

The Effects of a State Foreclosure Moratorium on Loan Repayment Behaviors *

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During the 2008 housing crisis, lenders were documented making mistakes when repossessing homes, spurring some policymakers to call for a moratorium on foreclosure filings. Using a New Jersey court-ordered stay on foreclosure-related filings that applied to six high-profile lenders and a difference-in-differences strategy, this paper shows that borrowers were more likely to catch up on delinquent loans due to the moratorium. This is in contrast to industry predictions that moral hazard would drive borrowers to stop making payments during the moratorium. The results highlight the potential role of court oversight to facilitate borrower compliance with loan contracts.

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1. The Role of Courts in Mortgage Default

Contracts between two parties rely on the good faith that if either party fails to uphold his obligation, sanctions will follow. In many situations, courts are the third party administrator of a contract in the case of a breach. Beginning with seminal work by Grossman and Katz (1983) on the effects of plea bargains on social welfare, economists have been interested in the role of the courts in producing economically efficient outcomes. Cooter and Rubinfeld (1989) and later Miceli (1996) reiterate the importance of courts in influencing economic behavior, as they redistribute resources in ways that can distort the costs and benefits of future behavior. This paper contributes to this literature by examining how a change in court enforcement of mortgage contracts can serve as a mechanism to enhance adherence to contract terms by some borrowers.

Mortgages are contracts between lenders and borrowers, and in 27 states courts are obligated to administer sanctions in the case of a default on that contract (Rao et al., 2011). During the housing bust of the late 2000s, however, this was not always the case. Courts became overwhelmed by the volume of cases in which lenders were not following legal due process for foreclosure cases. The popular press (see, for example, Gopa (2010); Yeebo (2011); Martin and Streitfeld (2010); Dennis (2010)), leading research organizations (for example Morton (2011)), and even Congressional hearings (US Senate, 2010) focused attention on the issue nationally. Large banks routinely used contractors to prepare documents to file foreclosures. With little oversight, some cases were filed with no legal basis for foreclosure. Thousands of documents were signed at high volumes and a rapid pace, operating like robots, or so-called ‘robosigners.’ Improperly repossessing property is a form of theft, and legal regimes have set out to balance the rights of the borrower while protecting the lender’s right to enforce the mortgage contract. High levels of repossessions where legal rules were not followed by certain well-known lenders could result in some borrowers at risk of repossession losing trust in the process and withholding payments, fearing lenders will have an unfair advantage and unjustly repossess their properties.

As news reports of robo-signing increased, by October 2010, 61 percent of respondents to a Washington Post online poll responded that a national foreclosure moratorium as a “good idea” (Bhattarai, 2010; Novick, 2010). No national policy was implemented, but New Jersey implemented a substantive moratorium within that state in the first half of 2011 targeted at six large mortgage servicers implicated as failing to follow proper foreclosure processes.¹

The lending industry responded with predictions based on moral hazard, concluding that actions like New Jersey’s would increase the number of delinquencies as borrowers who would “otherwise stretch to continue to make payments will decide to stop at least for the duration of the moratorium” (MBA, 2010). The industry further predicted that borrowers would fail to catch up and would be unable to become current again, worsening an already bleak situation for borrowers in financial trouble (MBA, 2010). This portrayal is a classic, “when the cat’s away, mice will play” situation.

However, using a difference-in-difference-in-differences (DDD) strategy that exploits variation by mortgage servicer, across states, and over time, we document that the New Jersey moratorium actually did not result in increased defaults, but rather increased the rate of delinquent borrowers *making payments*. We observe no changes in mortgage servicer behavior related to offering borrowers more modifications, more generous modification terms, or other loss mitigation activities due to the moratorium. Borrowers subject to the moratorium in New Jersey who were delinquent before the start of the moratorium were more likely to become current during the moratorium period compared to loans with the same mortgage servicers in nearby states, as well as compared to other servicers not subject to the moratorium within the state.² We further find loans subject to the policy are no more or less likely to experience a repossession in the long run than those that were not.

The higher repayment rates are in part a simple mechanical process in that the moratorium simply added more time and borrowers had a longer window around which to access liquidity, gather information, and accumulate payments. However, if the borrowers perceive that the lender will take the property through an “unfair” foreclosure and repossession process, then more time alone would not create incentives to make payments. With the moratorium, the court signaled to borrowers that their legal rights would be respected during foreclosure, making capricious takings by widely mistrusted lenders less likely. The New Jersey moratorium provided a combination of circumstances that supported additional repayment: an extended time to become

current and a systematic reinforcement of borrower protections in the foreclosure process.

The remainder of the paper begins with background on the legal process surrounding foreclosures and explains the court's actions in New Jersey (Section 2). Section ?? explains the theoretical predictions associated with a mortgage moratorium. The following section (Section 3) reviews the methods used and explains the empirical framework and the natural experiment used for this analysis. Section 4 discusses the data used to complete the analysis, providing summary statistics. Finally, in Section 5 we discuss the results of the models, and in Section 6 we provide further discussion of this work and its implications for research and policy.

2. New Jersey Mortgage Moratorium

As the housing boom turned bust in 2008, millions of homeowners fell behind on their mortgages, triggering lenders to file for foreclosures at record levels. Media coverage of foreclosure filings focused on metaphors such as “the floodgates have opened” (Martin, 2011).

Federal policy responses included the Home Affordable Modification Program (HAMP), counseling hot-lines, and other attempts to facilitate alternatives to foreclosure. In judicial foreclosure procedure states, where the courts adjudicate foreclosure filings through a legal hearing, courts experienced substantial increases in cases filed. Reports began to surface that lenders failed to follow proper legal procedures, made clerical errors, and even falsified missing documents. Concerns about due process coalesced into calls for a moratorium on foreclosure cases in courts (for example, see Franks (2011) and Pierce and Tan (2007)). There was even a call for a national level moratorium (Bohan and Daly, 2010).

Historically, moratoria have been used in cases of natural disasters, such as in the aftermath of hurricanes (Davis, 2006; Zacks, 2012), in the context of farm foreclosures (Alston, 1984), or even during the Great Depression (Wheelock, 2008). The context of each approach is unique. Indeed, New Jersey's limited moratorium was designed primarily to shore up procedures and due process related to a subset of problematic lenders.

2.1 New Jersey Foreclosure Moratorium: Order to Show Just Cause

New Jersey, like 24 other states, requires lenders to go court and present a legal case to prove the borrower is in breach of the mortgage contract.³ This is an adversarial process, and the borrower is permitted to represent her best interests in the case. In New Jersey the court requires lenders to follow a series of steps to engage the borrower in the due process, including requiring at a minimum five legal notices that must be delivered at specified time intervals. Courts require lenders to provide evidence of their efforts to locate borrowers and evidence that the borrower received each document. Lenders are also required to organize signed loan documents for the court hearing showing the lender is in fact the rightful owner of the loan.

In the summer of 2010, the national media covered stories of mortgage loan servicers using questionable methods in serving foreclosure documents, including hiring robo-signing firms to prepare court documents with no official review. By fall, a number of large national lenders faced increasing scrutiny for procedural failures, as shown in Figure 1. In New Jersey, six lenders were closely watched: Bank of America, JP Morgan Chase, Citi Residential, GMAC (Ally Financial), OneWest (Indy Mac Federal), and Wells Fargo. These lenders were responsible for more than 29,000 of the 65,000 foreclosure filings in the state in 2010. On November 4, 2010, Legal Services of New Jersey provided the Chief Justice Rabner of the State Supreme Court a report on the flaws in the foreclosure document preparation and filing practices by these lenders. On December 20, 2010, the Court issued Administrative Order 01-2010, which created a moratorium on new foreclosure filings by these lenders 2010. Chief Justice Rabner stated (2010):

Today's actions are intended to provide greater confidence that the tens of thousands of residential foreclosure proceedings underway in New Jersey are based on reliable information. Nearly 95 percent of those cases are uncontested, despite evidence of flaws in the foreclosure process.

The Order to Show Cause (OTSC) required certain lenders to suspend uncontested foreclosure filings and foreclosure sales immediately. Before these lenders could proceed, they were required to show “why the Court should not suspend the ministerial duties of the Office of Foreclosure Plaintiffs.” The Court intended

for the OTSC to reinforce the use of proper legal processes for foreclosure cases among lenders for whom the court had documented a pattern of problems (Portlock, 2011). Lenders unsuccessfully attempted to block the OTSC, accusing the New Jersey Supreme Court of overreaching the rights of lenders (Kraus, 2011).

The OTSC suspended all uncontested foreclosure cases until the court was satisfied that the lenders could “show cause why the processing of uncontested residential mortgage foreclosure actions they have filed should not be suspended.” The OTSC applied to any motion from the six lenders, except for cases where the borrower had already contested the lender’s foreclosure claim. The court ordered a signed affidavit for every OTSC-covered filing, including (1) what information was communicated to borrowers, when, and by whom, (2) who reviewed the documents being submitted, and confirmed their accuracy, and (3) confirmation that all documents in the filing comport with all legal and regulatory requirements. The court provided lenders a form to organize these materials on January 31, 2011 and gave the targeted lenders 60 days to file all documents.

The court received the OTSC affidavits on April 1, 2011 and reviewed these documents until May 26, 2011. The Court stipulated a future court order would be issued to each lender, at which time that lender could proceed with foreclosure filings and repossessions through the normal judicial process. Five of the six lenders received court orders relieving them of the OTSC on August 17, 2011, with GMAC remaining under the OTSC until September 12, 2011.

The OTSC introduces a moral hazard problem. It can be viewed as a disincentive for payment, especially among borrowers who have a low marginal cost of one more missed payment and are at higher relative risk of being involved in uncontested foreclosure filings. The OTSC also increases the time frame over which borrowers form expectations about future house prices and future liquidity, as well as accumulate money for payments, facilitating payments (if borrowers have positive expectations). This might result in more payments. Finally, the OTSC might enhance borrower trust in the legal process of foreclosure takings related to the affected lenders, facilitating payments.

2.2 Moral Hazard: Fewer Payments

The OTSC extends the number of months a borrower can stay in her home rent-free before repossession and eviction. Some borrowers may use this period as a way to forestall repossession, using mortgage payments for other consumption (Meltzer, 2016). Indeed, Zhu and Pace (2015) found that borrowers in states with longer foreclosure processes have higher rates of default, and that borrowers appear to maximize the time from the first missed payment to repossession.

However, not all borrowers are likely to exercise the option to skip payments. The costs of default for borrowers with otherwise good credit are higher, since these borrowers would face the cost of derogatory payment patterns, which increase the costs of other forms of credit in the future (Boot and Thakor, 1994). Borrowers who are already behind have derogatory items in their credit reports, so the marginal costs of skipping further payments is relatively lower.

This prediction can be tested by estimating rates of payments among delinquent and non-delinquent borrowers subject to the OTSC. The prediction remains ambiguous regarding whether borrowers who are current and at low risk of being subject to a foreclosure filing would find the value of missing payments sufficient to justify the costs of late fees or derogatory credit records. Borrowers who are delinquent and potentially subject to foreclosure filings might be more likely to respond to the OTSC by withholding payments than current borrowers.

2.3 Longer Time Horizon to Form Expectations: More Payments

A longer time horizon increases the period over which borrowers can access formal and informal liquidity, including adding to income or income sources or liquidating other assets. Payments made represent positive expectations by the borrower about the prospects of maintaining the mortgage in the future. By late 2010, New Jersey house prices were showing no signs of recovery, although labor markets began to show some slight gains. Potentially, borrowers looking into 2011 had reason for growing optimism about future liquidity and their abilities to make mortgage payments. Given that it provided more time for borrowers to evaluate the costs and benefits of curing a loan in default, the OTSC may have facilitated positive expectations about future payments (Bruine de Bruin et al., 2010).

But if more time facilitated payments, lenders should regularly offer extended relief from foreclosures—for example, three-month grace periods after which payments are due in full. Yet this is not a common practice in loan servicing. Moreover, the timeline for foreclosures in New Jersey is already one of the longest in the nation, averaging more than 12 months in many jurisdictions. The OTSC added another four to six months for covered loans—a substantial increase—but all defaulted loans in the state had longer timelines than national averages.

New Jersey is a recourse state. The difference between the outstanding loan balance and the fair market value of the property can be recaptured by the lender within three months of the foreclosure sale through the pursuit of a deficiency judgment against the borrower.⁴ The threat of recourse adds an incentive for a borrower who owes more than the home is worth to avoid foreclosure if possible.

The court announced an intention to review documents in April 2011. This gave borrowers about three months to sell assets, restructure other forms of credit, gather resources from social networks, and earn income, including federal income tax refunds filed in January through April. For a typical borrower in the data who was behind two payments at the start of the OTSC and used the three months of the moratorium to accumulate resources, the total amount needed to cure a delinquency was about \$13,000. Borrowers might make partial payments, but they would still be subject to foreclosure until they could bring their loans current.⁵ Given the timing of the OTSC affidavit deadline, borrowers would be likely to work to make full payment before the end of the OTSC.

2.4 Increased Trust in Borrower Protections: More Payments

There is a robust literature on the role of trust in markets (see Glaeser et al. (2000) for example), but not an extensive study of the role of trust in mortgage foreclosure processes. The borrower's decision to make a payment on a mortgage is dependent upon her belief that the payment will be properly credited to the loan balance due, that the stipulations of the mortgage terms will be upheld, and that her rights as an owner will be safeguarded during the foreclosure and repossession process. Binding contracts (such as a mortgage when the repossession of collateral becomes imminent) rely on trust by each party. If one party lacks trust that the contract process will not be upheld as prescribed, breach may be the optimal choice (Göran and Hägg, 1994).

Tyler (2001) shows in several studies how people evaluate the courts in terms of the fairness of the treatment they expect to receive. The perception of fair treatment is a factor in how people decide to engage with the system. Higher quality oversight and fewer errors in foreclosure rulings should improve borrower confidence. Acemoglu and Johnson (2005) demonstrate that third party oversight, such as that provided by a court, facilitates contract enforcement. Prior studies recognize differences in state foreclosure laws, but focus on the costs (and, to a lesser extent, benefits) of borrower rights in the foreclosure process. For example, Calomiris and Higgins (2011) discuss the costs of delayed foreclosures, but not the role of legal rights in reassuring borrowers about the process. Casas-Arce and Saiz (2010) argue that judicial foreclosure systems may benefit lenders overall, despite longer times and higher costs.

It is reasonable to assume all borrowers in default mistrusted their lenders in this period given the widespread attention to robo-signing. Borrowers from OTSC lenders would reasonably have even higher levels of mistrust given media and other reports. Borrowers from OTSC lenders in New Jersey were distinct in that these loans were given a much more detailed review from the courts, including a special report finding specific cases of lenders violating consumer protections.

Borrowers who accumulate payments and have the ability to cure delinquent payments may not be willing to send in their payments, if they perceive that the lender will wrongly pursue foreclosure. The media attention to lenders, and in particular the large national lenders subject to the OTSC, was such that borrowers might perceive that their payments would not be properly recorded, or that lenders would proceed with highly automated foreclosure filings regardless. The topic of foreclosure mistakes and lender problems with the foreclosure process was widely discussed in the media over this period. According to Google Trends, media headlines about 'foreclosure robo-signing' was not discussed in 2009, mentioned 569 times in 2010, 1,041 times in 2011, and 940 times in 2012. After the national mortgage settlement in February 2012, the topic ceased to be a frequent media topic (see Appendix Figure 8). Examples in the media often included stories with titles like 'Facing Foreclosure Without Missing A Payment: One Couple's Housing Nightmare' about

homeowners who made payments, but the lender still took the borrower to foreclosure court because of paperwork mistakes (for example, Yeebo (2011)).

The rate of fraud or serious mistakes for foreclosures on loans in New Jersey, even among OTSC-reviewed lenders, was in the end not as high as initial media reports portrayed. A 2014 report by the Federal Reserve estimated that about 4.5 percent of foreclosures included flaws that could materially harm borrowers (Federal Reserve Board, 2014). Nevertheless, especially in 2011 before other data was available, borrowers could rationally perceive lenders, especially high volume lenders, as potentially having problems. Indeed, the 2012 National Mortgage Settlement distributed relief to over 300,000 borrowers who lost their homes but were not provided due process (Smith, 2013).⁶

3. Empirical Methods

We estimate the effect of the OTSC moratorium on borrower behavior using comparisons across geography, time, and lender. We compare loans across geography using loans in New Jersey relative to loans in neighboring states. Figure 2 shows the metropolitan statistical areas (MSAs) we use in the state of New Jersey, each of which include another state: Allentown–Bethlehem–Easton (PA-NJ), New York–Newark–Jersey City (NY-NJ-PA), and Philadelphia–Camden–Wilmington (PA-NJ-DE). By using MSAs in New Jersey that overlap into bordering states, we can study the effects of the OTSC on loans in New Jersey. Comparing lenders that were and were not subject to the OTSC over time provides a natural setting for a difference-in-difference-in-differences (DDD) analysis. This method estimates the effects of the OTSC using MSAs located in New Jersey that also overlap with surrounding states. This is helpful for creating more homogeneous regions to test for the effects of the OTSC, especially since prior studies show a high degree of heterogeneity in mortgage default by geographic location (Agarwal et al., 2010; Cordell et al., 2009; Foote et al., 2008).

We can compare loans over time relative to the pre- and post-OTSC periods. Figure 1 shows the chronology of events around the OTSC in late 2010 into 2011. The key time period in New Jersey is December 2010 to August 2011, when the court refused to proceed on any foreclosure filing from the six lenders targeted by the OTSC.

There are a variety of specifications used in the mortgage performance literature, including linear probability models, hazards, and multinomial logits, among others. Since our main interest is in borrowers curing, or catching up on behind payments, the outcome is binary. We are also not focused on borrowers engaging in spells of payments, but rather borrowers at least once achieving the threshold of being caught up. We choose a hazard approach, which has the added advantage of dealing with censoring of failed loans from prior periods.⁷ In this way, we can estimate when borrowers catch up and then not allow those borrowers to directly influence estimates in later periods. Once a loan is cured, it is dropped from the analysis; curing is treated as a terminal state.

Generally, our strategy is to examine monthly repayment rates for a sample of loans that are at least 30 days behind as of December 2009.⁸ We select this date in order (1) to focus on loans at some risk of foreclosure, and (2) to select loans before the robo-signing controversy might have influenced borrower behavior. The main loan behavior of interest is the rate of loans curing to a non-delinquent state. Most estimates are presented as relative hazard ratios or rates among loans on which borrowers have the chance to start paying each month. Specifically, we estimate the reduced form model shown in the following equation:

$$Y_{i,t} = \beta_0 + \beta_1 TT_t + \beta_2 NJ_i + \beta_3 TS_i + \gamma_1 (TT \times TS)_{i,t} + \gamma_2 (TT \times NJ)_{i,t} + \gamma_3 (NJ \times TS)_i \\ + \delta (TT \times NJ \times TS)_{i,t} + \eta (PTT \times NJ \times TS)_{i,t} + \lambda \mathbf{X}_{i,t} + \kappa_{\text{MSA}} + \epsilon_{i,t}$$

This specification is a DDD where TT is a dichotomous indicator equal to one if the OTSC moratorium was in effect in the given month-year combination and zero if it was not, regardless of location. NJ is an indicator for whether or not the loan is in the state, and hence, whether or not the OTSC would be binding, and TS is a dummy for the OTSC lenders, meaning those subject to the OTSC. The coefficient of interest, δ , will be the DDD estimator in this model, estimating the effect of the OTSC. We also identify η , which

is the causal effect of the OTSC on borrower behavior in the period after the OTSC concludes. *PTT* is an indicator for the time period after the OTSC concludes, and interactions of *PTT* with the OTSC lender and *NJ* dummies identify any persistent effects.⁹ Each loan-month is coded as being bound or not bound by the moratorium based on the state in which it was located and the lender being subject to OTSC. A small number of loans change servicer during the analysis period.

Contained in **X** are loan and borrower characteristics, including log(Home Value), log(original loan value), a dummy for an adjustable rate mortgage (ARM), the note interest rate, log(income) at origination, FICO score, months delinquent in December 2009, and a minority race indicator. Only home value and interest rate can change over time. Log(Home Value) uses the home's value at origination and captures the average price drop in the borrower's ZIP code from origination to each period using monthly ZIP code-level data from Zillow. We do not include a loan-to-value ratio since we do not measure equity directly.¹⁰ We include MSA fixed effects, κ_{MSA} , similar to the structure provided in the DDD model used in Chetty, Looney and Kroft (2009).

We make the following assumptions:

1. The payment trends of OTSC and non-OTSC lenders would be similar in the absence of the OTSC;
2. The payment trends across states/MSAs would be similar in the absence of the OTSC;
3. Borrowers do not select their lenders based on knowledge of the OTSC; and,
4. The OTSC is binding for lenders and borrowers have information about the OTSC.

We can confirm (1) and (2) are likely to be valid given the pre-post and cross-MSA trends for the rate of delinquency cures, loan modifications, and loans worsening in status in Figure 4. These assumptions are further confirmed using a regression framework in Appendix Table 10. The pre-periods (left of the line at December 2010), the OTSC, and non-OTSC plots follow similar patterns. Assumption (3) seems plausible, although is not testable in data. It is highly unlikely the OTSC was anticipated by borrowers before the month it was announced. Borrowers also have little direct control over which lender owns and services their loans, so they could not somehow switch to an OTSC lender in December 2010. Assumption (4) can be directly observed in the foreclosure filings data. Foreclosure filings dropped precipitously in New Jersey in the first half of 2011. Figure 3 plots the total foreclosure filings by ZIP code using data from RealtyTrac on all foreclosure filings. Lenders appear to have dramatically reduced foreclosure actions. The media also covered the robo-signing controversy, the New Jersey OTSC, and the resulting moratorium closely, making it likely that information was available to borrowers in this period.

4. Data

Corporate Trust Services (CTS) is a nationwide database comprised of individual monthly loan payments from mortgage backed securities pooled across more than 50 different lenders. The CTS data serves as a remittance report to investors on payments of principal and interest on each loan. The CTS only captures privately securitized loans—loans that were not backed by government sponsored agencies such as Freddie Mac and Fannie Mae. Most of the loans in the data have characteristics similar to industry standards for subprime mortgages, such as lower credit scores and a larger percentage of adjustable rate loans (versus fixed rate). We follow loans that changed to or from OTSC servicers due to acquisitions to ensure that each loan was accurately labeled as subject to the OTSC or not. These data have been described by White (2009) and Quercia and Ding (2009) and have been the basis of several studies, including Collins and Urban (2015), Collins, Schmeiser and Urban (2013), and Collins and Urban (2014).

The CTS data used in this study cover the period from December 2009 until July 2012 (with one cross section of December 2013 to examine long run foreclosures). Only owner-occupied, single-family homes where the mortgage is the primary or first position lien are included, since second mortgages have different incentive structures (Piskorski, Seru and Vig, 2010). In order to account for demographic characteristics of borrowers, we matched the CTS data to the data on loan applications from the Home Mortgage Disclosure Act (HMDA). This provides borrower characteristics recorded when the loan was first underwritten. We

match approximately 80 percent of CTS records to HMDA, and thus we use these data only as a robustness check. Note that the number of loans is slightly smaller when we use loan-level controls due to the mismatch between CTS and HMDA.

Table 1 Panel A presents summary statistics as of December 2009, the first observed period, conditional on loans being at least 30 days delinquent. Other than home values, the samples are similar. FICO scores are just above 680, the cutoff for subprime loans of this vintage. Both samples include high shares of racial minorities. It is clear that lenders subject to OTSC have statistically different portfolios, although the DDD framework addresses this.

House prices may be endogenous with both lender decisions to foreclose and borrower decisions to cure a delinquency (Frame, 2010). We use ZIP code-level house price data provided by Zillow to calculate parcel-level changes in home values at time t where: $\text{Value}_t = \frac{\text{Balance}_{t_0}}{\text{LTV}_{t_0}} \times \Delta P_{t-t_0}$, and ΔP_{t-t_0} is the difference in average ZIP code level prices between the month of the loan's origination and the current month. These loan-level values are more useful than applying MSA values. The typical borrower holds a loan on a home that has declined in value since purchase, which could leave this borrower in an "underwater" equity position, that is, with a loan-to-value (LTV) ratio that exceeds 1. Note, too, that New York has the highest median origination price, while New Jersey experienced the greatest decline in this period, roughly 19 percent.

5. Results

The intent of this analysis is to document repayments among borrowers at risk of being involved in a foreclosure filing with one of the six lenders implicated by the court as failing to protect borrower rights. These borrowers receive more time to catch up on back payments. The OTSC had an initial deadline of April 2011 for lenders to complete affidavits on outstanding cases, so borrowers could count on a foreclosure moratorium of at least three months. The OTSC may have potentially improved borrowers' confidence on how the court protected them in the legal process, specifically because their property rights were strengthened (or at least borrowers' perceptions of the respect given to their property rights by the courts improved). This was especially important in the face of the unfavorable perception borrowers had of the six implicated lenders.

Table 1 Panel B shows loans in New Jersey and border areas at the conclusion of the OTSC (August 2011) that were delinquent as of the start of the panel. In the far right column are the 2,423 OTSC loans in New Jersey. About 15 percent of OTSC loans in New Jersey experienced a cure, 24 percent were modified by the lender, and 1.3 percent transitioned to a worse foreclosure status (as opposed to status quo or better status). These average rates offer some context for the hazard rates calculated in the following tables.

Table 2 shows DDD estimates for the δ estimate in the equation. This table includes estimates during the OTSC in Panel A, compared to before the OTSC.¹¹ The second column replicates these estimates with controls. Panel B estimates a DD across states (within OTSC lenders), and Panel C estimates a DD across OTSC lenders (within New Jersey).

In Columns (1) and (2), Table 2 shows a hazard specification for the rate of delinquent borrowers starting to make payments again. These cures are defined as a terminal state, such that a borrower who goes from delinquent to current is then dropped from the sample. All loans are delinquent in December 2009, so each uncured loan can cure in each subsequent period. The DDD hazard ratio (Panel A) suggests cure rates are relatively faster for loans with OTSC lenders in New Jersey during the moratorium, relative to non-OTSC lenders before or after the OTSC. These estimates show relatively large effects of the OTSC on delinquent borrowers catching up, with approximately 48 percent faster rates of cure without controls, and 35 percent with controls, confirming the top panel of Figure 4. It is reassuring that trends hold across the estimates in Panels B and C, both among OTSC lenders in New Jersey compared to non-New Jersey, as well as loans only in New Jersey across OTSC and non-OTSC lenders. Cure rates are faster for OTSC loans across all of these comparisons, by 22 percent to 33.5 percent. The DD estimates are also shown in Appendix Figure 6.

One explanation for borrowers catching up could be that lenders are basically resetting loans to current as part of a loan modification. Facing longer delays, lenders might believe that modifying a loan could be less costly than pursuing foreclosures during the moratorium, making modifications more likely. Columns (3) and (4) show lenders in New Jersey subject to the OTSC during the moratorium tend to make modifications of loan terms at higher rates. However, these estimates are not statistically different from one and are even closer

to one in the DD comparisons. Lender loan modifications do not seem to be mechanically driving cure rates.

Table 3 shows the same DDD estimates (δ) as those in Table 2 for a subset of borrower LTV ratio and credit score categories. Borrowers with high LTV ratios have more at risk in the case of a foreclosure, in part due to New Jersey allowing lenders to seek deficiency judgments for shortfalls. Specifically, this table shows that delinquent borrowers with underwater loans, where the home is worth less than the mortgage ($LTV \geq 1$), are more likely to make payments on their loans during the OTSC. About 31 percent of mortgage loans in the data were underwater—the estimated value of the home was less than the mortgage amount as of December 2010. The OTSC may provide these borrowers with differential confidence in the protections of the foreclosure process, which increases the expected value of their positions. These borrowers are more likely to cure back payments to avoid foreclosure.

Credit scores in Table 3 are divided by FICO score at 690 or above measured at loan origination. About 48 percent of borrowers in these data have scores at or above 690. FICO scores are designed to predict payment behaviors, so these cures are at least partially explained by the underlying traits of borrowers. Indeed, higher FICO borrowers cure twice as fast due to the OTSC (Panel B in Table 3). A foreclosure will also cause relatively more harm to the credit record of these borrowers, since lower-score borrowers have less margin to decline further. The hazard rates for lower-score borrowers are all greater than one, but much smaller and not statistically different from one. Higher-score borrowers may be focused on preserving their credit as well as more attentive to the OTSC and more sensitive to how well they expect to be treated in the judicial process.

Borrowers with higher LTVs and higher FICO scores making payments to OTSC lenders at higher rates is consistent with borrowers perceiving the OTSC as assurance that their payments would count and their rights would be protected in the judicial foreclosure process. Panel C of Table 3 shows that high-LTV and high-FICO borrowers are driving the effect, when compared to low-FICO and low-LTV borrowers also subject to the OTSC. The six lenders targeted by the OTSC were subject to a great deal of negative press and scrutiny; borrowers might rationally have lower levels of trust in these lenders relative to other lenders. The external oversight provided by the OTSC may have shifted borrower perceptions and reduced incentives for withholding payments.

5.1 Mechanisms

The results so far are consistent with the OTSC encouraging more borrowers whose loans are subject to it to cure delinquent payments. This effect does not appear to be driven by lender actions alone (via modifications). It remains unclear whether the effect is driven more by borrower's renewed trust in lenders subject to the OTSC or simply by more time being automatically provided to borrowers with loans from lenders covered by the OTSC.

First, we ask: are borrowers, even if they fail to cure, making any payments? A cure should remove a borrower from the foreclosure process altogether. Making payments, especially loan principal payments, suggests there is trust that the process will uphold the borrower's rights and protections even if foreclosure processes recommence. Table 4 is an ordinary least squares (OLS) panel regression estimate for the change in the monthly principal balance, controlling for all prior independent variables and adding month-by-year fixed effects. The intent here is to look at borrowers who may or may not cure a delinquency but are making headway on paying off principal. The dependent variable is the natural log of the change in monthly balance (the log was of $(1 + \Delta \text{ balance})$ to adjust for zero values).¹² These estimates can be interpreted as mean monthly percent changes in principal payoff. During the OTSC borrowers with loans subject to the OTSC paid off 5.6 percent more per month relative to the DDD, and 12.3 percent more with controls (including initial balance).¹³ The DD estimates are all positive and statistically significant, as well. These results suggest that the OTSC encouraged borrowers to catch up at higher rates, in addition to the estimates of higher cure rates in Table 2.

Second, we ask: did OTSC lenders encourage repayments by making more generous loan modifications to OTSC covered borrowers when they did allow modifications? Table 5 shows the terms of loan modifications by type of lender based on a cross section of loans that were modified. There is no evidence in these estimates that OTSC lenders were offering deeper concessions on loan terms during the OTSC and in New Jersey, conditional on making a modification. Lender loan modifications alone cannot explain the improved cure rate

shown in prior tables.

Third, we ask: did delinquent borrowers respond by becoming further behind? Or did borrowers who were previously current on their loans begin to miss payments? Loans are designated by loan status, from current to 30 days delinquent, then 60 days delinquent, then 90 or more days delinquent. The panel begins with loans that are all 30 days behind, but loans can transition from 30 to 60 or 60 to 90 or more (once a loan moves to 90 days delinquent, loan status cannot become worse). Table 6 shows a hazard estimate of the rate of loans moving to worse status. Columns (1) and (2) confirm that delinquent loans subject to the OTSC were not more likely to worsen in status. Columns (3) and (4) use a different sample, unlike other models, where the loans included in December 2009 were all current. Here it does appear that borrowers subject to the OTSC were more likely to miss payments, conditional on starting at current status. Although only one estimate, with controls, is statistically different from one and only marginally so (at the 10 percent level), these results are consistent with some industry predictions that borrowers would stop making payments when short-term sanctions for default are relaxed during a moratorium. Again, these results are not confirmed with the DD setup, where the estimates are closer to and never statistically different from one.

However, counter to industry predictions, delinquent borrowers are not stopping payments. These borrowers actually have a lower marginal cost of missing payments (they already have tarnished credit), so the moral hazard mechanism is dominated by other motivations. Overall, these results show no evidence that delinquency increases due to the OTSC among delinquent borrowers and weak evidence of delinquencies among current borrowers. This distinction again may support the notion that borrowers who were at risk of default benefited from the perceived enhanced protections of the OTSC.

Fourth, we ask whether lenders subject to the OTSC are behaving differently in New Jersey during the moratorium. Table 7 further underscores that lenders are not offering other forms of loss mitigation besides loan modifications. These include forbearance, interest reductions, or other changes in terms that are not a formal modification. We are also able to examine loans being paid off in full, which could signal a short sale, short refinance, or deed in lieu of foreclosure. Using the approach employed by prior studies (Adelino, Gerardi and Willen, 2013), loans with changes in terms are flagged as temporary (not formal modifications, which typically have a 90 day trial period). There do not appear to be patterns of lender behavior under the OTSC that might serve as an alternative explanation of borrower behavior. Table 8 further shows the rate of self-cures for loans—that is loans where delinquent borrowers resume payments with no loss mitigation or modifications provided by the lender. The rate of cures here is even larger than in Table 2. These cures are driven by the actions of borrowers and include no modifications of loan terms, interest rates, or principal forgiveness. A further measure of cures in Columns (3)-(4) of Table 8 removes all loans paid in full to ensure that lenders were not writing off a portion of mortgages, and results remain robust. The main effect of the OTSC seems to be derived from borrowers reconsidering the net present value of making payments given the oversight of the foreclosure process provided by the courts.

5.2 Long Run Effects

While borrowers subject to the OTSC appear to be more likely to make payments, a key question remains: Does the OTSC shift the trend in long run loan outcomes, especially related to foreclosure repossessions? Table 9 shows loans as a cross section as of the last period available, December 2013. This allows foreclosures to matriculate through the legal process. The dependent variable is an indicator of a loan going to repossession or REO (real estate owned by the lender) in Columns (1)-(2), and a dummy variable equal to one if a foreclosure action was ever filed in Columns (3)-(4). Since all loans are exposed to the same time periods, it is only possible to estimate a difference-in-differences (not a DDD). Importantly, OTSC-covered loans are no more or less likely to experience a repossession. Columns (3) and (4) do not show differential foreclosure rates among OTSC-covered loans in New Jersey. OTSC lenders are less likely to file for foreclosure overall, and loans in New Jersey are more likely to have a filing overall, however. Borrowers cure at a higher rate, but in the longer run the OTSC did not result in any significant change in foreclosure rates or repossessions.

The court's actions under the OTSC may have functioned to reassure borrowers that payments on the loan would not be captured by capricious lenders through sloppy legal processes. But borrowers do not appear to have made short-term gains only to eventually fall behind and lose their homes. In the longer run,

borrower protections granted under the OTSC also did not result in fewer foreclosures. The OTSC may have just brought the six targeted lenders back to the levels of typical lenders who were not implicated in the robo-signing controversy. This result underscores the importance of trust in property rights, contracts, and the judicial process for a well-functioning financial system.

5.3 Robustness

There is the possibility that both house prices and cure rates could be simultaneously affected by the moratorium. The pattern of price declines is shown in Figure 5. Though we argue that a change in the stock of foreclosures in New Jersey and not the surrounding states does not change the prices (see, for example, Fisher, Lambie-Hanson and Willen (2013)), we also verify that ZIP code-level house prices do not change as a result of the moratorium using the methods in Mian, Sufi and Trebbi (2015). We show and explain these results in Section 9.1. Specifically, Table 9 and Figure 9 use a Regression Discontinuity Design (RD) to show that there is no change in house prices due to the OTSC.

We offer further reassuring analyses in the Appendix. Table 11 shows the same model as Table 2, but with a shared frailty specification by county, allowing county-level correlations in outcomes, in Columns (1) and (3). This approach allows for systematic and unobserved factors within groups of loans by county. Columns (2) and (4) include stratified estimates by servicer (Van den Berg and Drepper, 2016). The results in Table 2 appear to be robust to the alternative estimations in Table 11.

The cure rates in Figure 4 show that May 2011 was the period when the treated borrowers shift rates of repayment on delinquent loans. This was the month the court received the required documentation from the impacted lenders and was the expected end date for the OTSC; borrowers (and servicers) understood the moratorium could be lifted at any point after that date. This means borrowers subject to the OTSC tended to cure in April 2011, which was recorded by servicers in May 2011 (remittance reports are for the prior month). In part this is because borrowers used the time of the OTSC to accumulate payments and viewed the initial court deadline of April 1 as also being a deadline to cure back payments. The spike in May, shown in Figure 4, is striking but even removing May from the analysis, as we do in Table 12, the same general results hold.

5.4 Discussion

The OTSC targeted on the most tarnished lenders and servicers who the media focused attention on in a negative way. These firms perhaps need some external reinforcement to return their perceptions to more typical levels that might support relationships with borrowers.

The closest work to this study is Gerardi, Lambie-Hanson and Willen (2012), which examines a right-to-cure law that added more time for borrowers. Using a difference-in-differences identification strategy across states and over time, paired with monthly loan data to estimate hazard and multinomial models, the authors conclude that the added time of the state's protection did not facilitate higher cure rates. The authors show right-to-cure decreases the short run rate of foreclosures but not loan modifications or long run foreclosure rates.

Mayer et al. (2014) examine a change in one lender's process for modifying mortgage contracts, but without any changes in state policies, to show that the marginal current borrower will default in response to a loan modification program. That paper also uses a difference-in-differences identification strategy, comparing across lenders and over time. Like Gerardi, Lambie-Hanson and Willen (2012), borrowers appear to respond to incentives to default if they are economically meaningful.

Our results are generally consistent with those of Gerardi, Lambie-Hanson and Willen (2012). Our main analysis is of borrowers in trouble—with a history of delinquency—and how they respond to a policy that is salient for their context. The OTSC was a universal policy applied to all borrowers serviced by a specific group of lenders implicated in robo-signing; it offered more time for borrowers to cure delinquencies. Under right-to-cure, borrowers had to actively respond to lenders to be eligible it. Right-to-cure thus involves some borrower selection, where borrowers did not obtain the 150 day “free rent” if they did not respond to the lender's contact within 30 days. The OTSC was not optional; all borrowers with OTSC loans were subject to it. However, as in Gerardi, Lambie-Hanson and Willen (2012), those subject to the OTSC are also no less likely to foreclose in the long run. We also show heterogeneous effects where the riskiest borrowers (high

LTV), and borrowers with most at risk (high FICO) are the most responsive. Low FICO borrowers and those with home equity are less impacted by the OTSC. Higher credit score borrowers could be more informed about the moratorium, in addition to more fearful of a deficiency judgment.

Several caveats are worth noting. First, the New Jersey moratorium focused on six large lenders, all with relatively low default rates and negative public attention on questionable filing procedures. It is hard to rule out the possibility that these lenders were engaged in increased borrower outreach or public relations during or after the OTSC. It seems unlikely that these lenders could have predicted with precision when the moratorium would begin, or even if it would begin. The attention brought on by the OTSC could have influenced lender practices in ways that encouraged delinquent borrowers to make payments. Since we see no changes in modifications, this would have had to be in unobserved ways, such as telephone calls, counseling or informal payment plans. Appendix Figure 7 further shows that there was not a spike in online discussions of foreclosure counseling by people in New Jersey relative to people online in New York. It seems unlikely that any outreach strategy could be limited to New Jersey and also achieved at scale only among OTSC lenders.

6. Conclusions

Broadly speaking, this paper explores how *ex post* changes in the rules regarding due process in contract disputes impacts behavior. The OTSC could have encouraged borrowers, especially those at risk of default and with poor credit, to retain their mortgage payments for other consumption and live rent free for a few months. Alternatively, the OTSC could provide assurance to borrowers that they would receive due process under the terms of the mortgage contract, encouraging them to increase the rate of repayment.

We find that relative to border areas and noncovered lenders, loans subject to the New Jersey OTSC show higher repayment rates. This behavior is consistent with borrowers evaluating the long run expected value of the foreclosure process and judging that court oversight strengthens the value of payments in the current period, and then using the OTSC period to catch up. Moreover, loans subject to the OTSC moratorium appear more likely to remain in good standing up to three years after the OTSC was released; these loans are no more or less likely to experience a repossession.

The OTSC results in about a 5 percentage point greater cure rate (where the moratorium sped cure as a marginal effect by 35.5 percent from a baseline average rate of 15 percent). The six lenders subject to the OTSC had just under 30,000 loans statewide in default or foreclosure in late 2010. A back-of-the-envelope estimate based on these numbers is about 1,500 additional loans in default that cured due to the OTSC (if cure rates of all loans mirror that of the data in our study). Ignoring the legal and reputation costs of the robo-signing controversy, OTSC, at least in the short run, benefited from more payments being made by borrowers without using extraordinary workouts or modifications.

The combination of more time, a deadline (that was eventually extended), and enhanced trust for a subset of lenders/servicers with tarnished reputations are key features of the OTSC. The circumstances of the OTSC were unique, however. The court in New Jersey acted quickly when problems became public and zeroed in on the largest and presumably most problematic lenders. This action provided borrowers with these lenders more time and supported borrowers' expectations of being protected by court in a period when trust in these specific lenders was being questioned. The results do not offer predictions about how a more general moratorium might shift payment patterns, or how enhanced protections would affect lenders who were not implicated in wrongdoing.

Court oversight may result in better-quality legal filings by lenders, and generally higher levels of consideration of the borrower's rights. Courts and policymakers under pressure to weaken the level of review of repossession cases might want to consider how borrowers at risk of default will perceive such changes. When a lender or set of lenders has for some reason lost the trust of borrowers, mechanisms to restore trust may facilitate borrowers' cooperation and increase repayment rates.

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7. Figures

Figure 1

Events Highlighting Lender Problems with Foreclosure Procedures

Sept 10, 2010 Ally cites 'technical defects' in filings
Sept 30, 2010 JPMorgan Chase suspends foreclosures in judicial states
Oct 10, 2010 Bank of America halts foreclosure sales nationwide
Oct 18, 2010 Bank of America resubmits 102,000 affidavits; resumes foreclosures
Oct 27, 2010 Wells Fargo submits 55,000 'supplemental' affidavits in judicial states
Nov 11, 2010 JPMorgan Chase resumes foreclosures
Nov 18, 2010 Citi Mortgage director testifies in Congress; reviews 10,000 affidavits

Timeline of the New Jersey Court Order To Show Cause (OTSC)

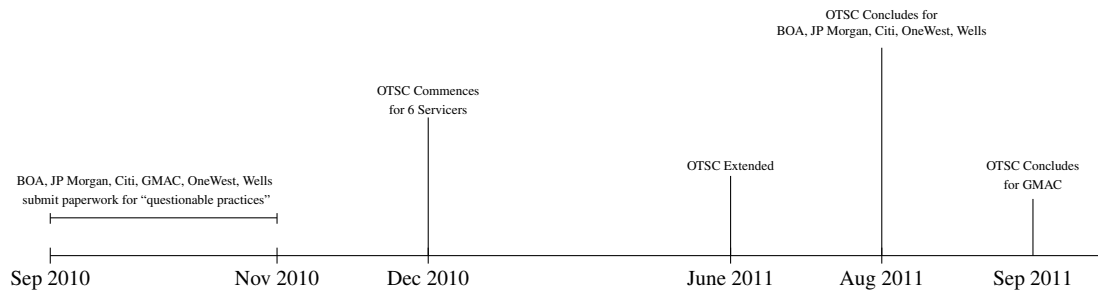


Figure 2: Metropolitan Statistical Areas Crossing New Jersey State Lines

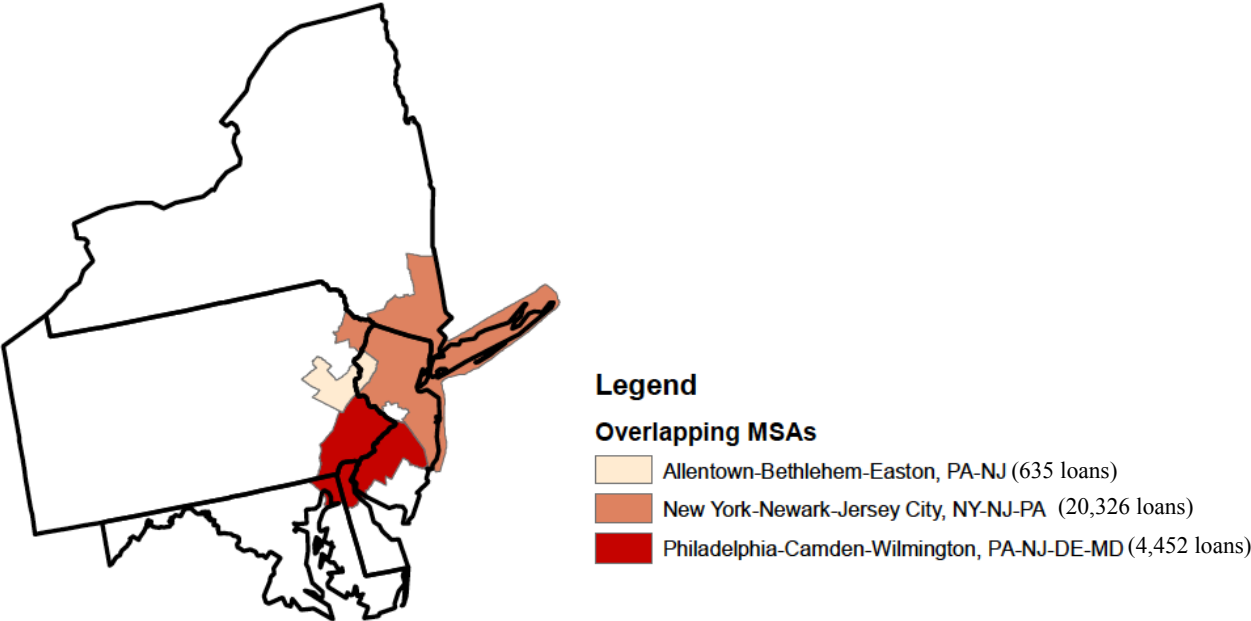
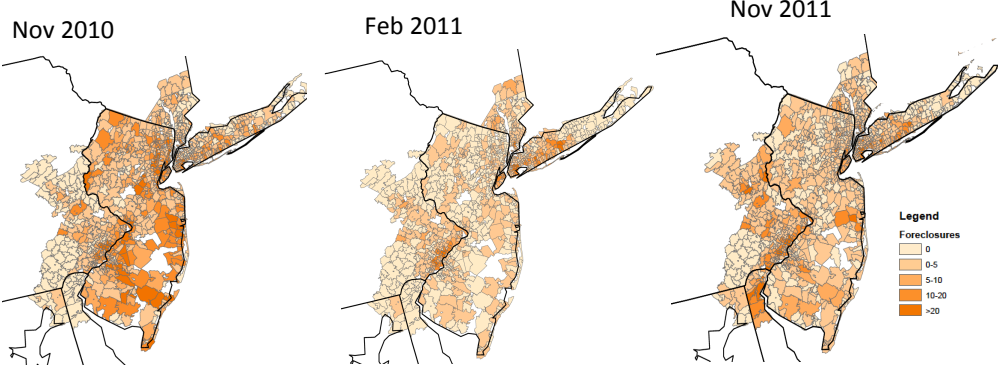
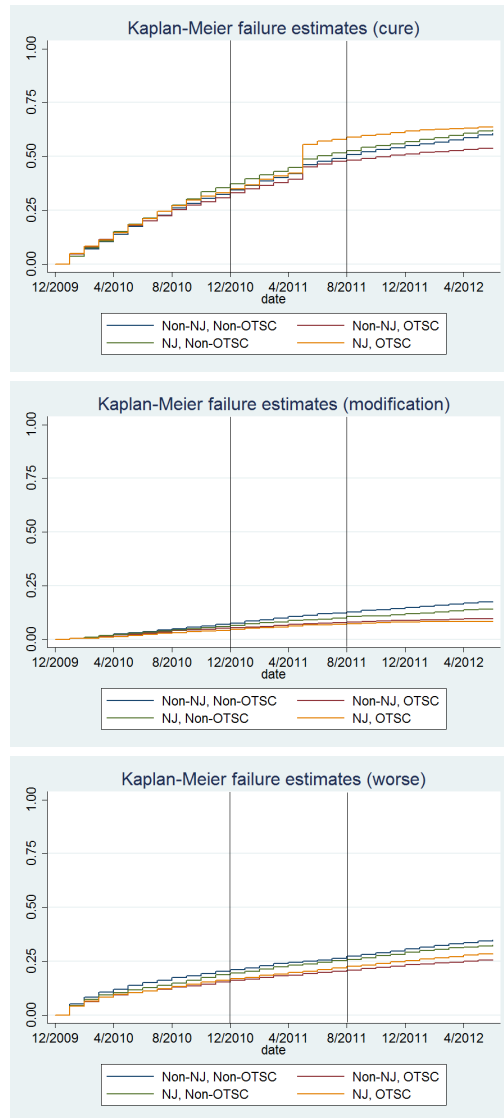


Figure 3: New Jersey ZIP Code Level Foreclosures: Before (Nov 2010), During (Feb 2011), and After (Nov 2011) OTSC



Source: Authors' calculations using RealtyTrac data.

Figure 4: Difference-in-differences-in-differences (DDD) for Cure, Modifications and Worsened Status by New Jersey x OTSC Lender x Moratorium Time Period



Notes: The figures above show Kaplan-Meier failure functions for cures (row 1), modifications (row 2), and when loans moving to worsened delinquency status (row 3). The first column presents the DDD trends, where the functions are grouped by combinations of OTSC lenders and being located in New Jersey. The second column presents DD trends across OTSC and non-OTSC lenders within New Jersey only. The third column presents DD trends across New Jersey and border state lenders within OTSC lenders only.

Figure 5: Median Home Value Changes Since Loan Origination



Source: Home value at origination based on loan records in CTS data (the average loan was taken out in 2005). Value as of November 2010 (the month prior to the OTSC) estimated based on Zillow Home Value Index.

8. Tables

Table 1: Descriptive Statistics

	Border Non-OTSC	Border OTSC	NJ Non-OTSC	NJ OTSC
Panel A: Loan Characteristics at Start of Panel (December 2009)				
ARM Indicator	0.601 (0.499)	0.498 (0.500)	0.692 (0.462)	0.550 (0.498)
Interest Rate	6.49 (1.61)	6.45 (1.17)	6.40 (1.68)	6.39 (1.26)
Home Value (000s)	470.36 (279.66)	548.28 (319.40)	391.84 (230.87)	433.92 (248.94)
Income (000s)	144.45 (138.73)	168.32 (146.51)	142.19 (122.79)	164.63 (250.52)
Origination Year	2005.46 (0.91)	2005.53 (0.83)	2005.50 (0.88)	2005.50 (0.78)
FICO (divided by 100)	6.851 (0.661)	6.835 (0.869)	6.856 (0.660)	6.845 (0.853)
Minority	0.528 (0.499)	0.445 (0.497)	0.496 (0.500)	0.467 (0.499)
Panel B: Loan Status at End of OTSC (August 2011)				
Cure	0.24 (0.42)	0.15 (0.36)	0.17 (0.38)	0.15 (0.36)
Modified	0.39 (0.49)	0.22 (0.42)	0.37 (0.48)	0.24 (0.43)
Worse	0.035 (0.18)	0.018 (0.13)	0.033 (0.18)	0.013 (0.11)
Number of Loans	11,439	5,369	5,040	2,423

Source: Panel A: CTS data conditional on loan being delinquent as of December 2009. Panel B: CTS Data August 2011. Conditional on loan being delinquent as of December 2009. Notes: Means reported, standard deviations in parentheses. Across all variables for all groups, we reject the null of equality across groups using Wilks' lambda at the 10% level. Total number of loans is lower than in Figure 2 due to small numbers of missing variables. Worse means that a loan went from current to first delinquency, one month behind to two months behind, or two months behind to three months behind.

Table 2: The Moratorium Sped Up Cure Rates but not Modifications

Dependent Variable	Cure		Modification	
	(1)	(2)	(3)	(4)
Panel A, DDD: All Loans				
During x NJ x OTSC	1.483*** (0.145)	1.351*** (0.144)	1.262 (0.218)	1.324 (0.252)
Number of loans	28,448	21,862	28,448	21,862
Observations	189,216	154,426	525,806	401,353
Panel B, DD: OTSC Only				
During x NJ	1.335*** (0.103)	1.223** (0.103)	0.939 (0.153)	1.011 (0.181)
Number of loans	11,464	8,771	11,464	8,771
Observations	58,355	46,524	187,518	139,663
Panel C, DD: Loans in NJ Only				
During x OTSC	1.270*** (0.0981)	1.221** (0.103)	1.010 (0.155)	0.937 (0.158)
Number of loans	8752	6666	8752	6666
Observations	56,847	45,145	160,244	121,001
<u>Includes</u>				
Controls	No	Yes	No	Yes

Source: CTS data December 2009 - July 2012. Conditional on loan being delinquent as of the first period (December 2009). Notes: Hazard rates presented with robust standard errors clustered at the loan-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each observation is a loan-month. All models include MSA fixed effects, months delinquent in period one, $\log(\text{home value})$, $\log(\text{original loan balance})$, interest rate, ARM indicator. HMDA controls include FICO score quartiles, borrower race, and $\log(\text{income})$. $NJ = 1$ if the loan is in New Jersey. $OTSC=1$ if the lender was subject to the OTSC in any state. $During=1$ if the loan-month was during the moratorium period. Panel A provides the DDD estimator, Panel B provides a DD estimator across states within OTSC lenders, Panel C provides a DD estimator across lenders within New Jersey.

Table 3: The Moratorium Sped Up Cure Rates More for Underwater and Higher FICO Borrowers

Dependent Variable: Cure				
	LTV < 1		LTV ≥ 1	
	(1)	(2)	(3)	(4)
Panel A, DDD by LTV				
During x NJ x OTSC o	1.132 (0.239)	0.888 (0.219)	1.468** (0.241)	1.543** (0.280)
Number of Loans	17,020	12,860	7,679	6,223
Observations	95,000	76,770	84,497	70,049
	FICO ≥ 690		FICO < 690	
	(1)	(2)	(3)	(4)
Panel B, DDD by FICO				
During x NJ x OTSC	1.976*** (0.295)	1.967*** (0.319)	1.239 (0.165)	1.218 (0.178)
Number of Loans	15,726	11,259	12,728	10,599
Observations	66,260	54,817	122,956	103,841
	FICO ≥ 690 and LTV ≥ 1		FICO < 690 and LTV < 1	
	(1)	(2)	(3)	(4)
Panel C, DDD by LTV and FICO				
During x NJ x OTSC	1.720* (0.529)	2.181** (0.785)	1.190 (0.294)	0.995 (0.290)
Number of Loans	2,967	2,440	6,623	5,459
Observations	25,499	21,212	58,330	48,893
Controls	No	Yes	No	Yes

Source: CTS data December 2009 - July 2012. Conditional on loan being delinquent as of the first period (December 2009). Notes: Hazard rates presented for panel. Robust standard errors clustered at the loan-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Each observation is a loan-month. All models include MSA fixed effects, months delinquent in period one, log(home value), log(original loan balance), interest rate, ARM indicator. HMDA controls include FICO score quartiles, borrower race, and log(income). $NJ = 1$ if the loan is in New Jersey. $OTSC = 1$ if the lender was subject to the OTSC in any state. $During = 1$ if the loan-month was during the moratorium period. Panel A provides the DDD estimator by LTV. Panel B splits the sample by high and low FICO scores, where high is above 690 and low is below 690. Panel C compares high LTV and high FICO to low LTV and low FICO.

Table 4: The Moratorium Increased Payments

Dependent Variable= $\ln(\Delta$ balance from previous month)		
	(1)	(2)
Panel A, DDD: All Loans		
During x NJ x OTSC	0.0560*** (0.0121)	0.123*** (0.0186)
Observations	598,535	462,665
Panel B, DD: OTSC Only		
During x NJ	0.0373** (0.0139)	0.0499** (0.0196)
Observations	202,153	152,220
Panel C, DD: Loans in NJ Only		
During x OTSC	0.195*** (0.0412)	0.251*** (0.0408)
Observations	180,338	137,716
Controls	No	Yes

Source: CTS data December 2009 - July 2012. Conditional on loan being delinquent as of the first period (December 2009). Notes: OLS estimates with month by year fixed effects presented with robust standard errors clustered at the loan-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Each observation is a loan-month. All models include MSA fixed effects, months delinquent in period one, $\log(\text{home value})$, $\log(\text{original loan balance})$, interest rate, ARM indicator. HMDA controls include FICO score quartiles, borrower race, and $\log(\text{income})$. $NJ = 1$ if the loan is in New Jersey. OTSC=1 if the lender was subject to the OTSC in any state. During=1 if the loan-month was during the moratorium period. Panel A provides the DDD estimator, Panel B provides a DD estimator across states within OTSC lenders, Panel C provides a DD estimator across lenders within New Jersey.

Table 5: Modifications During the Moratorium were not Different than those Before or After

Dependent Variable	Payment Change (1)	(2)	Balance Change (3)	(4)	6-Month Re-default (5)	(6)	12-Month Re-default (7)	(8)
Panel A, DDD: All Loans								
During x NJ x OTSC	0.0353 (0.0575)	-0.0023 (0.0939)	4.5999 (13.0504)	11.7313 (18.2145)	0.0004 (0.0873)	0.0533 (0.1398)	0.0416 (0.1048)	0.0249 (0.1695)
Observations	2,245	696	2,245	696	2,053	692	1,863	684
Panel B, DD: OTSC Only								
During x NJ	0.0319 (0.0430)	-0.1422 (0.1509)	15.2834* (9.1886)	30.2474 (24.9195)	-0.0660 (0.0572)	-0.1953 (0.2371)	-0.0357 (0.0819)	-0.4097* (0.2453)
Observations	1,079	452	1,079	452	992	451	910	445
Panel C, DD: Loans in NJ Only								
During x OTSC	0.0208 (0.0525)	0.0681 (0.0875)	-0.5675 (12.0343)	5.9729 (18.2673)	-0.1208 (0.0830)	-0.1273 (0.1311)	-0.0298 (0.0983)	-0.1405 (0.1615)
Observations	721	238	721	238	669	237	601	233
<u>Includes</u>								
Controls	No	Yes	No	Yes	No	Yes	No	Yes
State Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Servicer Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes

Source: CTS data reshaped to a cross section of modified loans from December 2009 - July 2012. Notes: All models are OLS regressions, where payment change and balance change are pre and post modification. Re-default follows the loan for an additional 6 or 12 months, and equals one if the loan became at least 60 days behind after receiving a modification and 0 otherwise. Each observation is a cross section of modified loans. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Robust standard errors in parentheses. All models include MSA fixed effects, months delinquent in period one, log(home value), log(original loan balance), interest rate, ARM indicator, HMDA controls include FICO score quartiles, borrower race, and log(income). $NJ = 1$ if the loan is in New Jersey OTSC=1 if the lender was subject to the OTSC in any state. During=1 if the loan-month was during the moratorium period. Panel A provides the DDD estimator, Panel B provides a DD estimator across states within OTSC lenders, Panel C provides a DD estimator across lenders within New Jersey.

Table 6: The Moratorium did not Transition Delinquent Loans to “Worse”

	Dependent Variable: Worse			
	Delinquent Loans		Current Loans	
	(1)	(2)	(3)	(4)
Panel A, DDD: All Loans				
During x NJ x OTSC	0.762 (0.197)	0.798 (0.231)	1.230 (0.170)	1.312* (0.203)
Observations	176,364	145,535	343,816	254,113
Panel B, DD: OTSC Only				
During x NJ	0.764 (0.191)	0.761 (0.214)	1.017 (0.138)	1.248 (0.193)
Observations	52,617	42,609	125,580	90,818
Panel C, DD: Loans in NJ Only				
During x OTSC	0.626* (0.152)	0.636 (0.176)	1.076 (0.144)	1.189 (0.178)
Observations	51,900	41,837	105,869	77,749
Controls	No	Yes	No	Yes

Source: CTS data December 2009 - July 2012. Sample in Columns (1)-(2) are conditional on loan being delinquent as of the first period (December 2009). Sample in Columns (3)-(4) are conditional on loan being current as of first period (Dec 2009). Hazard, where time to failure is if the loan gets worse, meaning that it went from current to first delinquency, one month behind to two months behind, or two months behind to three months behind. Robust standard errors clustered at the loan-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each observation is a loan-month. All models include MSA fixed effects, months delinquent in period one, log(home value), log(original loan balance), interest rate, ARM indicator. HMDA controls include FICO score quartiles, borrower race, and log(income). OTSC=1 if the lender was subject to the OTSC in any state. During=1 if the loan-month was during the moratorium period. Panel A provides the DDD estimator, Panel B provides a DD estimator across states within OTSC lenders, Panel C provides a DD estimator across lenders within New Jersey.

Table 7: The Moratorium Did Not Change Loss Mitigation, Full Payments, or Trial Modifications

Dependent Variable	Loss Mitigation		Paid in Full		Temp Mod	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A, DDD: All Loans						
During x NJ x OTSC	0.561 (0.274)	0.639 (0.340)	0.897 (0.0888)	0.861 (0.101)	0.690 (0.520)	1.020 (0.875)
Observations	626,053	483,799	632,806	489,107	632,024	488,662
Panel B, DD: OTSC Only						
During x NJ	0.571 (0.273)	0.667 (0.350)	0.914 (0.0906)	0.946 (0.111)	1.097 (0.827)	1.268 (0.994)
Observations	209,845	157,708	212,706	160,035	212,336	159,844
Panel C, DD: Loans in NJ Only						
During x OTSC	0.626 (0.290)	0.598 (0.305)	1.111 (0.114)	1.126 (0.136)	0.441 (0.411)	0.539 (0.541)
Observations	188,717	144,060	190,931	145,790	190,822	145,729
Controls	No	Yes	No	Yes	No	Yes

Source: CTS data December 2009 - July 2012. Conditional on loan being delinquent as of the first period (December 2009). Notes: Hazard rates presented with robust standard errors clustered at the loan-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each observation is a loan-month. Columns (1)-(2) dependent variable signifies the loan went from delinquent to loss mitigation in the given period, and Columns (3)-(4) loans were paid in full in the given period. Loss mitigation does NOT include modifications. Columns (5)-(6) are temporary modifications defined as loans with one of the following: (1) a change from an ARM to a FRM in the given month (2) No payment in the last period and a balance reduction (3) a lowered interest rate (below 3%) on a FRM (4) a term extension AND did not have a formal modification. All models include MSA fixed effects, months delinquent in period one, log(home value), log(original loan balance), interest rate, ARM indicator. HMDA controls include FICO score quartiles, borrower race, and log(income). $NJ = 1$ if the loan is in New Jersey. $OTSC=1$ if the lender was subject to the OTSC in any state. $During=1$ if the loan-month was during the moratorium period. Panel A provides the DDD estimator, Panel B provides a DD estimator across states within OTSC lenders, Panel C provides a DD estimator across lenders within New Jersey.

Table 8: Hazard: The Moratorium Sped Up Self Cure Rates and Cure Rates that Exclude Paid in Full

Dependent Variable	Self Cure		Cure (No Full Payments)	
	(1)	(2)	(3)	(4)
Panel A, DDD: All Loans				
During x NJ x OTSC	1.466*** (0.188)	1.256 (0.175)	1.912*** (0.230)	1.680*** (0.217)
Observations	262,227	214,093	189,462	154,630
Panel B, DD: OTSC Only				
During x NJ	2.041*** (0.200)	1.853*** (0.193)	1.248** (0.114)	1.106 (0.106)
Observations	76,171	60,888	58,355	46,524
Panel C, DD: Loans in NJ Only				
During x OTSC	1.857*** (0.177)	1.889*** (0.193)	1.489*** (0.145)	1.417*** (0.146)
Observations	76,871	61,218	56,952	45,208
Controls	No	Yes	No	Yes

Source: CTS data December 2009 - July 2012. Conditional on loan being delinquent as of the first period (December 2009). Notes: Hazard rates presented with robust standard errors clustered at the loan-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each observation is a loan-month. Self cures are defined as loans that went from delinquent to current without a modification. All models include MSA fixed effects, months delinquent in period one, log(home value), log(original loan balance), interest rate, ARM indicator. HMDA controls include FICO score quartiles, borrower race, and log(income). $NJ = 1$ if the loan is in NJ. $OTSC = 1$ if the lender was subject to the OTSC in any state. $During = 1$ if the loan-month was during the moratorium period. Panel A provides the DDD estimator, Panel B provides a DD estimator across states within OTSC lenders, Panel C provides a DD estimator across lenders within New Jersey.

Table 9: Foreclosure Filings and Repossessions (REO) 3 Years After OTSC Announced (December 2013)

	Ever REO		Ever Foreclose	
	(1)	(2)	(3)	(4)
OTSC x NJ	-0.00398 (0.00580)	0.00126 (0.00682)	-0.0100 (0.0143)	-0.0130 (0.0148)
OTSC Servicer	-0.00756** (0.00316)	-0.00574 (0.00368)	-0.0541*** (0.00777)	-0.0272*** (0.00789)
Loan in NJ	0.00584 (0.00364)	0.00647 (0.00415)	0.00720 (0.00830)	0.0274*** (0.00861)
Controls	No	Yes	No	Yes
Observations	24,281	18,705	24,281	18,705

Source: CTS data reshaped to a cross section of loans that were active during the moratorium, followed for up to 3 years after the moratorium commenced. Data spans December 2010 - December 2013. Notes: OLS for last observed month. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Each observation is a cross section of loans in their final period, where data spans December 2013. All models include MSA fixed effects, months delinquent in period one, log(home value), log(original loan balance), interest rate, ARM indicator. HMDA controls include FICO score quartiles, borrower race, and log(income). $OTSC \times New\ Jersey$ equals one if the loan was serviced by a servicer subject to the moratorium and active in NJ. MSA dummies are also included in all models. $NJ = 1$ if the loan is in New Jersey a zero otherwise. $OTSC = 1$ if the servicer was subject to the moratorium in any state and zero otherwise. $During = 1$ if the month, year pairing was during the moratorium period and zero otherwise.

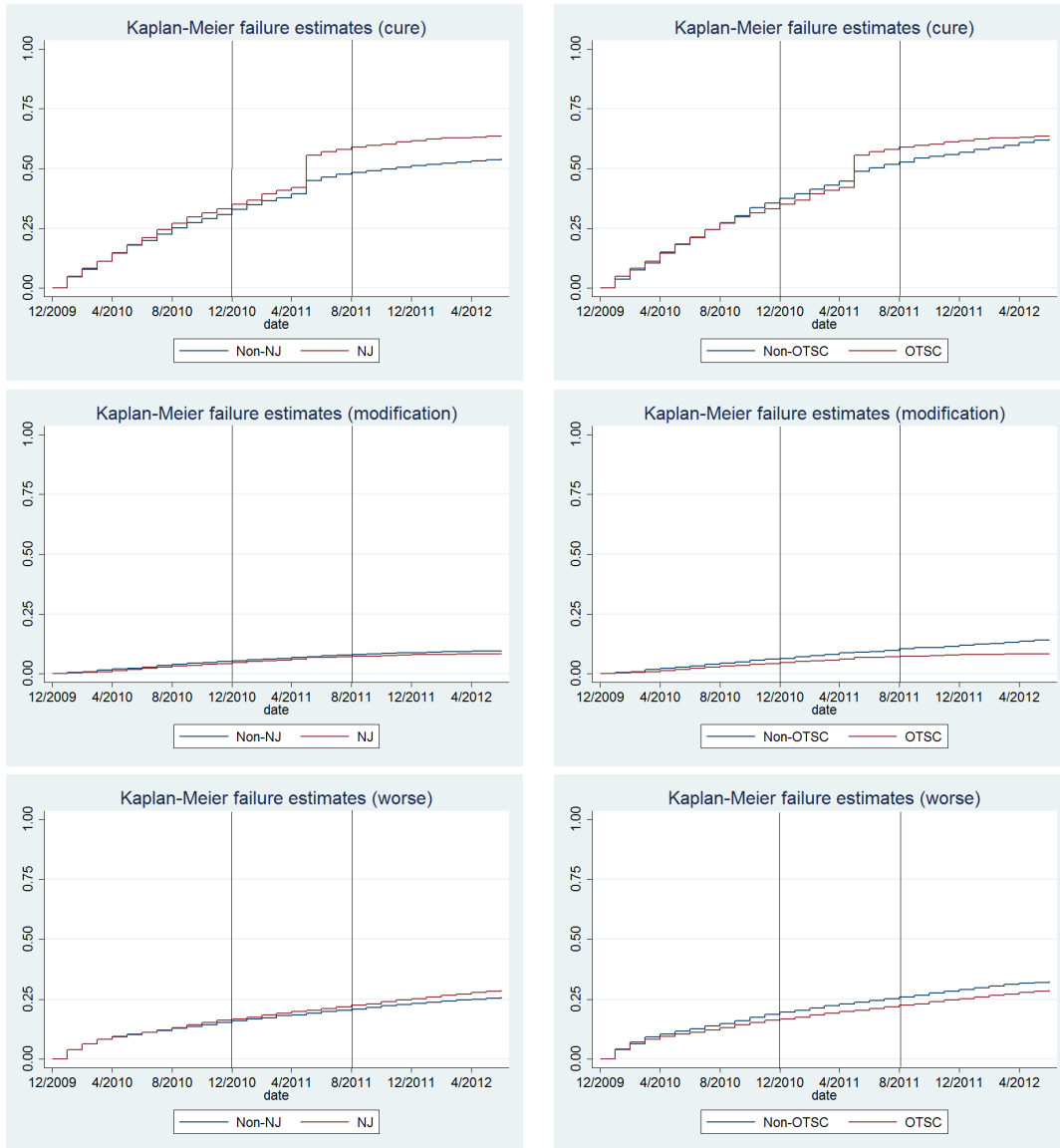
9. Appendix

Table 10: Hazard: Verifying the Pre-trends Assumptions

Dependent Variable	Cure		Modification	
	(1)	(2)	(3)	(4)
Panel A, DDD: OTSC in NJ				
$OTSC \times NJ \times 2009_{q4}$	1.162 (0.163)	1.007 (0.160)	0.626* (0.162)	0.778 (0.216)
$OTSC \times NJ \times 2010_{q1}$	1.020 (0.0182)	1.041* (0.0213)	1.001 (0.0926)	0.939 (0.0953)
$OTSC \times NJ \times 2010_{q3}$	1.187 (0.188)	1.222 (0.221)	0.887 (0.213)	0.920 (0.242)
$OTSC \times NJ \times 2010_{q4}$	0.923 (0.178)	0.937 (0.196)	1.066 (0.289)	1.055 (0.318)
Observations	121,745	98,844	296,939	226,667
Panel B, DD: OTSC Only				
$NJ \times 2009_{q4}$	0.856 (0.152)	0.782 (0.159)	0.898 (0.267)	1.064 (0.350)
$NJ \times 2010_{q1}$	0.954 (0.175)	0.994 (0.207)	1.414 (0.387)	1.712* (0.513)
$NJ \times 2010_{q2}$	0.799* (0.108)	0.825 (0.128)	1.308 (0.299)	1.172 (0.298)
$NJ \times 2010_{q4}$	0.824 (0.176)	0.881 (0.209)	1.042 (0.307)	0.791 (0.260)
Observations	34,741	27,270	99,891	73,449
Panel C, DD: Loans in NJ Only				
$OTSC \times 2009_{q4}$	1.104 (0.190)	0.995 (0.197)	0.772 (0.235)	0.869 (0.285)
$OTSC \times 2010_{q1}$	0.957 (0.168)	0.956 (0.190)	1.228 (0.350)	1.418 (0.440)
$OTSC \times 2010_{q2}$	1.045 (0.135)	0.987 (0.146)	0.758 (0.165)	0.752 (0.178)
$OTSC \times 2010_{q4}$	0.762 (0.155)	0.773 (0.174)	0.967 (0.295)	1.074 (0.363)
Observations	37,031	29,388	90,589	68,477
Controls	No	Yes	No	Yes

Source: CTS data December 2009 - December 2010. Conditional on loan being delinquent as of the first period (December 2009). Notes: Hazard rates presented for panel with robust standard errors clustered at the loan-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each observation is a loan-month. All models include MSA fixed effects, months delinquent in period one, log(home value), log(original loan balance), interest rate, ARM indicator. HMDA controls include FICO score quartiles, borrower race, and log(income). $NJ = 1$ if the loan is in NJ. $OTSC=1$ if the lender was subject to the OTSC in any state. $Post=1$ if the loan-month was during or after the moratorium period. Panel A provides the DDD estimator, Panel B provides a DD estimator across states within OTSC lenders, Panel C provides a DD estimator across lenders within New Jersey. Combines the period during and the period after the moratorium.

Figure 6: DD Plots: New Jersey only (across OTSC), and OTSC only (across states)



Notes: The figures above show Kaplan-Meier failure functions for cures (row 1), modifications (row 2), and when loans moving to worsened delinquency status (row 3). The first column presents DD trends across OTSC and non-OTSC lenders within New Jersey only. The second column presents DD trends across New Jersey and border state lenders within OTSC lenders only.

Table 11: The Moratorium Sped Up Cure Rates but not Modifications, DDD (Shared Frailty)

Dependent Variable	Cure		Modification	
	(1)	(2)	(3)	(4)
During x NJ x OTSC	1.464*** (0.154)	1.494*** (0.159)	1.268 (0.219)	0.997 (0.173)
Number of loans	28,448	28,448	28,448	28,448
Observations	189,510	189,510	526,224	526,224
Model	County Shared Frailty	Servicer Strata	County Shared Frailty	Servicer Strata

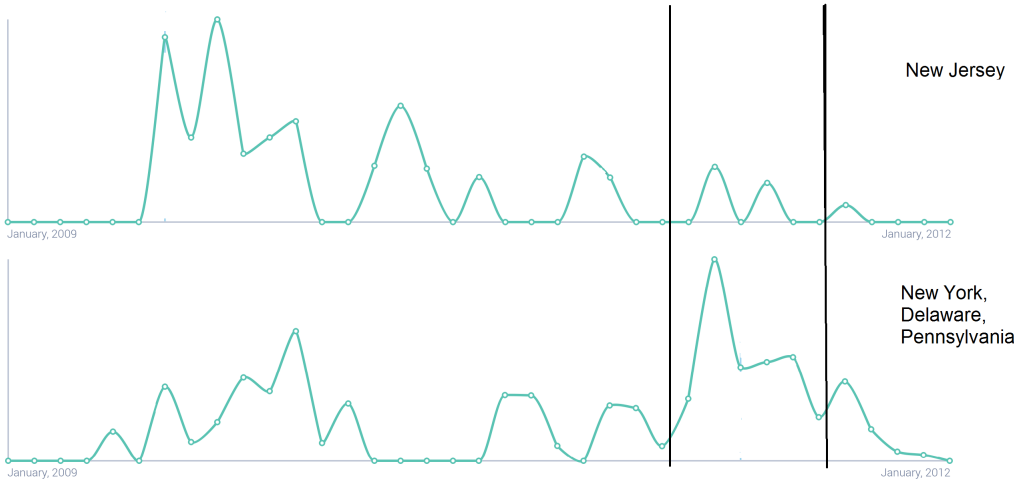
Source: CTS data December 2009 - July 2012. Conditional on loan being delinquent as of the first period (December 2009). Notes: Hazard rates presented with robust standard errors clustered at the loan-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each observation is a loan-month. All models include months delinquent in period one, log(home value), log(original loan balance), interest rate, ARM indicator. $NJ = 1$ if the loan is in New Jersey. $OTSC=1$ if the lender was subject to the OTSC in any state. $During=1$ if the loan-month was during the moratorium period. Results are from DDD specifications.

Table 12: Hazard Without May 2011: The Moratorium Sped Up Cure Rates but not Modifications (Removing May, 2011)

Dependent Variable	Cure		Modification	
	(1)	(2)	(3)	(4)
Panel A, DDD: All Loans				
During x NJ x OTSC	1.541*** (0.153)	1.405*** (0.152)	1.247 (0.212)	1.328 (0.249)
Number of loans	28,448	21,862	28,448	21,862
Observations	183,860	150,014	507,240	387,201
Panel B, DD: OTSC Only				
During x NJ	1.371*** (0.107)	1.255*** (0.107)	0.912 (0.146)	0.979 (0.175)
Number of loans	11,464	8,771	11,464	8,771
Observations	56,853	45,321	181,193	135,024
Panel C, DD: Loans in NJ Only				
During x OTSC	1.325*** (0.104)	1.284*** (0.110)	1.039 (0.158)	0.960 (0.160)
Number of loans	8,752	6,666	8,752	6,666
Observations	55,260	43,887	154,598	116,746
Controls	No	Yes	No	Yes

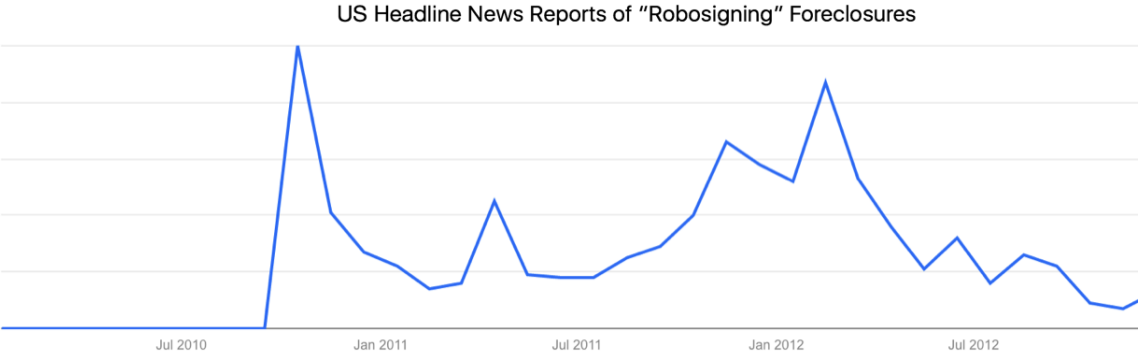
Source: CTS data December 2009 - July 2012. Conditional on loan being delinquent as of the first period (December 2009), removing May, 2011. Notes: Hazard rates presented with robust standard errors clustered at the loan-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each observation is a loan-month. All models include MSA fixed effects, months delinquent in period one, log(home value), log(original loan balance), interest rate, ARM indicator. HMDA controls include FICO score quartiles, borrower race, and log(income). $NJ = 1$ if the loan is in New Jersey. $OTSC=1$ if the lender was subject to the OTSC in any state. $During=1$ if the loan-month was during the moratorium period. Panel A provides the DDD estimator, Panel B provides a DD estimator across states within OTSC lenders, Panel C provides a DD estimator across lenders within New Jersey.

Figure 7: Social Media During OTSC Do Not Show Heightened Discussions of Foreclosure Counseling in New Jersey Relative to Neighboring States



Source: atlas.infegy.com. Infegy Atlas internet search for New Jersey New York, Delaware, Pennsylvania Jan 2009-Dec 2012 for online discussions of 'default OR mortgage OR foreclosure AND counseling' normalized by online population. Filtered for spam to measure mentions and discussions.

Figure 8: News Reports of Robosigning Peak in 2011-2012



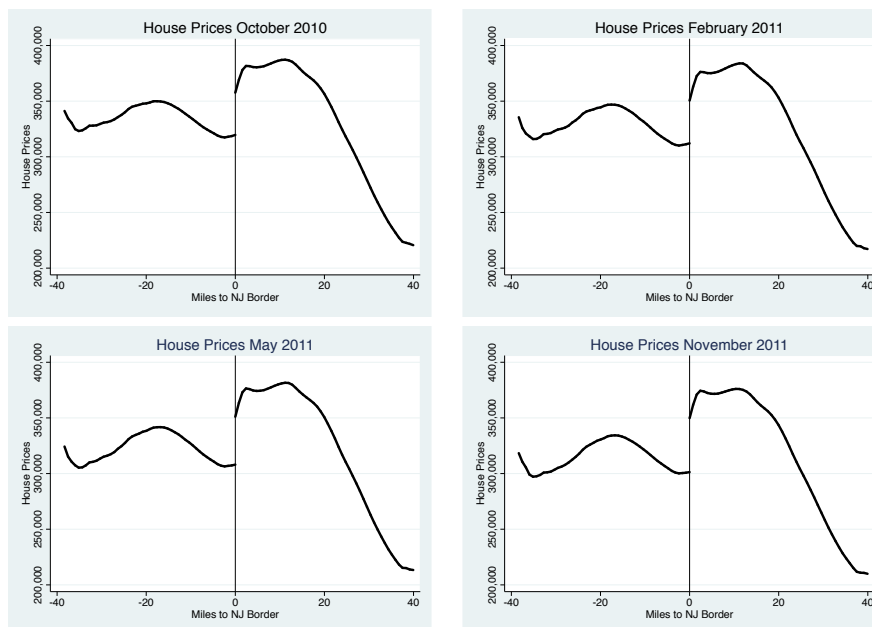
Source: Google Trends news search.

9.1 House Prices and the Moratorium

Concern may arise that the moratorium changed house prices at the border. To alleviate this concern, we replicate the methods of Mian, Sufi and Trebbi (2015) and look at how house prices change discretely at the border in the month before the moratorium (November 2010), during the moratorium (February 2011), when the moratorium was *expected* to conclude (May 2011), and after the moratorium concluded (November 2011). We use data from Zillow that contains ZIP code-level monthly median house prices, paired with a regression discontinuity design (RD). The running variable of the RD is the distance to the New Jersey border, where we code New Jersey distances as negative. We determine the ZIP codes that lay on the New Jersey border and are traversable by roads. For example, many ZIP codes are closer as the crow flies to Delaware. However, there are no bridges to traverse, making these areas seem less comparable. We are careful to only consider areas on the border if there are roads connecting the states.

With the RD design, we determine the jump in house prices across New Jersey and the border states (DE, MD, NY, PA) to verify that the jump is consistently the same size across periods. This ensures that there is not something else discretely changing at the border during the moratorium. Indeed, this is what we find in both Figure 9. The jump is consistently the same size across time periods. We look at zip codes within 40 miles of the border. The optimal bandwidth chosen is roughly a 13 miles distance between zip code centroids, though these findings are robust to reducing the bandwidth by 50 percent. Table 13 confirms that the jumps in house prices found in Figure 9 are not statistically different from each other in size. Each confidence interval contains the estimates from the other periods and we cannot rule that out these magnitudes are the same. Also, none of these jumps are statistically different from zero.

Figure 9: Regression Discontinuity Estimates of House Price Changes over time



Notes: The figures above show regression discontinuity design (RD) estimates of the distance to the border on zip code level house prices from Zillow for the given month.

Table 13: The Moratorium Did Not Change House Prices

	Dependent Variable =HPI			
	Nov 2010	Feb 2011	May 2011	Nov 2011
	(1)	(2)	(3)	(4)
Non-NJ	38,007.33	38,425.6	43,044.98	48,462.04
	(34137.47)	(34283.01)	(35148.87)	(35596.98)
95% CI	(-28901, 104916)	(-28768, 105619)	(-25846, 111936)	(-21307, 118231)
ZIP Codes	2,122	2,122	2,122	2,122

Source: Zillow Home Value Index data by ZIP code, month December 2006 - July 2012. Any OTSC loans from CTS data and determined monthly at the ZIP code level. Notes: RD model presented with standard errors in parenthesis.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Each observation is a ZIP code.