Yes
County FE	Yes	Yes
Cluster	Bank	Bank
Years	2004–2017	2004–2017

Table 7: Cross-sectional analyses for EDO banks

This table presents the results of a random effects Tobit estimation of an EDO’s impact on residential mortgage loan portfolios. The dependent variable is banks’ allocation of credit to minorities within their county-level residential loan portfolios. In [Panel A](#), column (1) shows the impact of regulatory strictness (using [Agarwal et al. \(2014\)](#)’s measure), Column (2) shows the impact of EDO severity (proxied by EDO length), and Column (3) shows the impact of low capital (measured as an indicator variable for the banks in the lowest tercile of regulatory capital before an EDO); whereas [Panel B](#) shows the impact of CRA ratings. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO (year)* corresponds to the indicator variables for the five years after an EDO’s termination; *Treat* corresponds to the measure of regulatory strictness, EDO length, or capital adequacy. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

Panel A: Regulatory strictness (state-chartered EDO banks only), EDO length, and capital

	Treat = Regulatory Strictness	Treat = EDO Length	Treat = Low Capital
	Portfolio shares of residential mortgage loans to minorities	Portfolio shares of residential mortgage loans to minorities	Portfolio shares of residential mortgage loans to minorities
	(1)	(2)	(3)
During EDO	0.331 (0.318)	-5.869*** (-5.236)	-0.902 (-1.191)
Treat	3.514** (2.027)	-1.341*** (-3.979)	9.495*** (8.823)
Post EDO (year 1)	-1.229 (-0.832)	-3.609** (-2.074)	1.051 (1.029)
Post EDO (year 2)	-4.302*** (-2.778)	-2.626 (-1.514)	1.985* (1.943)
Post EDO (year 3)	-6.355*** (-4.155)	-6.764*** (-3.835)	2.181** (2.156)
Post EDO (year 4)	-4.319*** (-2.707)	-8.355*** (-4.680)	2.201** (2.083)
Post EDO (year 5)	-2.183 (-1.372)	-2.267 (-1.255)	0.442 (0.382)
During EDO x Treat	-2.373 (-1.382)	2.141*** (4.931)	-0.103 (-0.095)
Post EDO (year 1) x Treat	4.204* (1.692)	2.165*** (3.310)	-2.953* (-1.724)
Post EDO x Treat (year 2)	9.470*** (3.750)	2.318*** (3.558)	-3.032* (-1.830)
Post EDO x Treat (year 3)	10.667*** (4.414)	3.431*** (5.255)	-5.706*** (-3.426)
Post EDO x Treat (year 4)	11.467*** (4.502)	5.474*** (8.114)	3.290** (1.992)
Post EDO x Treat (year 5)	8.003*** (2.753)	3.597*** (5.185)	9.363*** (5.530)
Observations	77,379	162,769	156,913
Wald χ^2	176***	496***	467***
Estimation method	RE Tobit	RE Tobit	RE Tobit
Controls	Yes	Yes	Yes
Year, County, Bank RE	Yes	Yes	Yes
Years	1994–2018	1994–2018	1994–2018

Table 7: Cross-sectional analyses for EDO banks, continued

Panel B: Portfolio shares of lending to minorities

	Portfolio shares of residential mortgage loans to minorities
	(1)
During EDO	-0.938 (-1.528)
Post EDO	2.698*** (4.736)
Low CRA (Pre EDO)	5.396* (1.880)
During EDO x Low CRA (Pre EDO)	-3.514 (-1.212)
Post EDO x Low CRA (Pre EDO)	8.854*** (3.087)
Observations	162,769
Wald χ^2	405***
CRA in pre-period	3 or 4
Estimation method	RE Tobit
Number of bank-counties	57,599
Controls	Yes
Year, County, Bank RE	Yes
Years	1994–2018

Table 8: Mechanism: Competition

This table presents the results of a random effects Tobit estimation of an EDO's impact on residential mortgage loan portfolio shares as a result of county-level competition for deposits. The dependent variable is banks' allocation of credit to minorities within their county-level residential loan portfolios. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO (year)* corresponds to the indicator variables for the five years after an EDO's termination; *High Competition* corresponds to the lowest deposit market HHI tercile in a given county. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

	Portfolio shares of residential mortgage loans to minorities
	(1)
During EDO	-2.951*** (-3.122)
High Competition	18.449*** (17.788)
Post EDO (year 1)	-1.115 (-0.755)
Post EDO (year 2)	2.297 (1.606)
Post EDO (year 3)	-0.393 (-0.278)
Post EDO (year 4)	3.685*** (2.626)
Post EDO (year 5)	5.022*** (3.559)
During EDO x High Competition	2.326** (2.126)
Post EDO (year 1) x High Competition	3.054* (1.749)
Post EDO (year 2) x High Competition	0.146 (0.086)
Post EDO (year 3) x High Competition	2.136 (1.260)
Post EDO (year 4) x High Competition	1.016 (0.600)
Post EDO (year 5) x High Competition	1.431 (0.831)
Observations	162,663
Wald χ^2	992***
Estimation method	RE Tobit
Controls	Yes
Year, County, Bank RE	Yes
Years	1994–2018

Table 9: Lending to women for EDO banks

This table presents county-level analysis of EDO banks' portfolio allocation and market shares of lending to women. Column (1) shows EDO banks' allocation of credit to women within their county-level residential loan portfolios; whereas column (2) shows EDO banks' county-level market shares of residential mortgage lending to minorities (column 2). The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO (year)* corresponds to the indicator variables for the five years after an EDO's termination. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio and NPA), and county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

	Portfolio shares of residential mortgage loans to women	Market shares of residential mortgage loans to women
	(1)	(2)
During EDO	3.199*** (5.716)	0.026 (1.040)
Post EDO (year 1)	4.141*** (5.382)	0.574*** (16.412)
Post EDO (year 2)	6.262*** (8.307)	0.571*** (16.575)
Post EDO (year 3)	4.423*** (5.991)	0.573*** (16.809)
Post EDO (year 4)	5.498*** (7.316)	0.648*** (18.821)
Post EDO (year 5)	8.740*** (11.536)	1.027*** (29.362)
Observations	162,769	529,238
Wald χ^2	966***	17817***
Estimation method	RE Tobit	RE Tobit
Controls	Yes	Yes
Year, County, Bank RE	Yes	Yes
Years	1994–2018	1994–2018